

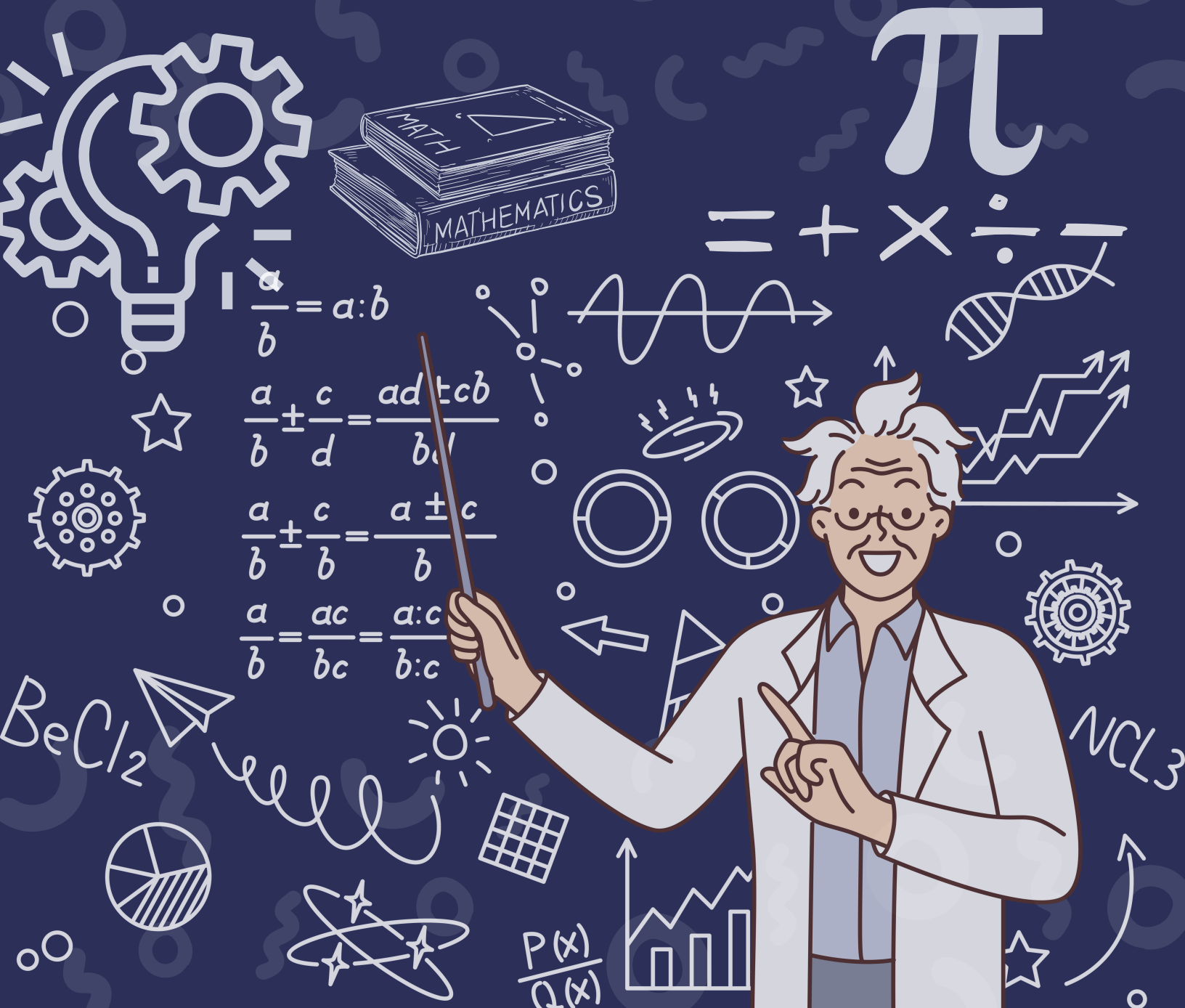


CAMPUS RECRUITMENT TRAINING

APTITUDE

QUESTIONNAIRE

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Author Profile

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With a passion for education and a dedication to helping students succeed, G Sandhya Rani has been involved in the field of campus recruitment training for aptitude for over 9 years. Holding a M.Sc in Mathematics, G Sandhya Rani combines academic expertise with practical experience to deliver effective training programs tailored to the needs of aspiring professionals.

Throughout her career, G Sandhya Rani has worked with numerous educational institutions, corporate organizations, and individuals, providing them with valuable insights and strategies to excel in aptitude tests commonly used in campus recruitment processes. She understands the importance of mastering aptitude skills in today's competitive job market and is committed to empowering students with the knowledge and confidence needed to succeed. As an author, G Sandhya Rani has penned several insightful articles, guides, and books focusing on various aspects of aptitude training, ranging from mathematical proficiency to logical reasoning and critical thinking. Her publications have been widely acclaimed for their clarity, depth, and practicality, making her a trusted resource among students, educators, and recruiters alike.

In addition to her writing endeavors, G Sandhya Rani is a sought-after speaker and trainer, regularly conducting workshops, seminars, and interactive sessions on aptitude development. She employs innovative teaching methodologies and engaging activities to ensure maximum comprehension and retention among participants. With a mission to bridge the gap between academic knowledge and real-world application, G Sandhya Rani remains dedicated to empowering individuals with the skills and confidence necessary to thrive in today's competitive employment landscape.

PREFACE

Welcome to "Campus Recruitment Training - Aptitude"!

In today's fiercely competitive job market, excelling in aptitude tests is crucial for securing coveted positions in top companies. Whether you're a fresh graduate stepping into the professional world or a seasoned job seeker aiming for career advancement, mastering aptitude skills is essential for success.

This book is your comprehensive guide to mastering the intricate art of aptitude testing. Designed specifically for students and professionals preparing for campus recruitment processes, it covers a wide range of topics essential for acing aptitude tests conducted by leading companies worldwide.

Each chapter of this book is meticulously crafted to provide you with in-depth insights, practical tips, and hands-on exercises to enhance your aptitude skills. From numerical reasoning and logical reasoning to verbal aptitude and data interpretation, every aspect is covered to ensure you're well-equipped to tackle any aptitude test thrown your way.

But this book is more than just a collection of practice questions and solutions. It's a strategic tool to help you understand the underlying principles behind each type of aptitude question, empowering you to approach them with confidence and precision. Whether you're navigating through complex mathematical problems or unraveling intricate patterns in logical reasoning, you'll find step-by-step explanations and expert guidance to steer you toward the right answers.

As you embark on this journey to master aptitude skills, remember that perseverance and practice are key. Rome wasn't built in a day, and neither is mastery of aptitude. But with dedication, determination, and the right resources at your disposal, you can conquer even the most daunting aptitude tests and emerge victorious in your quest for professional success.

So, whether you're gearing up for campus placements, job interviews, or competitive exams, let this book be your trusted companion on your journey to aptitude excellence. Let's embark on this exciting adventure together and unlock the doors to a world of endless opportunities.

Best of luck!

G Sandhya Rani

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AVERAGE

1. The average of first 47 natural numbers is :
a)23 b) 24 c) 25 d) 47
2. If the average of five consecutive numbers is 23, find the smallest number.
a)20 b) 21 c) 22 d) 25
3. If sum of 3 consecutive odd numbers is 63, find the first term.
a)19 b) 21 c) 22 d) 23
4. Average of first five multiples of 3 is :
a)12 b) 15 c) 18 d) 21
5. The average age of 25 students of a class is 13 years. If the age of teacher is also included, the average age is increased by 2 years. Find the age of the teacher?
a)65 yrs. b) 75 yrs c) 85 yrs d) 95 yrs
6. Average age of 6 persons is decreased by 1 year when one new person is included in the group. Find the age of new man, if average age of 6 persons was 39 years.
a)32 yrs. b) 33 yrs c) 38 yrs d) 40 yrs
7. The average marks obtained by a group of 10 students is 41 marks . Find the new average if a new student who scored 63 marks is also included in the group.
a)39 b) 40 c) 43 d) 45
8. Average age of 7 members of a family is 29 years. If present age of the youngest member is 5 years , find the age of the remaining members at the time of birth of the youngest member:
a)22 years b) 24 year c) 26 years d) 28 years
9. 4 years ago, the average age of 5 members of a family was 22 years, A baby having been born, the average age of the family is the same today. Find the age of the baby:
a)2 yrs. b) 3 yrs. c) 5 yrs. d) 17 yrs.
10. The average weight of 24 students of section A of a class is 72 kg where as the average weight of 26 students of section B of the same class is 80 kg. Find the average weight of all the 50 students of the class?
a)76 kg b) 76.16 kg c) 79 kg d) none
11. The average monthly expenditure of a family was Rs. 1,050 during first 3 months ; Rs. 1.260 during next 4 months; and Rs. 1.326 during last 5 months of the year. If the total savings during the year be Rs. 720, find average monthly income.
a)1390 Rs b) 1395 Rs c) 1670 Rs d) none

12. The average weight of 10 oarsmen in boat is increased by 1.5 kg when one of the crew, who weighs 68 kg is replaced by a new man. Find the weight of the new man?
 a)83 kg b) 90 kg c) 60 kg d) none
13. The average of 5 consecutive number is n. If the next two numbers are also included, the average will.
 a)Increase by 1 b) remain the same
 c) increase by 1.4 d) increase by 2
14. The average age of a committee of 8 members is 40 years .A members, aged 55 years ,retired and he was replaced by a member aged 39 years. The average ago of the present committee is:
 a)39 years b)38 years c)36 years d) 35 years
15. In the first 10 over's of a cricket game, the run rate was only 3.2. What should be the run Rate in the remaining 40 over's to reach the target of 282 runs?
 a)6.25 b)6.5 c)6.75 d)7
16. A family consists of grandparents, parents and three grandchildren. The average age of the Grandparents are 67 years, that of the parents is 35 years and that of the grandchildren is 6years. What is the average age of the family?
 a)284/7years b)31 5/7years c)32 1/7years d)None of these
17. A grocer has a sale of Rs. 6435, Rs. 6927, Rs. 6855, Rs. 7230 and Rs. 6562 for 5 consecutive months. How much sale must he have in the sixth month so that he gets an average sale of Rs. 6500?
 a)Rs. 4991 b) Rs. 5991 c)Rs. 6001 d)Rs.6991
18. The average weight of 8 person's increases by 2.5 kg when a new person comes in place of one of them weighing 65 kg. What might be the weight of the new person?
 a)76kg b)76.5 kg c)85 kg d) Data inadequate
19. The captain of a cricket team of 11 members is 26 years old and the wicket keeper is 3 years older. If the ages of these two are excluded, the average age of the remaining players is one year less than the average age of the whole team. What is the average age of the team?
 a)23 years b)24 years c)25 years d)None of these
20. The average monthly income of P and Q is Rs. 5050. The average monthly income of Q and R is Rs. 6250 and the average monthly income of P and R is Rs, 5200. The monthly income of P is:
 a)3500 b)4000 c)4050 d)5000

21. The average age of husband, wife and their child 3 years ago was 27 years and that of wife and the child 5 years ago was 20 years. The present age of the husband is:
 a)35 years b)40 years c)50 years d)None of these
22. A car owner buys petrol at Rs.7.50, Rs.5 and Rs. 8.50 per liter for three successive years. What approximately is the average cost per liter of petrol if he spends Rs. 4000 each year?
 a)Rs. 7.98 b)Rs. 8 c)Rs. 8.50 d)Rs. 9
23. In Arun's opinion, his weight is greater than 65 kg but less than 72 kg. His brother does not agree with Arun and bethinks that Arun's weight is greater than 60 kg but less than 70kg. His mother's view is that his weight cannot be greater than 68 kg. If all are them are correct in their estimation, what is the average of different probable weights of Arun?
 a)67 kg. b)68 kg. c)69 kg. d)Data inadequate
24. A library has an average of 510 visitors on Sundays and 240 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is:
 a)250 b)276 c)280 d)285
25. A pupil's marks were wrongly entered as 83 instead of 63; Due to that the average marks for the class got increased by half. The number of pupils in the class is:
 a)10 b)20 c)40 d)73

Excercise2(Higher skill level Questions)

1. The average number of shirts with A,B and C IS 60, if all of them reached a shopping mall in Hyderabad and purchased 6 shirts each of them then the average number of shirts each of now has:
 a)66 b) 63 c) 62 d) can't be determined
2. A, B, C, D, E, F is the only six families in Indiranagar. A, B, C, D, E and F have 7,8,10,13,6 and 10 members in their families respectively. If 1 member from all the six families left their respective families to accommodate themselves in the hostel of IIM Lucknow., then the average number of members of now in each family of Indiranagar is:
 a)8 b) 9 c) 10 d) 13
3. The number of students at 4IIM in morning batch, evening batch and weekends batch is 30,40 and 60 respectively and their respective average ages (in year) are 22,21 and 25, then the average age of all the students(combined) is:
 a)22 $\frac{1}{3}$ years b) 23 $\frac{1}{3}$ years c) 24.4 years d) None of these

4. 6 months ago the present age of the student of class 10th was 14 years. 6 months hence, the age of the same students will be:
 a) 15 years b) $15\frac{1}{2}$ years c) 20 years d) None of these
5. The average age of priyambada's family consisting of 5 members 3 years ago was 35 years. One year ago a new baby was born in this family. Three years hence the average age of the family will be:
 a) 36 years b) $34\frac{5}{6}$ years c) $35\frac{4}{5}$ years d) None of these
6. 10 years ago the average age of all the 25 teachers of the Girls College was 45 years. 4 years ago, the principal has retired from her post at the age of 60 year. So after one year a new principal whose age was 54 years recruited from outside. The present average age of all the teachers is, if principal is also considered as a teacher;
 a) $54\frac{18}{25}$ years b) $55\frac{17}{25}$ years c) $49\frac{1}{2}$ years d) None of these
7. The average salary of all the 60 employees in an office is Rs.12, 000 per month. If the number of executives is twice the number of non executives employees, then the average salary of all the non executive employees is ;
 a) Rs 9000 b) Rs 8000 c) Rs 6000 d) can't be determined
8. Columbus started his journey from Lucknow to Kolkata, which is 200 km, at the speed of 40 km/hr then he went to Bangalore which is 300 km, at the speed of 20 km/hr. Further he went to Ahmedabad which is 500 km, at the speed of 10 km/hr. The average speed of Columbus is:
 a) $14\frac{2}{7}$ km/hr b) $14\frac{5}{7}$ km/hr c) 15.6 km/hr d) None of these
9. The average weight of all the 11 players of Indian cricket team is 50 kg. If the average of first six lightest weight players is 49 kg and that of the six heaviest players is 52 kg. The average weight of the player which lies in the sixth position in the list of players when all the 11 players are arranged in the order of increasing or decreasing weights:
 a) 56 kg b) 52 kg c) 51 kg d) None of these
10. The average weight of a class of 20 students is 45 kgs. A new student whose weight is 40 kgs replaces an old student of this class. Hence, the average weight of the whole class decreases by 1 kg. The weight of the replaced student is ;
 a) 55 kgs b) 50 kgs c) 60 kgs d) None of these

11. Pankaj went to the post-office at the speed of 60 km/hr while returning for his home he covered the half of the distance at the speed of 10 km/hr, but suddenly he realized that he was getting late so he increased the speed and reached the home by covering rest half of the distance at the speed of 30 km/hr. the average speed of the Pankaj in the whole length of journey is :
- a) 5.67 km/hr b) 24 km/hr c) 22.88 km/hr d) 5.45 km/hr
12. A travel agency has three types of Vehicles i.e. four seaters, auto rickshaw, 10 seaters maxi cab and 20 seaters minibus. The rate of each passenger (irrespective of its age or weight or seniority) for the auto rickshaw is Rs.12 and for the maxi cab is rs.15 and for the minibus is Rs.8 for the one round . the average occupancy of the seats is 100%, 80% and 75% respectively/ If he has only one vehicle of each kind, then the average earning for one round of each vehicle is:
- a) Rs 96 b) Rs.90 c) Rs.86 d) Rs.70
13. In a MOCK CAT 123 students appeared and the average score obtained was 120. But later it was found that the top three students were repeaters, so their score has been eliminated and then the new average score was found to be decreased by 1.5. Also, it is known that all the students obtained the marks in integers and the scores of the toppers were distinct. If the second highest topper has scored more than 185 marks, then the highest possible score of the third highest topper is :
- a) 166 b) 167 c) 168 d) 170
14. There are two houses in parliament. One like Lok sabha and the other one is Rajya sabha and the member of parliaments in both the houses is 300 and 200 respectively. The average age of the members of Lok sabha and Rajya sabha is 40 years and 50 years respectively. A member of the Rajya sabha when elected for the Lok sabha also, he left the Rajya sabha and becomes the member of the Lok sabha. Thus the average age of both the houses increases. Which one of the following statement is true?
- a) The age of this member is greater than 50 years.
 b) The age of this member is less than 40 years.
 c) The age of this member is greater than 40 but less than 50 years.
 d) None of these.

RATIO AND PROPORTION

1. What is the ratio of 5 liters to 50 ml?
 1) 10: 1 2) 1 : 10 3) 100: 1 4) none of these
2. What is the ratio of 0.3 m to 50 cm?
 1) 6:1 2) 3 : 2 3) 3:5 4) 1 : 6
3. Find the ratio of 0.5 of Rs. 5.00 to $\frac{3}{4}$ of Rs: 6.00.
 1) 2:9 2) 5 : 9 3) 7:1 4) 5 : 6
4. Find the ratio of 0.20 of 0.06 m to $\frac{1}{3}$ of 0.30 cm.
 1) 5:6 2) 6 : 5 3) 3 : 25 4) 12 : 1
5. If $x : y = 3 : 5$, then $(3x + 5y) / (5y - 3x) =$
 1) 3 : 2 2) 2 : 1 3) 4: 1 4) 3 : 1
6. If $y / x = 0.20$, find $(2x + 5y) / (2x - 5y)$
 1) 3: 1 2) 4 : 5 3) 7 : 9 4) 7: 13
7. If $(x - y) : (x + y) = 1 : 2$, then $(x^2 - y^2) / (x^2 + y^2) =$
 1) 6:1 2) 4 : 5 3) 1 : 6 4) none of these
8. If $(x - y) : (x + y) = 2 : 3$, then $(x^3 - y^3) / (x^3 + y^3) =$
 1) 19:35 2) 35 : 19 3) 5 : 6 4) none of these
9. $x : y = 2 : 5$, then $(x^3 - y^3) / (xy^2 - x^2y) =$
 1) 65 : 6 2) 13 : 6 3) 5 : 2 4) none of these
10. In a ratio that is equal to 5: 8. find the consequent if the antecedent is 40.
 1) 72 2) 32 3) 64 4) 48
11. If $(19x^3 - 11y^3) / (5y^3 - 51x^3) = 0.3$, then $(x + y) / (y - x) =$
 1) 1 : 6 2) 4: 3 3) 6 : 1 4) 5 : 2
12. In a ratio that is equal to 7: 9, find the antecedent if the consequent is 42.
 1) 45 2) 54 3) 63 4) none of these
13. Express 729: 81 in terms of lowest ratio.
 1) 8:1 2) 7:2 3) 8:3 4) 9 : 1
30. The ratio of spirit and water in a spirit solution is 5 : 2. If 4 litres of water is added to the solution, the ratio of spirit to water is 3 : 2. Find the quantity of spirit present in the new solution?
 1) 20 litres 2) 15 litres 3) 10 litres 4) 12 litres
31. In a mixture of 25 litres, the ratio of milk to water is 4:1, How many litres of water is to be added to make the ratio of milk to water 2:1.
 1) 4 litres 2) 5 litres 3) 10 litres 4) 15 litres

32. Find the ratio of the two numbers whose sum is 50 and difference is 5.
1) 9 : 7 2) 7 : 5 3) 5 : 2 4) 11 : 9
33. Find the sum of the numbers if the ratio of the numbers is 4 : 5 and their difference is 2
1) 90 2) 100 3) 150 4) 180
34. Find the ratio of the numbers if their sum and product is 96 and 1728 respectively.
1) 1 : 3 2) 2 : 3 3) 4 : 5 4) none of these
35. Find the least number, if the LCM of the two numbers is 200 & the ratio of the numbers is 4 : 5.
1) 50 2) 25 3) 100 4) none of these
36. 0.6 of a first number is equal to 0.09 of the second number. What is the ratio of the first number to the second number?
1) 3 : 20 2) 4 : 11 3) 5 : 9 4) 3 : 16
37. If 10% of x is the same as 20% of y find x : y.
1) 2 : 1 2) 3 : 1 3) 3 : 2 4) 4 : 1
38. If $\frac{1}{5} : \frac{1}{x} = \frac{1}{x} : \frac{1}{1.25}$ find the value of x.
1) $\frac{7}{2}$ 2) $\frac{5}{2}$ 3) 3 4) $\frac{3}{2}$
39. If $x : y = 2 : 3$ and $2 : x = 1 : 2$ find the value of y.
1) 5 2) 12 3) 6 4) 8
40. Two numbers are in the ratio 3 : 5. If each number is increased by 10 the ratio becomes 5 : 7. Find the numbers.
1) 15,20 2) 20,25 3) 25, 15 4) None of these
41. Two numbers are in the ratio 6:5. If each number is decreased by 5 the ratio becomes 5 : 4. Find the numbers.
1) 18, 15 2) 24,20 3) 12: 10 4) 30,25
42. Two numbers are in the ratio 4 : 3. Find the smallest number that is to be added to the terms of the ratio so that the resultant ratio will be 6 : 5.
1) 4 2) 2 3) 3 4) 1
43. The ratio of the number of boys to girls in a class is 2 : 3. If there were 25 more girls in the class then the ratio would have been reversed. Find the number of girls in the class initially.
1) 15 2) 30 3) 45 4) 20
44. Two numbers are in the ratio 4 : 5. Find the number that is to be subtracted from the terms of the ratio so that the resultant ratio will be 3 : 4.
1) 2 2) 1 3) 3 4) none of these
45. The ratio of the ages of A and B is 3 : 4. If A is eight years younger than B. find the ages of A and B (in years).

- 1) 16, 24 2) 24, 32 3) 32, 40 4) 28, 36
46. The ratio of the present ages of A and B are in the ratio 4:1. After 5 years the ratio would be 5 : 2. Find the present age of A.
 1) 15 years 2) 25 years 3) 20 years 4) 30 years
47. The ratio of the present ages of A and B are in the ratio 2:1. Four years earlier, the ratio was 3 : 1. What is the present age of A?
 1) 12 years 2) 16 years 3) 20 years 4) 24 years
48. The ratio of the age of a father (K) that of his son is 5 : 2. If the difference in their ages is 24 years, find their ages.
 1) 36 years, 12 years 2) 40 years, 16 years
 3) 50 years, 26 years 4) none of these
49. The ratio of the ages of two persons is 4 : 3. If their average age is 21 years, find the age of the youngest person.
 1) 16 years 2) 18 years 3) 24 years 4) 15 years
50. The ratio of the present ages of two persons A and B is 3 : 5. Six years ago, the sum of their ages was four years more than twice the present age of A. Find the present age of B.
 1) 24 years 2) 40 years 3) 32 years 4) 48 years
51. The ratio of the students to lecturers in a college is 30 : 1. If three more lecturers are appointed, the number of lecturers to students become 1 : 25. Find the number of students in the college.
 1) 300 2) 450 3) 150 4) 225
52. There are two contestants in an election. The number of votes received by them are in the ratio 3 : 4. If one of the contestant lost the election by 12,000 votes, find the numbers of votes got by the winning candidate.
 1) 36,000 2) 24,000 3) 60,000 4) 48,000
53. The incomes of two persons are in the ratio 3 : 5. If the sum of their salaries is Rs. 24,000. Find the difference of their salaries.
 1) Rs. 5, 000 2) Rs. 6, 000 3) Rs. 7, 500 4) Rs. 8,000
54. If A : B = 2 : 3 and B : C = 4 : 5 find C : A.
 1) 8 : 15 2) 15 : 8 3) 12 : 8 4) 8 : 12
55. If A : B = 7 : 9 and B : C = 3 : 5 find A : B : C.
 1) 7 : 9 : 15 2) 7 : 27 : 5 3) 7 : 9 : 13 4) 7 : 10 : 13
56. If $A = B/3$ and $B = C/2$ find A : B : C.
 1) 1 : 2 : 4 2) 2 : 3 : 4 3) 1 : 3 : 4 4) 1 : 3 : 6
57. If $2A = 3B = 4C$ find A : B : C.

- 1) 7:5:3 2) 6:4:3 3) 4 : 3 : 2 4) None
58. If $2A - 3B$ and $4B = 5C$ find A: C.
 1) 15: 8 2) 8: 15 3) 8 : 10 4) 8 : 13
59. If one third of A, one fourth of B and one fifth of C are equal, find A: B: C.
 1) 1:3:5 2) 3:5: 7 3) 3:4:5 4) none
60. The ratio of the marks of A and B is 5 : 6. B and C is 4 : 5. How many marks did B get if the total marks of A. B and C are 210?
 1) 50 2) 60 3) 70 4) 40
61. The ratio of the three numbers is 3 : 4 : 5. If the difference of the squares of the largest and the smallest is 256, find the numbers.
 1) 12, 8, 10 2) 8, 15,20 3) 6, 10, 12 4) 12, 16, 20
62. The ratio of the three number! is 2:3: 5. If the sum of the squares of the numbers is 950. Find the largest number.
 1) 25 2) 10 3) 15 4) 20
63. An amount of Rs. 29. 500 is divided among A. B and C in the ratio $\frac{1}{5} : \frac{3}{4} : 2$. Find share of B.
 1) Rs. 6000 2) Rs. 6, 500 3) Rs. 7,500 4) none of these
64. In an office, the salary of the attender is one-third of the salary of the officer, and the salary of the officer is $\frac{5}{3}$ of the salary of the typist. If the sum of their salaries for a month is Rs. 29,000, find the annual salary of the typist (if they draw salary for all the months).
 1) Rs. 96,000 2) Rs. 1,44,000 3) Rs. 84,000 4) Rs. 1, 08,000
65. A certain amount is divided among three persons A, B and C in the ratio 4:7:3. If B's share is Rs. 3600 more than that of C, find the share of A.
 1) Rs. 3,600 2) Rs. 2,400 3) Rs. 4, 800 4) Rs. 8, 400
66. A certain amount is divided among three persons A. B and C. The ratio of the shares of A and B is 5 : 9, and the ratio of the shares of C and A is 3 : 4. If the amount with C is Rs. 45, 000, what is the total amount?
 1) 1,96,000 2) Rs. 2. 13.000 3) Rs. 1,56.000 4) none of these
67. The ratio of amounts with three persons is 2 : 4 : 5. If each of these amounts is increased by Rs. 500 the ratio changes to 3 : 5 : 6. Find the amount with A initially.
 1) Rs. 1, 500 2) Rs. 1, 000 3) Rs. 2. 500 4) Rs. 2. 000
68. The monthly salaries of three persons A, B and C are in the ratio 1:2:3. If the difference between the salaries of A and B is Rs. 3. 000, difference between the salaries of C and A is
 1) Rs. 3, 000 2) Rs. 4. 000 3) Rs. 5, 000 4) Rs. 6. 000

69. An amount of Rs. 1,32,000 is divided among A, B and C in such a way that the share of A to that of the shares of B and C together is 3 : 8. Find the share of A.
 1) Rs. 24,000 2) Rs. 36,000 3) Rs. 36,000 4) data inadequate
70. In the above problem, find the share of C.
 1) Rs. 48,000 2) Rs. 72,000 3) Rs. 60,000 4) data inadequate
71. The ratio of the ages of A, B and C is 2 : 3 : 5. If their average age is 30 years, find the difference between the age of the eldest and the youngest person.
 1) 16 years 2) 32 years 3) 27 years 4) 21 years
72. The ratio the present ages of three persons is 5 : 7 : 3. After 10 years, the sum of their ages will be nine years more than six times the present age of the youngest person. Find the present age of the eldest person.
 1) 35 years 2) 42 years 3) 49 years 4) 63 years
73. The number of votes received by the three contestants A, B and C in an election are in the ratio 2:5:7. If the number of votes polled for A is 15,300 less than the number of votes polled for C, find the number of votes polled for B.
 1) 36,000 2) 24,000 3) 15,300 4) 48,000
74. An amount of Rs. 1,26,000 is divided between A, B and C in such a manner that for every Rs. 5 A gets, B gets Rs. 7 and C gets Rs. 9. Find the difference in the shares of A and B.
 1) Rs. 15,000 2) Rs. 24,000 3) Rs. 12,000 4) Rs. 18,000
75. If A : B = 2 : 3, B : C = 4 : 5 and C : D = 6 : 7 find A : D.
 1) 16 : 24 2) 16 : 30 3) 16 : 35 4) 24 : 33
76. If $a : b = 3 : 5$, $c : d = 5 : 9$, find $f : d$.
 1) 15 : 45 2) 45 : 15 3) 15 : 25 4) can't be determined
77. Let an amount of Rs. 4,32,000 is divided among four persons A, B, C and D in the ratio $\frac{23}{4} : \frac{11}{2} : \frac{31}{2} : \frac{11}{4}$. Find the share of D.
 1) Rs. 50,000 2) Rs. 60,000 3) Rs. 40,000 4) Rs. 75,000
78. Four numbers are in the ratio 2:3:5:7. If the sum of the square of the numbers is 783. Find the largest number.
 1) 9 2) 12 3) 18 4) 21
79. Four numbers are in the ratio 1 : 2 : 3 : 4. If the sum of the cubes of the numbers is 800, find the difference between the largest and the smallest numbers.
 1) 4 2) 8 3) 6 4) 2
80. If A : B = 3 : 2, B : C = 4 : 5, C : D = 6 : 7, D : E = 1 : 2, find E : A.
 1) 2) 3) 4) 35 : 18
81. If A : B = 1 : 2, B : C = 3 : 4, C : D = 5 : 6, E : D = 7 : 8, F : E = 2 : 1. find A : F.

- 1) 20:24 2) 42 : 15 3) 21 : 42 4) 15 : 84
82. Find the mean proportional between 15 and 135.
 1) 45 2) 60 3) 75 4) 50
83. Find the third proportional to the numbers 25, 30.
 1) 42 2) 50 3) 36 4) 40
84. Find the fourth proportional to the numbers 10, 15, 20.
 1) 25 2) 40 3) 35 4) 30
85. $12 : 18 :: \text{_____} : 30$.
 1) 18 2) 24 3) 16 4) 20
86. If 12, x and 27 are in continued proportion, find the value of x.
 1) 15 2) 21 3) 16 4) 18
87. If 6, 12 and x are in continued proportion, find the value of x.
 1) 18 2) 15 3) 24 4) 30
88. Let a, b, c and d be in proportion. If the sum of the extremes is 23, sum of the means is 21, and product of the first two terms is 30. find the terms.
 1) 5,6, 15, 16 2) 5, 6, 16, 15 3) 5, 6, 15, 18 4) 5, 6, 12, 15
89. If an amount of Rs. 45, 000 is divided into two shares proportional to the numbers 4 and 5, what is the larger share?
 1) Rs. 25, 000 2) Rs. 30, 000 3) Rs. 35,000 4) none of these
90. If an amount of Rs. 76, 000 is divided into three shares proportional to the numbers 5, 6 and 8, find the difference between the largest and the smallest shares?
 1) Rs. 4000 2) Rs. 12,000 3) Rs. 8000 4) Rs. 10,000
91. Divide a number 1380 into three, parts, which are proportional to the fractions $\frac{2}{3}$, $\frac{4}{5}$, $\frac{5}{6}$.
 1) 350, 450, 580 2) 420, 460, 500 3) 400, 480, 500 4) 360, 480, 540
92. A bag contains 25 balls. If some of the balls are selected, which of the following cannot be the ratio of the selected and unselected Balls?
 1) 3:4 2) 5 : 2 3) 4 : 1 4) none of these
93. A stick 1.4 cm long casts a shadow 1.3 m long at the same time when a pole casts a shadow 5.2 m long. Find the length of the pole. .
 1.4.2m 2) 5.2m 3) 5.6m 4) 4.8m
94. The efficiencies of A, B and C are in the ratio 4:5:6. Find the ratio of the time taken by them to complete a work.
 1) 15 : 12: 10 2) 4:5:6 3) 12 : 15 : 20 4) 6 : 5 : 4

95. The incomes of A and B are in the ratio 4 : 5 and their expenditures are in the ratio 3 : 5. If each of them saves Rs. 2000. find the income of B.
 1) Rs. 7500 2) Rs. 7200 3) Rs. 9000 4) Rs, 8000
96. The incomes of A and B are in the ratio 5 : 6 and their expenditures are in the ratio 3 : 4. If B and A save Rs. 4500 and Rs. 4000 respectively, find the income of B.
 1) Rs. 6, 000 2) Rs. 7,500 3) Rs. 5,000 4) Rs. 6, 250
97. The salaries of two persons A and B two years ago are in the ratio 3 : 4. The ratio of their salaries increased in the ratio 1 : 3 and 3 : 5 respectively. Find the salary of A (at present), if the sum of their monthly salaries at present is Rs. 23, 500.
 1) Rs. 12500 2) Rs.10500 3) Rs.14500 4) None of these
98. An amount of Rs. 21, 000 is divided among 34 persons, men and women, in the ratio 4 : 3. If the share of a man and a woman is in the ratio 3 : 2, find the number of women in the group.
 1. 15 2) 16 3) 18 4) none of these
99. The diagonals of two squares are in the ratio 2 : 3. Find the ratio of their areas.
 1) 3:2 2) 4 : 9 3) 8 : 27 4) none of these
100. The ratio of the areas of the two circles is 16 : 25. Find the ratio of the radii of the two circles.
 1) 4:3 2) 2:5 3) 4:5 4) 3:5
101. A bag contains rupee, 50 paisa and 25 paisa coins in the ratio 5: 6: 8. If the total amount is Rs.420, find the number of 50 paisa coins in the bag, of each type.
 1) 224 2) 254 3) 256 4) 267
102. Let the amount received for doing a work is Rs. 58, 000. If this amount is divided among 5 men, 6 women and 5 boys such that a man receives twice as that of a woman and thrice that of a boy, find the share of the 5 boys.
 1) Rs. 12, 500 2) Rs. 1;5. 000 3) Rs. 10, 000 4) Rs. 18, 000
103. Let an amount of Rs. 93, 000 be divided among three persons A, B and C in such a way that twice the share of A is equal to thrice the share of B and thrice the share of B is equal to five times the share of C. Find the share of C.
 1.Rs. 15000 2) Rs. 18000 3) Rs. 17500 4) None of these
104. The number of passengers traveling by bus and train between two places A and B are in the ratio 1:10. The ratio of the fares between those two places by bus and train are in the ratio 5 : 4. If the total fare collected as fare is Rs. 1,17,000. Find the fare collected from the bus passengers.
 1) Rs. 18, 000 2) Rs. 13, 000 3) Rs. 23, 000 4) Rs. 27, 000

105. 15 kg of a product is made by mixing three ingredients A, B and C in the ratio 3:2:5 by weight. The prices of the ingredients A, B and C per kg are in the ratio 5:7:2. The difference between the prices of the ingredients; A and C is Rs. 18 per kg, find the cost of the product.
 1) Rs. 154 2) Rs. 251 3) Rs. 357 4) Rs. 453
106. There are 10 shirts of same kind. If 5 shirts can be dried in 60 minutes, find the time taken to dry 10 shirts.
 1) 120 minutes 2) 100 minutes 3) 1 ½ hour 4) one hour
107. 5 dogs can eat 5 biscuits in 5 minutes. In how many minutes can 10 dogs eat 10 biscuits.
 1) 10 minutes 2) 20 minutes 3) 15 minutes 4) 5 minutes
108. A tree of height 12 m casts a shadow of length 36 m. Find the height of the building that casts a shadow of length 33 m.
 1) 99m 2) 90m 3) 9m 4) 11 m
109. A garrison has provisions for 230 men for 15 days. If there are 70 more men. find the number of days for which the food last?
 1) 12 days 2) 18 days 3) 9¼ days 4) 11 ½ days
110. What is the cost of dozen apples, if the cost of four apples is Rs. 32
 1) Rs. 80 2) Rs. 72 3) Rs. 108 4) Rs. 96
111. 25 men can do a piece of work in 5 days. In how many days can 10 men do the same work?
 1) 12 2) 15 3) 12 ½ 4) 16
112. 15 men can do a piece of work in 10 days, working 8 hours a day. In how days can 20 men, working ten hours a day, do the same work?
 1) 8 days 2) 5 days 3) 6 days 4) none of these
113. In 2004 against Sri Lanka, the Indian cricket team won 3 matches more than it lost. If it won 3/5 of its matches against them in that year, how many matches did it play against them?
 1) 25 2) 20 3) 15 4) 10
114. Find the ratio of the volumes of two spheres whose radii are in the ratio 2 : 3 (volume of a sphere varies directly with the cube of its radius).
 1) 27:8 2) 4:9 3) 9:4 4) none of these
115. The volume of a sphere varies directly with the cube of its radius. The volume of a sphere with radius 3 cm is 162 cm³. Find the; radius of the sphere whose volume is 4374 cm³.
 1) 8cm 2) 9cm 3) 12cm 4) 19cm
116. The volume of a cuboid varies directly with the length and breadth, when height is kept constant. The volume of a cuboid whose length and breadth are 12 cm and 16 cm

- respectively is 2880 cm. Find the length of the cuboid of breadth 25 cm and volume 12,000 cm³.
- 1) 26cm 2) 44 cm 3) 32cm 4) 46cm
117. X varies inversely with the square of Y and directly with the cube of Z. When X=6, Y=8 and Z = 6. Find the value of X if Y = 4 and Z = 9.
- 1) 9 2) 81 3) 56 4) None of these
118. A man has a wife, two sons and three daughters. His property of Rs. 10, 60, 000 is divided among them in such a way that the ratio of the share of his wife to daughter is 5 : 2, and that of his wife to son is 3 : 2. Find the share of his each son.
- 1) Rs. 3, 00, 000 2) Rs. 2, 00? 000 3) Rs. 1, 20, 000 4) Rs. 1, 50, 000
119. Rs. 385 has been divided among A, B and C in such a way that A receives $\frac{2}{9}$ th of what B and C together receives. Find the share of A.
- 1) Rs. 90 2) Rs. 105 3) Rs. 70 4) None of these
120. Rs.1870 has been divided into three parts in such a way that half of the first part, one-third of the second part and one-sixth of the third part are equal. What is the amount of the third part?
- 1) Rs. 1200 2) Rs. 1020 3) Rs. 1450 4) Rs. 1350
121. A and B are two alloys of gold and copper prepared by mixing metals in the ratios 7: 2 and 7 : 11 respectively. If equal quantities of the alloys are melted to form a third alloy C, find the ratio of gold and copper in the alloy C.
- 1) 7 : 5 2) 6 : 5 3) 8 : 5 4) 5 : 4
122. 729 ml of a mixture contains milk and water in the ratio 7: 2. How much more water is to be added to get the new mixture containing milk and water in the ratio of 7 : 3?
- 1) 75ml 2) 81 ml 3) 85 ml 4) 78 m
123. Divide Rs. 600 among A, B and C so that Rs. 40 more than that of $\frac{2}{5}$ th of the A's share. Rs.20 more than that of the $\frac{2}{7}$ th of the B's share and Rs. 10 more than that of $\frac{9}{17}$ th of the C's share are equal. Find the share of A.
- 1) Rs. 180 2) Rs. 175 3) Rs. 150 4) Rs. 200
124. Rs. 1050 is divided among P, Q and R. The share of P is $\frac{2}{51}$ of the combined share of Q and R. Find the amount P gets.
- 1) Rs. 300 2) Rs. 350 3) Rs. 250 4) None of these
125. If a : b = c : d then $\frac{ma+nc}{mb+nd}$ is equal to (a : b or c:d)
1. a:b 2) c : d 3) 1 or 2 4) None of these

126. Vinay got thrice as many marks in Mathematics as in English. The ratio of his marks in Mathematics and History is 4:3. If his total marks in Mathematics, English and History are 250, what are the marks he obtained in English?
 1) 45 2) 40 3) 50 4) 42
127. 15 litres of a mixture contains 20% alcohol and the rest is water. What will be the % of alcohol in the new mixture if 3 litres of water be mixed in it?
 1) $16\frac{2}{3}$ 2) 16 3) $14\frac{3}{4}$ 4) 20
128. The proportion of zinc and copper in a brass piece is 13: 7. How much zinc will be there in 100 kg of such a brass piece?
 1) 56kg 2) 65 kg 3) 50kg 4) 73 kg
129. A mixture contains milk and water in the ratio 5: 1. On adding 5 litres of water, the ratio of the milk and water becomes 5: 2. What is the quantity of milk in the mixture?
 1) 25 litres 2) 20 litres 3) 30 litres 4) 40 litres
130. The ratio of the milk and water in 85 litres of milk is 27: 7. Find the amount of water that must be added to make the ratio 3:1)
 1) 4kg 2) 5kg 3) 7.5 kg 4) 6kg
131. Two equal glasses are respectively $\frac{1}{3}$ rd and $\frac{1}{4}$ n full of milk. They are then filled up with water and the contents mixed in a vessel. Find the ratio of milk and water in the vessel?
 1) 13 :6 2) 15 : 8 3) 7 : 17 4) 6 : 13
132. Find the share of A if the sum of Rs. 1300 is divided among A, B, C and D such that
 $\frac{A's\ share}{B's\ share} = \frac{B's\ share}{C's\ share} = \frac{C's\ share}{D's\ share} = \frac{2}{3}$
 1) Rs. 540 2) Rs. 350 3) Rs. 160 4) None of these
133. In a mixture of 60 litres, the ratio of milk and water is 2: 1. What amount of water must be added to make the ratio 1: 2?
 1) 120 litres 2) 75 litres 3) 30 litres 4) 60 litres
134. Let an amount of Rs. 47, 000 be divided into three parts such that three times the first is equal to four times the second and five times the third. Find the difference between the largest and the smallest parts.
 1) 12,000 2) 6500 3) 8000 4) 7000
135. Let an amount of Rs. 23, 100 be divided among three persons A, B and C in such way that for every rupee A has, B has 40 paise and C has 80 paise. Find the share of C.
 1) Rs. 7200 2) Rs. 8400 3) Rs. 7800 4) None of these
136. A bag contains rupee. 50 paise and 25 paise coins in the ratio 5 : 6 : 8. If the total amount is Rs. 420 find the number of coins of each type.

- 1) 125,150,200 2) 210,256,336 3) 130,156,208 4) None of these
137. If three dozens of eggs have been dropped, which of the following cannot be the ratio of the broken eggs to unbroken mirrors?
- 1) 2 : 1 2) 3 : 2 3) 3 : 1 4) 7 : 5
138. Two whole numbers whose sum is 64 cannot be in the ratio
- 1) 5 : 3 2) 7 : 1 3) 3 : 4 4) 9 : 7
139. A cash box contains 25 paise, 10 paise and 5 paise coins in the ratio 1: 2: 3. If their total value is Rs. 30, find the number of 5 paise coins.
- 1) 150 2) 175 3) 180 4) 145
140. What number should be subtracted from each of the number 54, 71, 75 and 99 to make them the terms of the proportion?
- 1) 4 2) 5 3) 3 4) 7
141. What number must be added to each of the term 6, 14. 18 and 38 to make them equally proportionate?
- 1) 5 2) 2 3) 4 4) 6
142. What number must be added to each term of the ratio 7: 13 so that the ratio becomes 2: 3?
- 1) 2 2) 3 3) 5 4) None of these
143. Three numbers are in the ratio 2 : 3 : 5. If the sum of their squares is 608, find the numbers.
- 1) 10, 15,25 2) 6,9, 16 3) 12,18,30 4) 8,12,20
144. The price of a scooter and a TV are in the ratio 3: 2. If a scooter costs Rs. 6000 more than the TV, find the cost of the TV.
- 1) Rs. 1400 2) Rs. 1200 3) Rs. 1500 4) Rs. 1800
145. The monthly salary of A, B and C is in the ratio 2: 3: 5. If C's monthly salary is Rs. 1200 more than that of A, find the annual salary of B.
1. Rs. 12500 2) Rs. 15000 3) Rs. 14400 4) None of these
146. If the circle and a square have the same area, what will be the ratio of the side of the square to the radius of the circle?
- 1) 22 : 7 2) 7:22 3) 11 : 7 4) None of these
147. 6 men, 8 women and 6 children complete a job for a sum of Rs. 950. If their individual wages are in the ratio 4: 3: 2. find the total amount earned by the children.
- 1) Rs. 240 2) Rs. 275 3) Rs. 190 4) Rs. 245
148. The ratio of money with Ram and Gopal is 7 : 17 and that with Gopal and Krishna is 7: 17. If Ram has Rs. 490, find the amount with Krishna.
- 1) Rs. 2890 2) Rs 2750 3) Rs. 3000 4) None of these

PARTNERSHIP

1. A and B started a business with capitals Rs. 24, 000 and Rs. 36, 000 respectively. If there is a profit of Rs. 1, 00, 000 at the end of the year, find the share of B.
1) Rs. 40, 000 2) Rs. 36, 000 3) Rs. 75, 000 4) Rs. 60, 000
2. A started a business with a capital of Rs. 42, 000. B joined him after six months with a capital o Rs. 84, 000, If there was a profit of Rs. 2, 40, 000 at the end of the year, find the share of B.
1) Rs. 80, 000 2) Rs. 1,20,000 3) Rs. 1.00.000 4) Rs. 90, 000
3. A and B started a business with capitals Rs. 8,000 and Rs. 12,000 respectively. B withdraws has of his investment at the end of six months, and the remaining investment at the end of nine months. Find the share of B if there is a profit of Rs. 46, 500.
1) Rs. 23,250 2) Rs. 22, 500 3) Rs. 16,500 4) Rs. 15.000
4. A, B and C started a business with capitals Rs. 30, 000, Rs. 45, 000 and Rs. 60, 000 respectively If there is a profit of Rs. 5, 40, 000 at the end of the year, find the share of B.
1) Rs. 1, 40, 000 2) Rs. 1, 20, 000 3) Rs. 1, 80, 000 4) Rs. 2, 00, 000
5. A started a business with Rs. 12, 000, After three months, B joined the business with an capital of Rs. 16, 000. C invested his capital of Rs. 20, 000 in the business for 3 months. Find the share of if there is a profit of Rs. 2, 32, 000 at the end of the year.
1) Rs. 1, 08, 000 2) Rs. 96, 000 3) Rs. 80, 000 4) Rs. 1,16, 000
6. Ajay. Anil and Akash jointly hired a tractor for a week at Rs. 5,400. If they used it for 36 hours, 24 hours and 48 hours respectively, how much should Akash pay?
1) Rs. 1200 2) Rs. 1800 3) Rs. 2400 4) Rs. 2800
7. X and Y enter into a partnership and their investments are in the ratio of $1/2 : 1/3$. After 4 months X withdraws half of his capital. At the end of the 12 months the total profit is Rs. 1500. What is X's share in the total profit?
1) 750 2) 900 3) 600 4) 800
8. P began a business with Rs. 1, 00, 000. Q joined him with a capital of Rs. 1, 50, 000 afterwards, the profits at the end of the year were, divided equally, after how many months did Q join P?
1) 6 months 2) 8 months 3) 4 months 4) none of these
9. Ramesh and Suresh started a business. Ramesh invested a capital of Rs. 50, 000. At the end of the year, total profit of the business is Rs. 10, 000. If the share of Ramesh is Rs. 8, 000, find the investment of Suresh.
1) Rs. 25, 000 2) Rs. 20, 000 3) Rs. 15, 000 4) Rs. 12, 500

10. A and B started the business. A invested money for 8 months in a business. If A and B's investments and profits are in the ratio 11:12 and 4: 3 respectively, find the time for which B invested his money?
 1) 5 months 2) 6 months. 3) 6 /months 4) none of these
11. A and B started together a firm by investing Rs. 50, 000 and Rs. 80, 000 respectively, 4 months later, C joined by investing Rs. 60. 000 and B left the firm. If the total profit at the end of the year is Rs. 35,000, find the share of B in the profit.
 1) Rs. 12, 000 2) Rs. 15, 000 3) Rs. 8, 000 4) none of these
12. P and Q invested Rs. 12, 500 and Rs. 8, 500 respective!) in a business. They mutually agree that 60% of the profit should be divided equally between them and the remaining profit is distributed in the proportion of their investments. If one partner's share is Rs. 320 more than that of the other, I what is the total profit?
 1) Rs. 5600 2) Rs. 6000 3) Rs. 5500 4) Rs. 5880
13. X, Y and Z enter into a partnership with X investing Rs. 3, 000 for the whole year, Y investing Rs.2, 000 initially and increasing it to Rs. 3, 000 at the end of the 4 months, while Z invests Rs. 2,000 initially but withdraws Rs. 1,000 at the end of 8 months. What is X's share in profit at the end of the year, if the total profit is Rs. 2. 200?
 1) Rs. 800 2) Rs. 900 3) Rs. 500 4) None of these
14. P, Q and R entered into a partnership with investments of Rs. 20,000, Rs. 30,000 and Rs. 40,000 respectively. At the end of the year, Q got Rs. 3, 000 as his share of the profits. Find the total profit of the business.
 1) Rs. 12000 2) Rs. 10,500 3) Rs. 13500 4) Rs. 9000
15. A man divided an amount of Rs.19,00,000 among his wife, three sons and two daughters, in such a way that the ratio of wife.io son is 2: 1 and his wife to daughter is 3 : 1. Find the share of each daughter.
 1) Rs. 4,00,000 2) Rs. 3,89,000 3) Rs. 2,00,000 4) none of these
16. The capitals and time of investments of P, Q & R in a business are in the ratio 3:5:7 and 2:3:5. Find the ratio in which the profit is shared by P, Q and R?
 1) 6 : 10 : 21 2) 6 : 15 : 35 3) 3 : 5 : 7 4) none of these
17. A, B and C invested their capitals in the business in the ratio 6: 9: 10. If their profits are in the ratio 12: 15: 20, find the ratio of their time of investments.
 1) 6:5:6 2) 7 : 5 : 6 3) 4 : 3 : 3 4) none of these
18. P, Q and R started a business. P invested one-third of the capital for half of time. Q invested half of the capital for one-third of the time. R invested one-fourth of the capital for one-third of the time. Find the share of Q if there is a total profit of Rs. 50,000.

- 1) Rs. 30000 2) Rs. 15000 3) Rs. 20000 4) none of these
19. X and Y rent a pasture for 8 months. %puts 200 sheep for 5 months. How many sheep can B pi in the remaining months, if he pays half as much again as A?
1) 400 2) 800 3) 500 4) None of these
20. Dilip and Mohan started a business by investing Rs. 1, 00, 000 and Rs. 1, 50, 000 respectively. Find the share of each if there is a profit of Rs. 24, 000.
1) 14000, 10000 2) 9600, 14400 3) 16000, 8000 4) 15600, 8400
21. Sanjay and Raju started a business and invested Rs. 20, 000 and Rs. 25, 000 respectively. After four months, Raju left and Naresh joined by investing Rs. 15, 000. At the end of the year, there was a profit of Rs. 4,600. Find the share of Naresh.
1) Rs. 200 2) Rs 1320 3) Rs 1440 4) None
22. Three partners A, B and C invest Rs. 26, 000, Rs. 34, 000 and Rs. 10, 000 respectively in a business. Find the share of B if there is a profit of Rs. 3, 500 at the end of the year.
1) Rs. 700 2) Rs 1440 3) Rs 1350 4) Rs 1500
23. A's capital is equal to twice the capital of B. R's capital is three times the capital of C. Find the ratio of their capitals.
1) 4:2:1 2) 6 : 3 : 1 3) 7:5:2 4) None
24. If $6(\text{A's capital}) - 8(\text{B's capital}) = 10(\text{C's capital})$, find the ratio of their capitals.
1) 10: 8:6 2) 6 : 8 : 10 3)20: 15 :12 4) None
25. A, B and C are three partners in a business. If twice the investment of A is equal to thrice the capital of B and the capital of B is four times the capital of C. Find the share of C if there is a total profit of Rs. 5.940.
1) Rs 540 2) Rs 650 3) Rs 730 4) None
26. A started a business investing Rs. 9000. Five months later B joined by investing Rs. 8000. If they make a profit of Rs. 6970 find the profit of B at the end of the year.
1) Rs 2000 2) Rs 2380 3) Rs 1750 4) Rs 3300
27. A, B and C subscribe Rs. 47000 for a business. A subscribes Rs. 7000 more than B and B subscribes Rs. 5000 more than C.-Find the share of B if there is a profit of Rs. 9400.
1) Rs 4200 2) Rs2750 3) Rs 3000 4) Rs 3500
28. Jayanth started a business investing Rs. 6000. 6 months later, Tharun joined him investing Rs. 4000. What is the share of Tharun if there is a profit of Rs. 5200 at the end of the year?
1) Rs. 300 2) Rs. 450 3) Rs. 245 4) Rs. 1125
29. 'A and B entered into a partnership investing Rs. 16000 and Rs. 12000 respectively. After 3 months, A withdrew Rs. 5, 000 while B invested Rs. 5000 more. After 3 more months C

joins the business with a capital of Rs. 21,000. The share of B exceeds that of C. By how much does the share of B exceeds that of C, out of a profit of Rs. 26,400 at the end of the year?

- 1) Rs 2400 2) Rs: ^500 3) Rs 3600 4) Rs 5500

30. Rs. 700 is divided among A, B and C so that A receives half as much as B and B half as much as C. Find the share of C.

- 1) Rs 350 2) Rs 275 3) Rs 300 4) Rs 400

31. Manoj got Rs. 6000 as his share out of a total profit of Rs. 9000 that he and Ramesh earned at the end of one year. If Manoj invested Rs, 20,000 at the end of the 6 months, whereas Ramesh invested his amount for the whole year, find the amount invested by Ramesh.

- 1) Rs 5000 2) Rs 4500 3) Rs 3750 4) Rs 6500

32. Dilip, Ramu and Amar started a shop by investing Rs. 27000, Rs. 81,000 and Rs. 72,000 respectively. At the end of the one-year, the profit was distributed among them. If Ramu's share of profit be Rs. 36,000, find the total profit.

- 1) Rs 72,500 2) Rs 60,000 3) Rs 80,000 4) Rs 92,545

33. A and B enter into a partnership investing Rs. 32000 and Rs. 16000 respectively. After 8 months. C joins them with a capital of Rs. 15000. Find the share of C in a profit of Rs. 45,600 after two years.

- 1) Rs 12,000 2)Rs 11,200 3) Rs 14,400 4) Rs 13,200

34. A, B and C invested Rs. 2000, Rs. 3000 and Rs. 4000 in a business. After one year, A withdrew his money but B and C continued for one more year. If the net profit after two years be Rs. 3200, find the share of A in the profit.

- 1) Rs 900 2) Rs 800 3) Rs 400 4) Rs 1100

35. A, B and C enter into a partnership. A invests some money at the beginning. B invests double the amount after six months. C invests thrice the amount after 8 months. If the annual profit be Rs. 18000, find the share of C.

- 1) Rs 6000 2) Rs 7500 3) Rs 5000 4)

36. A and B enter into a partnership. A invests Rs. 16000 for 8 months and B remains in the business for four months. Out of the total profit B claims $\frac{2}{7}$ th of the profit. The contribution of B in the business is

- 1) Rs 14,400 2)Rs 12,800 3) Rs 13,200 4) Rs 15,200

37. A, B and C enter into a partnership by investing in the ratio 3: 5: 7. After a year, C invests another Rs. 3,37,600 while A withdrew =Rs. 45,600. The ratio of investments then changes to 24: 59: 167. How much did A invest initially? 2

- 1) Rs 1,50,500 2) Rs.1,41,600 3) Rs 2,25,600 4) Rs 2.72,600

38. A and B joined a firm. A's investment was thrice the investment of B and the period of his investment was two times the period of the investment of B. If B got Rs. 4000 as profit, find the total profit of them.
 1) Rs 28000 2) Rs 34000 3) Rs 20000 4) Rs 32000
39. A and B start a business with initial investments in the ratio 12: 11 and their annual profits were in the ratio 4: 1. If A invested the money for 11 months, find the time for which B invested the money.
 1) 2 months 2) 5 months 3) 3 months 4) 4 months
40. A, B and C enter into a partnership and their capitals are in the proportion $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}$. A withdrew half of his capital at the end of the four months. Find the share of A if there is a profit of I Rs. 847.
 1) Rs 560 2) Rs 450 3) Rs 300 4) Rs 280
41. In a partnership, A invests $\frac{1}{6}$ th of the capital for $(\frac{1}{6})$ th of the time. B invests $(\frac{1}{3})$ of the capital for $(\frac{1}{3})$ th of the time and C invests the rest of the capital for the whole period of time. Find the share of B if there is total profit of Rs. 4600.
 1) Rs 800 2) Rs 900 3) Rs 700 4) None
42. Jagmohan, Rooplal and Pendeyji rented a videocassette for one week at a rent of Rs. 350. If they use it for 6 hours, 10 hours and 12 hours respectively, find the rent paid by Pendeyji.
 1) Rs225 2) Rs 150 3) Rs200 4) Rs 175
43. Four milkmen rented a pasture. A grazed 18 cows four 4 months, G grazed 25 cows for 2 months, 1 C grazed 28 cows for 5 months and D grazed 21 cows for 3 months. If A's share of rent is Rs. 360, find the total rent of the field.
 1) Rs.250 2) Rs 1345 3) Rs. 625 4) Rs 1500
44. A, B and C contract a work for Rs. 550. Together A and B are to do $\frac{7}{11}$ of the work. Find the share of C.
 1) Rs. 200 2) Rs. 400 3) Rs. 100 4) Rs. 155
45. A, B and C hire a meadow for Rs, 2934. 00. A puts in 10 oxen for 20 days, B 30 oxen for 8 days and C 16 oxen for 9 days. How much in Rs B exceeds by C in the pay of the rent?
 1) 282.40 2) 300 3) 482.40 4) 542.20
46. A began a business with Rs. 2100 and B joined afterwards with Rs. 3600. How many months did B join if the profits at the end of the year are divided equally?
 1)5 2)3 3)6 4) 9
47. The incomes of A and B are in the ratio 3: 2. The income of A is 3000 and their expenditure is in the ratio 5: 3. If each saves equal amount then the expenditure of A is 4
 1) 2200 2) 2100 3) 1800 4)2500

48. A, B and C invested capitals in the ratio 2: 3: 5. The time periods of their investments are in the ratio 4: 5: 6. Find the ratio of their objects.
 1) 7:12:15 2) 8 : 5 : 30 3) 3 : 4 : 5 4) None of these
49. A and B enter into a partnership with their capitals in the ratio 7: 9. At the end of 8 months, A withdraws his capital. If they receive the profits in the ratio 8 : 9, find the time for which B's capital is used.
 1) 4 months 2) 8 months 3) 7 months 4) 6 months
50. A started a business with a capital of Rs, 18,000. Four months later B joined him with a capital of Rs. 24, 000. A at the end of the year, total profit earned was 5, 100. Find the share of B in the profit.
 1) Rs. 2000 2) Rs. 1800 3) Rs. 2100 4) Rs. 2400
51. Ravi, Ramesh and Raju contributed Rs. 7000. Rs. 8000 and Rs. 9000 respectively towards a business. They receive 5 % interest on their investments. The total profit of Rs. 3600 was distributed to them after deducting the interest. Find the present worth of each partner's capital if the profit is distributed in the ratio of 3: 4: 5.
 1) Rs 14400, Rs. 15000, Rs. 17000 2) Rs 8000, Rs. 10000, Rs. 12000
 3) Rs 8200, Rs. 9500, Rs. 10000 4) Rs 7950. Rs. 9200, Rs. 10450
52. Three partners A, B and C started a business and agreed to pay B a salary of Rs. 12000 per month, and C a salary of Rs. 10000 per month and to divide the remaining profit or loss in the ratio 3:2: 1. If the net profit is Rs. 384000, find the amount earned by C?
 1) Rs 144000 2) Rs 131000 3) Rs 124200 4) Rs 140000
53. Two partners A and B invested Rs. 125000 and Rs. 85000 respectively in a business. They decided to distribute equally 60% of the profit and the remaining as interest on their capitals. If A received Rs. 3000 more than B, find the total profit.
 1) Rs 44000 2) Rs 31785 3) Rs 39375 4) Rs 37500
54. Four friends A, B, C and D enter into a partnership. A, B and C subscribed respectively $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{5}$ part of the capital and the rest was subscribed by D. D is a working partner and gets 4% of the total profit for that. The rest is divided among A, B, C and D in the ratio of their capitals. Find the share of D.
 1) Rs 144000 2) Rs 231785 3) Rs 248000 4) Rs 307500
55. Three partners A, B and C enter into a partnership and contributed Rs. 30,000. Rs. 40,000 and Rs. 50000 respectively, toward capital. They agree to divide the annual profit in proportion to the capital employed and to the time it is in use. After six months. C withdrew Rs. 5000 and B added Rs. 122400. If at the end of the year, the profit is Rs. 22400, find the share of C in the profit?

PROBLEMS ON AGES

1. Father is aged three times more than his son Ronit. After 8 years, he would be two and a half times of Ronit's age. After further 8 years, how many times would he be of Ronit's age?
A. 2 times B. 2 1/2 times C. 2 times D. 3 times
2. The sum of ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child?
A. 4 years B. 8 years C. 10 years D. None of these
3. A father said to his son, "I was as old as you are at the present at the time of your birth". If the father's age is 38 years now, the son's age five years back was:
A. 14 years B. 19 years C. 33 years D. 38 years
4. A is two years older than B who is twice as old as C. If the total of the ages of A, B and C be 27, the how old is B?
A. 7 B. 8 C. 9 D. 10 E. 11
5. Present ages of Sameer and Anand are in the ratio of 5: 4 respectively. Three years hence, the ratio of their ages will become 11: 9 respectively. What is Anand's present age in years?
A. 24 B. 27 C. 40 D. Cannot be determined E. None of these
6. A man is 24 years older than his son. In two years, his age will be twice the age of his son. The present age of his son is:
A. 14 years B. 18 years C. 20 years D. 22 years
7. Six years ago, the ratio of the ages of Kunal and Sagar was 6: 5. Four years hence, the ratio of their ages will be 11: 10. What is Sagar's age at present?
A. 16 years B. 18 years C. 20 years D. Cannot be determined E. None of these
8. The sum of the present ages of a father and his son is 60 years. Six years ago, father's age was five times the age of the son. After 6 years, son's age will be:
A. 12 years B. 14 years C. 18 years D. 20 years
9. At present, the ratio between the ages of Arun and Deepak is 4: 3. After 6 years, Arun's age will be 26 years. What is the age of Deepak at present?
A. 12 years B. 15 years C. 19 and half D. 21 years
10. Sachin is younger than Rahul by 7 years. If their ages are in the respective ratio of 7 : 9, how old is Sachin?
A. 16 years B. 18 years C. 28 years D. 24.5 years E. None of these
11. The present ages of three persons in proportions 4:7:9. Eight years ago, the sum of their ages was 56. Find their present ages (in years).
A. 8, 20, 28 B. 16, 28, 36 C. 20, 35, 45 D. None of these

12. Ayesha's father was 38 years of age when she was born while her mother was 36 years old when her brother four years younger to her was born. What is the difference between the ages of her parents?
A.2 years B.4 years C.6 years D.8 years
13. A person's present age is two-fifth of the age of his mother. After 8 years, he will be one-half of the age of his mother. How old is the mother at present?
A.32 years B.36 years C.40 years D.48 years
14. Q is as much younger than R as he is older than T. If the sum of the ages of R and T is 50years, what is definitely the difference between R and Q's age?
A.1 year B.2 years C.25 years D. Data inadequate E. None of these
15. The age of father 10 years ago was thrice the age of his son. Ten years hence, father's age will be twice that of his son. The ratio of their present ages is:
A. 5 : 2 B. 7 : 3 C.9 : 2 D. 13 : 4

RATIO & PROPORTION, PATNERSHIP AND AGES

Exercise2(Higher skill level questions)

1. A, B and C have 40, x and y balls with them respectively. If B gives 20 balls to A, he is left with half as many balls as C. If together they had 60 more balls, each of them would have had 100 balls on an average. What is the value of x: y?
a)3:2 b) 4:6 c) 2:1 d) 3:4
2. A cat takes 7 steps for every 5 steps of a dog, but 5 steps of a dog are equal to 6 steps of cat. What is the ratio of speed of cat to that of dog?
a)24:25 b) 42:25 c) 24:19 d) 25:42
3. We have to divide a sum of Rs.13,950 among three persons A,B and C. B must get the double of A's share and C must get Rs.50 less than the double of B's share. The share of A will be:
a)Rs.1950 b) Rs.1981.25 c) Rs.2000 d) Rs.2007.75
4. A started a business by investing Rs.36, 000. After 4 months B joined him with some investment .At the end of the year, the total profit was divided between them in the ratio of 9:7. How much capital was invested by B in the business?
a)Rs.42,000 b) Rs.40,000 c) Rs.52,000 d) Rs.45,000

5. A started a business with Rs.52, 000 and after 4 months B joined him with Rs.39,000. At the end of the year, out of the total profits B received total Rs.20, 000 including 25% of the profit as commission for managing the business. What amount did A receive?
 a)10,000 b) 20,000 c) 12,000 d) 25,000
6. A started some business with Rs.26, 000. After 3 months B joined him with Rs.16, 000. After some more time C joined them with Rs. 25,000. At the end of the year, out of a total profit of Rs.15, 453, c gets Rs.38256 as his share. How many months after B joined the business did C join?
 a)6 months b) 3 months c) 9 months d) 5 months
7. A student obtained equal marks in History and Sociology. The ratio of marks in Sociology and Geography is 2:3 and the ratio of marks in History and Philosophy is 1:2. If he has scored an aggregate of 55% marks. The maximum marks in each subject is same . In how many subjects did he score equal to or greater than 60% marks?
 a)1 b) 2 c) 3 d) None of these
8. In ABC Corporation there are some management trainees. These trainees are divided in to 3 groups A,B and C for 3 different projects in the ratio of 3:4:5 respectively, where P,Q,R are the projects-in-charge of A,B,C respectively. The difference between the number of trainees in A and C is not greater than 3. Also P, Q, R belongs to the group of trainees. The number of assistant of Q is less than the number of assistance of R by:
 a)33.33% b) 20% c) 25% d) 16.66%
9. A couple got married 9 years ago when the age of wife was 20% less than her husband. 6 years from now the age of wife will be only 12.5% less than her husband. Now they have six children including single, twins and triplets and the ratio of their ages is 2:3:4 respectively. What can be the maximum possible value for the present age of this family?
 a)110 years b) 103 years c) 105 years d) 83 years
10. There are two containers, the first contain, 1 liter pure water and the second contains 1 liter of pure milk. Now 5 cups of water from the first container is taken out is mixed well in the second container. Then, 5 cups of his mixture is taken out and is mixed in the first container. Let A denote the proportion of milk in the first container and B denote the proportion of water in the second container then:
 a)A<B b) A=B c) A>B d)can't be determined

PERCENTAGES

1. What percentage of 120 is 40?
1) 30% 2) $33\frac{1}{3}\%$ 3) 25% 4) 40%
2. What percentage of 243 is 81?
1) 20% 2) $33\frac{1}{3}\%$ 3) 25% 4) 35%
3. 18% of what number is 27?
1) 130 2) 200 3) 150 4) 120
4. Which of the following fractions is $115\frac{1}{3}\%$?
1) $\frac{183}{100}$ 2) $\frac{200}{157}$ 3) $\frac{173}{150}$ 4) None of these
5. What percent is equivalent to $\frac{8}{13}$?
1) 73% 2) $61\frac{7}{13}\%$ 3) $75\frac{1}{3}\%$ 4) None of these
6. What percent is 25 of 75?
1) 30% 2) $33\frac{1}{3}\%$ 3) 35 4) 25%
7. What percent is 150 of 75?
1) 300% 2) 200% 3) 250% 4) 125%
8. A number when increased by 40% becomes 56. Find the number.
1) 30 2) 36 3) 40 4) 42
9. A number when decreased by 30% becomes 49. Find the number.
1) 60 2) 70 3) 80 4) 75
10. What do 150 become when it is decreased by 15%?

- 1) 130 2) 120 3) 127.5 4) 135.5
11. Convert 0.75 to equivalent percentage.
 1) 60% 2) 75% 3) 85% 4) 90%
12. 25% of what price is Rs. 230?
 1) 1300 2) 920 3) 840 4) 780
13. Express the fraction which Rs. 1. 50 is of Rs. 20 as a percentage.
 1) 7.5% 2) 8% 3) 12 ½% 4) 11%
14. $r\%$ of 450 = 30% of 300, $x = ?$
 1) 30% 2) 25% 3) 15% 4) 20%
15. The number A is 6 times as large as B. What % is B of A?
 1) 13% 2) 20% 3) 16 1/6% 4) 17 1/3%
16. When 30% of a number is added to 63, the original number is obtained. Find the number.
 1) 90 2) 120 3) 95 4) 100
17. First number is 20% more than the second number. What percent is the second of the first?
 1) 130 % 2) 200 % 3) 75 % 4) None of these
18. First number is 25% more than the second number. What percent is second number less than that of the first number?
 1) 20 % 2) 25 % 3) 35 % 4) 40 %
19. First number is 30% less than the second number. What percent is second number more than that of the first number?
 1) 42 6/7 % 2) 50 % 3) 45 % 4) 60 %
20. Two numbers A and B are 25% and 75% of the third number C. What percent is A of B?
 1) 25 % 2) 33 1/3% 3) 22 3/5 % 4) 20 %
21. Two numbers A and B are respectively 25% and 75% more than the third number C. What percent is the first number of the second number?
 1) 71 3/7% 2) 50% 3) 82 1/5% 4) 80%
22. In the above problem, what percent less is A than that of B?
 1) 93 1/3% 2) 28 4/7% 3) 22 3/5% 4) 50%
23. Two numbers A and B are respectively 20% and 25% less than the third number C. What percent is A of B?
 1) 93 1/3% 2) 95% 3) 105% 4) 106 2/3 %
24. The price per kilogram of sugar increases by 25%. By what percent should its consumption be reduced such that the expenditure remains the same?
 1) 15% 2) 33 1/3% 3) 16 1/6% 4) 20%

25. The price per kilogram of rice decreases by 30%. By what percent should the consumption be increased so that the expenditure remains the same?
 1) $33\frac{1}{3}\%$ 2) 50% 3) $42\frac{6}{7}\%$ 4) 40%
26. If the salaries of the two persons A and B are in the ratio $\frac{3}{4} : \frac{7}{8}$. By what percent is B's salary more or less than that of A's salary?
 1) $16\frac{1}{6}\%$ 2) $13\frac{1}{3}\%$ 3) $12\frac{1}{5}\%$ 4) 14%
27. The price of one kg of onion in November is Rs. 12. In December, the price was Rs. 15. What is the percentage increase in its price?
 1) 30% 2) $33\frac{1}{3}\%$ 3) 25% 4) 20%
28. Ravi secured 65% of total marks, and got 1040 marks. How many did a student who secured 80% get?
 1) 1200 2) 1280 3) 1340 4) None of these
29. A student has to secure 35 % of the total marks to pass the examination. If he gets 50 marks he fails the examination by 20 marks. Find the total (maximum) marks of the examination.
 1) 120 2) 180 3) 200 4) 240
30. In an examination, A gets 30% of the total marks and fails by 14 marks and B, who scores 50% of the total marks, gets 10 marks more than that required to pass the examination. Find the total (maximum) marks of the examination.
 1) 150 2) 120 3) 200 4) 300
31. In a class, 20% of the students failed in Mathematics and 30% of the students failed in Telugu. If 10% of the students failed in both the subjects, find the percentage of students who passed in both subjects?
 1) 20 % 2) 30 % 3) 50 % 4) 60 %
32. The number of workers, working presently in a factory is 2875. There was an increase of 15% when compared to the number of workers two years ago. Find the number of workers two years ago?
 1) 2000 2) 2400 3) 2500 4) None of these
33. In a school, there were 1200 students three years ago. In the first year, there was an increase of 20% of the total strength. In the second year, there was an increase of 25% of the increased strength. In the third year, there was an increase of 20% of the increased strength. Find the total number of students at present in the school.
 1) 1500 2) 1540 3) 1800 4) 2100

34. In 2004, a school sent 120 students to the board exam. 20% of its students failed in the exam. In the next year, it sent 50% more students than in the previous year. If there is a pass percentage off 80% for both years, find the percent of students failed in 2005?
 1) 20% 2) 18% 3) 30% 4) 10%
35. In a school, 250 students of class X. consisting of two sections A and B wrote the board exam. 60% of the students passed the exam. 50 % of the section A, consisting of 150 students, passed the exam. What is the pass percent of the section B?
 1) 50 % 2) 60 % 3) 75 % 4) None of these
36. A's salary is 40% more than that of the B's salary. What percent is B's salary less than that of A's salary?
 1) 22% 2) 33 % 3) 25% 4) None of these
37. A's salary is 25% less than that of B's salary. By what percent is B's salary more than that of A's salary?
 1) 30% 2) 33 1/3% 3) 20% 4) 35%
38. A's salary is 25% more than that of B's salary. B's salary is 30% less than that of C's salary. What percent of C's salary is A's salary?
 1) 87.5% 2) 75% 3) 66 1/6% 4) 80%
39. In the above problem, what percent is B's salary more than that of A's salary?
 1) 13% 2) 12.5% 3) 142/7% 4) 112/3%
40. The monthly incomes of two persons A and B are Rs. 45, 000 and Rs. 30, 000 respectively. The savings of A and B are 25% and 40% respectively. How much percent more/less is A's expenditure of B's expenditure?
 1) 55 % more 2) 87 1/2 % more 3) 70 % less 4) None of these
41. Ramesh's height is 60% more than that of Suresh. What percent is the height of Suresh less than that of Ramesh?
 1) 37.5 % 2) 33 % 3) 27.5% 4) 30%
42. The number of employees in a company increases by 20% every year. If the difference between the number of employees in fourth and third year is 3456, find the number of employees in the first year?
 1) 13000 2) 20000 3) 15000 4) 10000
43. The price of the petrol is first decreased by 25%. and then increased by 25%. If the price of the petrol now is Rs. 37.5, find the initial price of the petrol, before increase or decrease.
 1) Rs. 45 2) Rs. 35 3) Rs. 40 4) Rs. 50
44. The population of a city increases by 30% every year, over its previous year. If the present population of the city is 6, 53, 900. what was the population three years ago?

- 1) 3,00,000 2) 4,00,000 3) 5,00,000 4) 3,50,000
45. The population of a city is 4, 00, 000. If there is an annual increase of 10% every year, what will be the population after four years?
- 1) 5,00,000 2) 5,50,780 3) 5,85,640 4) 5,75,500
46. The population of a city three years ago is 3, 50, 000. There is an increase of 10% in the first year, decrease of 5% in the second year, and a decrease of 10% in the third year. What is the population at present?
- 1) 3,20,000 2) 3,29,175 3) 3,35,675 4) 3,45,000
47. Ramesh lost 20% of his monthly salary in a theft. If he is left with Rs. 8, 160 after spending 60% of the monthly salary left with him. What is his monthly salary?
- 1) 30,000 2) 25,000 3) 25,500 4) 15,000
48. The price of onion is first increased by 20% and then reduced by 20%. What is the net change in the price of the onion?
- 1) No change 2) 4 % increase. 3) 4% decrease 4) None of these
49. The price of rice is first increased by 10%, and then increased by 10 %. What is the net increase in the price of the rice?
- 1) 20 % 2) 21 % 3) 24% 4) 10 %
50. The price of onion is increased by 10% and its sale is decreased by 10%. Find the effect on the income of the sale of onion.
- 1) No change 2) 1 % increase 3) 1% decrease 4) None of these
51. While calculating the area of the triangle, the base of the triangle is taken 10% more than the usual length of the base and the height is taken 5% less than the usual height. Find the percentage error in the new area so obtained?
- 1) 15% change 2) 5 % increase 3) 4.5 % increase 4) 4 % increase
52. If the length and breadth of a rectangle are increased by 15% and 20% respectively, find the %increase in its area?
- 1) 35 % 2) 38 % 3) 20 % 4) None of these
53. While calculating the volume of the cube, by mistake, each side of the cube is taken 10% more than the usual length of the side. Find the percentage error in the new volume so obtained.
- 1) 30 % 2) 31.5 % 3) 33.1 % 4) None of these
54. In a city, 55% of the voters are males. 60% of the male voters are educated. 20% of the female voters are not educated. What percent is male literacy of female literacy?
- 1) $91 \frac{2}{3}$ % 2) $82 \frac{4}{5}$ % 3) 120 % 4) $113 \frac{3}{4}$ %

PROFIT AND LOSS

1. A man bought an article for Rs. 1, 200 and sold for Rs. 1, 350. Find the gain percent.
 1) 12.5% 2) 15% 3) 25% 4) 30%
2. A man bought an article for Rs. 3, 500 and sold for Rs. 3, 000. Find the loss percent.
 1) 15% 2) 14 $\frac{2}{7}$ % 3) 20% 4) 12%
3. A man bought 16 articles for Rs. 15 and sold 15 articles for Rs. 16. Find the gain percent.
 1) 25% 2) 40% 3) 31% 4) 20%
4. A man bought apples at 10 for Rs. 40 and sold them at 15 for Rs. 60. Find the percentage gain or loss he made?
 1) 10% 2) 5% 3) 2% 4) None of these
5. The cost price of an article is Rs. 5, 600. For how much should it be sold so that there is a profit of 12%.
 1) Rs. 6000 2) Rs. 5750 3) Rs. 6, 272 4) None of these
6. If by selling an article for Rs. 28, 500, there is a loss of 5%, find the cost price of the article.
 1) Rs. 36000 2) Rs. 30000 3) Rs. 37500 4) Rs. 40000
7. If an article is sold at a profit of 15%, there is a profit of Rs. 450. Find the cost price of the article.
 1) Rs. 600 2) Rs. 575 3) Rs. 450 4) Rs. 300
8. If the cost price of an article is 50% of the selling price, find what percent is the selling price is of cost price.
 1) 60% 2) 50% 3) 75% 4) 100%
9. The profit obtained by selling an article at Rs. 2,400 is same as the loss obtained by selling it Rs. 1800. Find the cost price of the article.
 1) Rs. 2600 2) Rs. 2575 3) Rs. 2450 4) Rs. 2100
10. Ajay sells a product to Anil at a profit of 12%. Anil sells it to Ajit at a profit of 15%. If Ajit buys the product at Rs. 25,760, find the price at which Anil bought the product.
 1) Rs. 23600 2) Rs. 24575 3) Rs. 22400 4) Rs. 30000
11. A man bought two articles A and B for Rs. 7,500 and Rs. 5, 000 respectively. He sells article A at a gain of 10%. On selling the article B. he found that there is a gain of 5% on the whole. Find the percent gain or loss on the article B.
 1) 1 $\frac{5}{6}$ % 2) 5% 3) 2 $\frac{2}{3}$ % 4) 3%
12. An article was marked 40% above the cost. If a profit of 10% is made by selling the article, find the discount percent on the article.
 1) 20% 2) 23% 3) 21 $\frac{3}{7}$ % 4) 19 $\frac{5}{7}$ %

13. An article was marked 50% above the cost. A discount of 20% is given on the catalogue price of the article. If the article is sold by giving an additional discount of Rs. 350, there is a profit of 15%. Find the marked price of the article.
 1) Rs. 10000 2) Rs. 9500 3) Rs. 10500 4) None of these
14. If an article is sold at a price of Rs. 1,020 there is a loss of 15%. Find the price at which it should be sold so that there would be a profit of 15%.
 1) Rs. 1600 2) Rs. 1575 3) Rs. 1380 4) Rs. 2100
15. A man sells an article for Rs. 5,250 and gains 5%. If he sells another article he bought at the same price so as to gain 20%, find its selling price.
 1) Rs. 6000 2) Rs. 5750 3) Rs. 5000 4) None of these
16. An article is sold at a profit of 16%. Had it been sold for Rs. 240 more, the profit would have been 20%. Find the cost price of the article.
 1) Rs. 6000 2) Rs. 5075 3) Rs. 4500 4) Rs. 7100
17. An article is sold for Rs. 2736 after given successive discount of 10%, 5% and 20%. Find the marked price of the article.
 1) Rs. 3500 2) Rs. 3750 3) Rs. 4255 4) Rs. 4000
18. Catalogue price of an article is Rs. 5, 000. If a discount of 10% is allowed on the article, find the selling price of the article.
 1) Rs. 2500 2) Rs. 3575 3) Rs. 4500 4) Rs. 5500
19. A company fixes the marked price of an article 35% above the cost of manufacture. What percent of discount is to be allowed so that there is a gain of 8%?
 1) 50% 2) 35% 3) 30% 4) 20%
20. The cost of manufacture of an article is Rs. 1, 500. The marked price of the article is fixed 20% above the cost. What percent of discount is to be allowed on the article so that there may be a gain of 5%?
 1) $12\frac{1}{2}\%$ 2) 40% 3) 22% 4) $16\frac{3}{4}\%$
21. An article is sold at a loss of 5%. Had it been sold for Rs. 510 more, the profit would have been 12%. Find the cost price of the article.
 1) Rs. 2500 2) Rs. 3000 3) Rs. 3500 4) Rs. 5200
22. An article is sold for Rs. 36, 000 at a gain of 20%. Had it been sold for Rs. 32, 500, what would be the profit or loss percent?
 1) $11\frac{1}{2}\%$ 2) $8\frac{1}{3}\%$ 3) $9\frac{1}{2}\%$ 4) $11\frac{3}{4}\%$
23. An article is sold at a profit of 16%. Had it been bought at 10% less and sold for Rs. 510 more, there would have been a profit of 30%. Find the cost price of the article.
 1) Rs. 60000 2) Rs. 45750 3) Rs. 51000 4) Rs. 35000

24. An article is sold at a loss of 10%. Had it been bought at 5% less and sold for Rs. 120 more, there would have been a profit of 20%. Find the cost price of the article.
 1) Rs. 600 2) Rs. 575 3) Rs. 500 4) Rs. 350
25. A trader makes a profit of 26% on an article after allowing two successive discounts of 10% and 20% on its catalogue price. Find by how much percent above the cost of manufacture the marked prices were fixed.
 1) 75% 2) 60% 3) 50% 4) 30%
26. The cost price of 24 articles is equal to the selling price of 15 articles. What is the profit percent?
 1) 60% 2) 50% 3) 75% 4) 100%
27. If a merchant sells rice at Rs. 16.50 per kg, there is a loss of 10%. At what price per kg should he sell the rice so that he gains 20%?
 1) Rs. 22 2) Rs. 25 3) Rs. 20 4) Rs. 18
28. A person sold 35 articles for the same money as he paid for 40 articles. Find the profit percent?
 1) $16 \frac{1}{6}\%$ 2) $14 \frac{2}{7}\%$ 3) 15% 4) 10%
29. A whole seller sells 45 articles for the price of 40 articles to the retailer. If the retailer sells the articles at the marked price, find his profit or loss percent.
 1) $12 \frac{1}{2}\%$ 2) 15% 3) $7 \frac{1}{2}\%$ 4) 10%
30. Some articles are purchased for Rs. 4, 500. Two-thirds of the articles are sold at a loss of 5%. In order to gain 5% on the whole, at what gain percent should the remaining articles be sold?
 1) 16% 2) 15% 3) 35% 4) 25%
31. A man purchases a certain number of articles at 5 per rupee and the same number at 6 per rupee. He mixed them together and sold them at 6 per rupee. What is his gain or loss percent?
 1) $9 \frac{1}{11}\%$ profit 2) $9 \frac{1}{11}\%$ loss 3) $7 \frac{1}{5}\%$ loss 4) $7 \frac{1}{5}\%$ profit
32. A man bought 6 cows and 8 oxen for Rs. 78,000. If he sells the cows at a profit of 15% and oxen at a profit of 20%, he gains Rs. 14,100. Find the price at which he bought a cow.
 1) Rs. 6, 000 2) Rs. 5, 000 3) Rs. 7, 000 4) Rs. 6, 750
33. If the price of an article is marked at 30% above its cost price and a discount of 15% is allowed, find the gain or loss percent on selling the article.
 1) 12% 2) 10% 3) $10 \frac{1}{2}\%$ 4) $14 \frac{3}{4}\%$
34. A reduction of 25% percent in the price of apples enables a person to buy 10 more apples for Rs. 100. Find the cost of each apple, before reduction of price.

- 1) Rs. 2.50 2) Rs. 2 3) Rs. 3.50 4) Rs. 4
35. A man bought two articles for Rs. 13, 500. He sold one of the articles at a loss of 10% and the other at a gain of 15% so that on the whole he neither gains nor loses. Find the cost of each article.
1) Rs. 6000, Rs. 7500 2) Rs. 5400, Rs. 8100 3) Rs. 5000, Rs. 7500 4) None of these
36. A shopkeeper sells a shirt at a profit of 10%. He sells another shirt of same price at a profit of 15%. If the difference between the selling prices of the two shirts is Rs. 50, find the cost price of each shirt.
1) Rs. 3600 2) Rs. 2000 3) Rs. 1000 4) Rs. 1500
37. A merchant bought two articles at Rs. 750 each. He sells one of them at a gain of 20% and the other at a loss of 10%. Find the gain or loss percent on the whole.
1) 6% loss 2) 5% loss 3) 5% profit 4) 10% profit
38. A merchant sold each of the two articles for Rs. 1, 500. The first one is sold at a profit of 20% and the second one at a loss of 20%. Find the percent gain or loss on the whole.
1) 6% loss 2) 4% loss 3) 5% profit 4) 6% profit
39. A merchant sold each of the two articles for Rs. 2, 000. If the first one is sold at a loss of 10% and the second one is sold at a profit of 30%. find the percent gain or loss on the whole.
1) 6 ½% loss 2) 5 ¾% loss 3) 6 ¼% profit 4) 7% profit
40. If the profit on selling an article for Rs. 5000 is twice the loss on selling it for Rs. 3,500, find that cost price of the article.
1) Rs. 4500 2) Rs. 4000 3) Rs. 4250 4) None of these
41. A man sells two articles for Rs. 2, 970 each, gaining 10% on one and losing 10% on the other. Find his total gain or loss.
1) Rs. 20 loss 2) Rs. 30 loss 3) Rs. 35 profit 4) Rs. 40 profit
42. What profit or loss percent is made by selling an article at a certain price, if by selling it at 1/3rd of that price would result in 50% loss?
1) 60% loss 2) 50% loss 3) 50% profit 4) 65% profit
43. A merchant sells rice at cost price, but uses a weight of 900 gm for every kg weight. Find the profit percent of the merchant.
1) 9 1/11% 2) 10% 3) 15 ½% 4) 12%
44. A merchant bought a certain number of articles at Rs. 250 per score. If he sells them at Rs 4000 per gross, find his profit or loss percent.
1) 66 2/3 % loss 2) 66 2/3 % profit 3) 52 % profit 4) 52 % loss

45. A company marks an article at Rs. 2, 500. If it is sold at Rs. 1, 900, there is a loss of 5% on the article. Find by how much percent above the cost the marked price is fixed.
 1) 25 % 2) 30 % 3) 40 % 4) None of these
46. A merchant professes to sell the goods at cost price but earns a profit of 25%. Find the weight he uses for every kg.
 1) 850 gm 2) 800 gm 3) 750 gm 4) None of these
47. A merchant calculates the loss percentage of an article on its selling price as 15%. Find the actual loss percentage on the article.
 1) 20 % 2) 25% 3) 18% 4) None of these
48. Find a single discount equivalent to successive discounts 20%, 15% and 5%.
 1) 40% 2) 45% 3) 42% 4) None of these
49. What is the profit percent on selling an article at a certain price, if by selling it at $\frac{1}{4}$ th of that price would be a loss of 60%?
 1) 40% 2) 50% 3) 75% 4) 60%
50. A shopkeeper purchases 40 dozens of eggs at Rs. 18 per dozen. Of these, 156 eggs were spoilt. At what price per dozen should the remaining eggs be sold so that there is an overall profit of 20%?
 1) Rs. 25 2) Rs. 32 3) Rs. 35 4) Rs. 40
51. Let a certain number of articles be bought at prices ranging from Rs. 1,000 to Rs. 1,500 and sold at prices ranging from Rs. 1,800 to Rs. 2,250. Find the greatest possible profit that might be made in selling ten articles.
 1) Rs. 12500 2) Rs. 18000 3) Rs. 7250 4) Rs. 10000
52. A merchant mixes 50 kg of rice that costs Rs. 12 a kg with 60 kg of rice that costs Rs. 15 per kg and sells the mixture at Rs. 16 per kg. Find the gain or loss percent on the whole.
 1) 16 $\frac{1}{2}$ % loss 2) 15 $\frac{3}{4}$ % loss 3) 26% profit 4) 17 $\frac{1}{3}$ % profit
53. If a discount of 5% is given on the marked price of an article, the gain is 10%. Find the gain or loss percent if an additional discount of 5% is given on the article.
 1) 5 $\frac{1}{2}$ % loss 2) 3 $\frac{3}{4}$ % loss 3) 4% profit 4) None of these
54. If a merchant sells an article at a profit of 20% and uses a weight, which is 10% less, find the total gain percent.
 1) 26 $\frac{1}{3}$ % loss 2) 33 $\frac{1}{3}$ % loss 3) 36 $\frac{1}{4}$ % profit 4) 27% profit
55. A shopkeeper professes to sell an article at its cost price but uses false weight. If his gain is 25% find the weight he uses for a kg weight.
 1) 500 gm 2) 800 gm 3) 550 gm 4) 400 gm

56. A man sold an article at a profit of 10%. If he had bought it at 20% less and sold at Rs. 250 more, he would have gained 25%. Find the cost price of the article.
 1) Rs. 2500 2) Rs. 1800 3) Rs. 2750 4) Rs. 3000
57. A merchant buys two types of rice, A and B at Rs. 15 and Rs. 18 respectively. If he mixes A and B in the ratio 4 : 5, and sells the mixture at Rs. 20 per kg. Find his gain or loss percent.
 1) 16% loss 2) 25 % loss 3) 20 % profit 4) 22 1/3% profit
58. There is gain of 10% if a discount of 5% is given on the marked price of a television set. If there is 5% more discount, what will be the profit percent?
 1) 5 % 2) 9 1/2 % 3) 6 % 4) None of these
59. By selling 120 articles, a merchant gains the selling price of 20 articles. Find the gain percent.
 1) 35 % 2) 25 % 3) 20 % 4) None of these
60. By selling 50 articles, a merchant loses the cost price of 10 articles. Find the loss percent.
 1) 30 % 2) 25 % 3) 20 % 4) None of these
61. A merchant sells 120 articles. He sells a part of them at a profit of 25% and the rest at a profit of 10%. He gains 15% on the whole. Find the quantity sold at 10% profit.
 1) 50 2) 40 3) 80 4) 100
62. A man sells two articles for Rs. 4,800 each. He gains 25% on one and loses 25% on the other. Find the total cost price.
 1) Rs. 12,500 2) Rs. 10,240 3) Rs. 12,750 4) Rs. 13,000
63. 6% of the cost price of an article is equal to 5% of its selling price. If the difference between 8% of selling price of the article and 9% of its cost price is Rs. 9, which of the following is the cost price and selling price of the article?
 1) Rs. 1200, Rs. 2500 2) Rs. 1500, Rs. 1800 3) Rs. 1750, Rs. 2500 4) None of these
64. In what proportion must water must he mixed with alcohol to gain 30% by selling it at the cost price?
 1) 5:8 2) 8: 5 3) 10: 3 4) 3: 10

SIMPLE INTEREST & COMPOUND INTEREST

1. The simple interest on a sum is $\frac{1}{9}$ th of the principal. If the rate percent per annum is same as the number of years, find the rate percent.
 1) 3 % 2) $3\frac{1}{3}\%$ 3) 4 % 4) $4\frac{1}{2}\%$
2. Find the simple interest on Rs. 6000 at 5% per annum for the period from March 30th to September 15th (approx.)
 1) Rs. 138 2) Rs. 124 3) Rs. 113 4) Rs. 118
3. A certain sum of money amounts to Rs. 1210 in 2 years and Rs. 1265 in 3 years. Find the sum and rate of interest.
 1) Rs. 1130, 4% 2) Rs. 1100, 5% 3) Rs. 1500, 3% 4) Rs. 1200, 4%
4. In what time does a certain sum of money become five times at simple interest, if the rate of interest is 5% per annum?
 1) 60 years 2) 80 years 3) 50 years 4) 45 years
5. A man deposits Rs. 2500 in a bank at the rate of 1.5% per month simple interest. After sometime he withdrew an amount of Rs. 2762.50. After what time did he withdrew the deposit?
 1) 6 months 2) 4 months 3) 5 months 4) none of these
6. A sum of money becomes four times in 20 years at simple interest. What is the rate of interest?
 1) 13 % 2) 12 % 3) 10 % 4) 11 %
7. In how many years will a certain sum of money become twenty times itself at $6\frac{1}{3}\%$ per annum simple interest?
 1) 60 years 2) 80 years 3) 50 years 4) none of these
8. What annual payment will discharge a debt of Rs. 1210 due in five years at simple interest, the rate of interest being 5% per annum?
 1) Rs. 220 2) Rs. 240, 3) Rs. 300 4) Rs. 180
9. What annual payment will discharge a debt of Rs. 2090 due in 4 years, the rate of interest being 3% per annum simple interest?
 1) Rs. 550 2) Rs.: 500 3) Rs. 400 4) none of these
10. Find the simple interest on a sum of Rs. 72, 000 at $11\frac{1}{9}\%$ per annum in 39 months.
 1) Rs. 25000 2) Rs. 21650 3) Rs.26000 4) Rs. 32000
11. Rate of interest for the first two years is 3% per annum, for the next three years is 5% per annum and for the period beyond five years is 8% per annum. If the man lends Rs. 15, 000 at simple interest for eight years, what is the interest he gets?

- 1) Rs. 2500 2) Rs. 1650 3) Rs.2510 4) Rs. 3250
12. A certain sum of money is lent at 5 % per annum for the first two years. 6 % per annum for the next three years, and 8 % per annum for the remaining period. If the interest for the period of ten years is Rs. 6216, find the sum lent.
- 1) Rs. 12500 2) Rs. 11650 3) Rs.34510 4) Rs. 12000
13. A sum of money doubles itself in 5 years at simple interest. What is the rate of interest?
- 1) 20% 2) 10% 3) 15% 4) 8%
14. If Rs. 3500 invested at simple interest yields a return of Rs. 144 in 8 months, find the rate of interest.
- 1) 2% 2) 4% 3) 5% 4) 6%
15. In what time does a sum of money become 3 times at the simple interest rate of 8% per annum?
- 1) 30 years 2) 20 years 3) 15 years 4) 25 years
16. A man borrowed Rs. 35,000 from a moneylender at a rate of 10% per annum, and cleared the amount by giving Rs. 5000 in cash and a motorbike, after one year. What is the price of the motorbike?
- 1) Rs. 30000 2) Rs. 33500 3) Rs. 35000 4) none of these
17. A sum of money doubles itself in 5 years. In how many years, will it become six times the original?
- 1) 35 years 2) 20 years 3) 15 years 4) 25 years
18. A sum of money trebles itself in 6 years. In how many years, will it become 11.5 times the original?
- 1) 35 years 2) 22.5 years 3) 31.5 years 4) 25 years
19. At a certain rate of simple interest, Rs. 1200 amounted to Rs. 1320 in 2 years. If the rate be increased by 5%, what will be the amount after 4 years?
- 1) Rs. 1600 2) Rs. 1680 3) Rs. 1750 4) Rs. 1800
20. At a certain rate of simple interest, Rs. 2500 amounted to Rs. 2700 in 2 years. If the rate of interest be decreased by 1%, what will be the amount after 5 years?
- 1) Rs. 2875 2) Rs. 2750 3) Rs. 3000 4) Rs. 2900
21. What is the amount due on a loan of Rs. 12,500 taken at 12% p.a. simple interest, at the end of 3 years?
- 1) Rs. 16000 2) Rs. 8000 3) Rs. 17500 4) Rs. 17000
22. Divide Rs. 4662 into 3 parts so that their amounts after 2, 3 and 4 years respectively may be equal, the rate of interest being 4% per annum.
- 1) Rs. 1584, Rs. 1590, Rs. 1622 2) Rs. 1584, Rs. 1560, Rs. 1522

- 3) Rs. 1584, Rs. 1566, Rs. 1512 4) none of these
23. A sum was lent at simple interest at a certain rate for 2 years. Had it been put at 4% higher rate, it would fetch Rs. 500 more. Find the sum lent.
1) Rs. 7500 2) Rs. 6250 3) Rs. 6500 4) Rs. 9000
24. The simple interest on a certain sum is Rs. 500 for 2 years. If the principal is doubled for the next 3 years, what will be the total interest at the end of the 5 years?
1) Rs. 1500 2) Rs. 1000 3) Rs. 2500 4) Rs. 2000
25. A sum of Rs. 5400 is lent out in two parts in such a way that the interest on one part at 5 % for 3 years is equal to that on another part at 6% for 2 years. Which of the following are two parts?
1) Rs. 2400, Rs. 3000 2) Rs. 2500, Rs. 2900
3) Rs. 3400, Rs. 2000 4) none of these
26. If the interest on a certain sum of money is $\frac{3}{8}$ of the sum itself, at the end of $6\frac{1}{4}$ years, find the rate of interest.
1) 2% 2) 4% 3) 5% 4) 6%
27. A certain sum amounted to Rs. 6720 at 4% per annum simple interest, in a time period, in which Rs. 6250 amounted to Rs. 6812.50 at 3% per annum simple interest.
1) Rs. 6000 2) Rs. 6500 3) Rs. 5500 4) Rs. 5700
28. A sum of Rs. 5500 is lent out in two parts, one at 12% and the other at $12\frac{1}{2}\%$. If the annual income is Rs. 676.50, find the money lent at $12\frac{1}{2}\%$.
1) Rs. 2200 2) Rs. 3300 3) Rs. 2500 4) Rs. 3000
29. A certain sum amounts to Rs. 3840 in 4 years at 5% per annum at simple interest. In how many years will it amount to Rs. 4160 at the same rate of interest?
1) 6 years 2) 8 years 3) 5 years 4) 7 years
30. The simple interest on Rs. 3400 is less than the simple interest on Rs. 4200 at 5% by Rs. 200. Find the time.
1) 6 years 2) 6.5 years 3) 5 years 4) 4.5 years
31. In how many years will the simple interest on Rs. 4500 at 4% p.a. be the same as the simple interest on Rs. 5000 in 4 years at 3%, p.a.?
1) $3\frac{1}{3}$ years 2) $4\frac{1}{2}$ years 3) 5 years 4) none of these
32. Two equal sums of money are lent, each at 8% per annum for 4 and 5 years respectively. If the difference between their interests is Rs. 320, find each sum.
1) Rs. 4500 2) Rs. 5500 3) Rs. 5000 4) Rs. 4000

33. A man invested Rs. 12,000 at 8% p.a. simple interest, and some amount at 12% p.a. simple interest. If the total interest at the end of the year was 10% p.a., what is the sum that is invested at 12%?
 1) Rs. 15000 2) Rs. 10500 3) Rs. 12,000 4) none of these
34. Rs. 70000 was lent in two parts at simple interest, one at 6% per annum and the other at 4% per annum. If the total simple interest is Rs. 16,000 in 5 years, find the amount lent at 6% per annum.
 1) Rs. 25000 2) Rs. 50000 3) Rs. 45000 4) Rs. 2000
35. A man lent Rs. 5000 to A for 2 years and Rs. 7000 to B for 3 years. If he got a total of Rs. 1550 as simple interest, then the rate of interest is
 1) 6% 2) 5 % 3) 5.5 % 4) 7 %
36. A man lent $\frac{1}{2}$ of the capital at 5%, $\frac{1}{4}$ of the capital at 6% and the remaining at 8%. If he gets a simple interest of Rs. 1060, find the capital.
 1) Rs. 16000 2) Rs. 16500 3) Rs. 15000 4) Rs. 12500
37. A man lent Rs. 25000 in four parts. He lent Rs. 5000 at 5%. Rs. 6000 at 6% and Rs.9000 at 4%. What rate percent should he lend the remaining, if the average interest is 5.5%.
 1) 6.5 % 2) 8.1 % 3) 7.5 % 4) 7.9 %
38. A man buys a television and makes a down payment of Rs. 6,000 in cash. He pays the balance in 3 years, at 6% p.a. simple interest, which amounts to Rs. 8,260. What is the actual price of the television?
 1) Rs. 14,500 2) Rs. 13,000 3) Rs. 12,675 4) Rs. 11,500
39. The interest on a certain sum of money at 4.5 % per annum is Rs. 1125 in one year. How much will be the additional interest on the same sum of money at 5% per annum?
 1) Rs. 150 2) Rs. 165 3) Rs. 125 4) Rs. 75
40. What is the sum that yields a simple interest in 3 years of Rs. 1, 425 at 5%, 6% and 8% per annum rate of interest respectively for three consecutive years?
 1) Rs. 5000 2) Rs. 6500 3) Rs. 6750 4) Rs. 7500
41. What is the sum that yields a simple interest of Rs. 5700 in 4 years at 5%, 8%, 10%, and 15%, per annum rate of interest respectively for four consecutive years?
 1) Rs. 15000 2) Rs. 16500 3) Rs. 16750 4) Rs. 17500
42. A man borrows Rs. 50,000 at 10% per annum simple interest. He repays the amount in two installments, one at the end of the first year and the other at the end of the second year. If he pays an amount of Rs. 24,000 at the end of the first year, what is the amount he should pay at the end of the second year?
 1) Rs. 26, 000 2) Rs. 28, 6500 3) Rs. 32.675 4) Rs. 33, 600

- 1) 8 years 2) 12 years 3) 9 years 4) none of these
54. In how many years will a sum become nine times itself, if it becomes three times itself in 10 years at compound interest?
- 1) 16 years 2) 20 years 3) 25 years 4) 30
55. In how many years will a sum become sixty four times itself, if it becomes four times itself in 12 years at compound interest?
- 1) 28 years 2) 48 years 3) 24 years 4) 36
56. A certain sum of money is lent at compound interest, compounded annually. If the interest on the sum is $\frac{3}{8}$ of the sum itself in one year, find the rate of interest.
- 1) 37.5 % 2) 40 % 3) 22.5 % 4) 26%
57. A certain sum of money is lent at compound interest, compounded annually. If the interest on the sum is $\frac{7}{9}$ of the sum itself in two years, find the rate of interest.
- 1) 30% 2) $33\frac{1}{3}\%$ 3) 21% 4) 33%
58. A certain sum of money is lent at compound interest, compounded annually. If the interest on the sum is $\frac{91}{125}$ of the sum itself in three years, find the rate of interest.
- 1) 20% 2) 25% 3) 30% 4) 16%
59. If a certain sum of money becomes 1.331 times of itself in three years at compound interest, compounded annually, find the rate of interest.
- 1) 13% 2) 11 % 3) 10% 4) none of these
60. Find the compound interest on Rs. 25500 in two years, the rate of interest being 5% for the first year and 6% for the second year.
- 1) Rs. 28381.50 2) Rs. 27500.75 3) Rs. 28400 4) 29725.25
61. If the compound interest on a certain sum for 2 years at 5% be Rs.4100, then what would be the simple interest on the same sum at the same rate for the same period?
- 1) Rs. 5000 2) Rs. 4500 3) Rs. 4000 4) none of these
62. If the simple interest on a certain sum of money at 6 % per annum for two years is Rs. 240, find the compound interest on the same sum for the same period.
- 1) Rs. 247.20 2) Rs. 300.50 3) Rs. 325.75 4) none of these
63. The compound interest and simple interest on a certain sum for 2 years is Rs. 1025 and Rs. 1000 respectively. Find the sum.
- 1) Rs. 8000 2) Rs. 9500 3) Rs. 10750 4) Rs. 10000
64. In the above problem, what is the rate of interest per annum?
- 1) 3% 2) 4 % 3) 5 % 4) 6%

65. A certain sum of money is lent at 12% p.a. simple interest for one year. If the same sum had been lent at 12% p.a. compound interest, compounded annually, which of the following is correct?
 1) $SI < CI$ 2) $CI < SI$ 3) $SI = CI$ 4) can't be determined
66. The compound interest, compounded yearly, on a certain sum of money for the second year is Rs. 880 and for the third year is Rs. 968. Find the sum of money.
 1) Rs. 8500 2) Rs. 7500 3) Rs. 10000 4) Rs. 8000
67. A sum of money Rs. 50000 is divided into two parts, and lent to two persons A and B. One part is lent at 12% p.a. simple interest for one year and the other part is lent at 12 % p.a. compound interest for one year, compounded half yearly. If the interest obtained on the part lent at compound interest is more than the interest obtained on the part lent at simple interest by Rs. 90, find the sum lent at simple interest.
 1) Rs. 24000 2) Rs. 24575 3) Rs. 25000 4) Rs. 23500
68. The difference between the compound interest and the simple interest on a certain sum at 4% per annum for 2 years is Rs. 15, find the sum.
 1) Rs. 12000 2) Rs. 13575 3) Rs. 15000 4) Rs. 35625
69. The difference between the compound interest and the simple interest on a certain sum at 5% per annum for 3 years is Rs. 183, find the sum.
 1) Rs. 22000 2) Rs. 32575 3) Rs. 25000 4) Rs. 24000
70. Find the difference between the simple interest at 12 % per annum and the compound interest of 12 % compounded half yearly on a certain sum of Rs. 30, 000.
 1) Rs. 120 2) Rs. 1850 3) Rs. 108 4) Rs. 210
71. If Rs. 41, 000 is divided between A and B, so that A's share at the end of 5 years may equal B's share at the end of 6 years, at 5 % compound interest, find the share of A.
 1) Rs. 20000 2) Rs. 18575 3) Rs. 24000 4) Rs. 21000
72. If a certain sum of money amounts to Rs. 8000 in 4 years and Rs. 8360 in 5 years on compound interest, find the rate per cent.
 1) 2% 2) 4 % 3) 7 % 4) 6%
73. A certain sum of money amounts to Rs. 15972 in 3 years and Rs. 19326.12 in 5 years, at compound interest, compounded annually. Find the sum lent.
 1) Rs. 12000 2) Rs. 10850 3) Rs. 11500 4) Rs. 12100.60
74. Every year the value of a machine depreciates by 5% of its value at the beginning of the year. If its value is estimated to be Rs. 42868.75 at present, what was its value three years back?
 1) Rs. 48000 2) Rs. 57500 3) Rs. 50000 4) Rs. 61000

75. Find the present worth at 5% per annum simple interest of Rs. 6375 due 15 months later.
 1) Rs. 5750 2) Rs. 6000 3) Rs. 6100 4) none of these
76. Find the true discount in the above problem.
 1) Rs. 375 2) Rs. 275 3) Rs. 625 4) Rs. 500
77. A certain sum of Rs. 75, 660 is to be paid back in three equal installments. Find the value of each installment if interest is compounded at 5% per annum.
 1) Rs. 25750 2) Rs. 25220 3) Rs. 27783 4) none of these
78. A certain sum of Rs. 50, 440 is to be paid back in three equal installments. Find the value of each installment if interest is 10% per annum, compounded half-yearly.
 1) Rs. 15750 2) Rs. 18522 3) Rs. 16194 4) none of these
79. The compound interest on a certain sum of money at 5% per annum for two years is Rs. 246. Find the simple interest on the same sum for 3 years at 6% per annum.
 1) Rs. 575 2) Rs. 432 3) Rs. 610 4) none of these
80. A certain sum of money is invested at compound interest payable annually. The interests in two successive years were Rs. 225 and Rs. 238.50. Find the rate percent,
 1) 2% 2) 4 % 3) 7 % 4) 6%
81. A certain sum of money is lent on compound interest for two years at 20 % per annum. If it would fetch Rs. 482 more if the interest was payable half yearly than if were payable yearly, what is the amount lent?
 1) Rs. 15750 2) Rs, 26000 3) Rs. 20000 4) none of these
82. The simple interest in three years and the compound interest in two years on a certain sum at the same rate are Rs. 1200 and Rs. 832 respectively. Find the difference between the compound interest and the simple interest for three years.
 1) Rs. 150.50 2) Rs. 98.56 3) Rs. 100.70 4) Rs. 113.48
83. A man borrowed a certain sum of money and paid it back in two years in two equal installments. The compound interest reckoned at 4 %. If he pays back annually Rs. 676, find the sum borrowed by him.
 1) Rs. 1575 2) Rs. 1275 3) Rs. 2500 4) none of these
84. A man lent a certain sum of money at compound interest for three years, rate of interest being 4%, 5% and 6% respectively. If the amount at the end of the three years is Rs. 1,38,902.40, find the sum lent.
 1) Rs. 1,15,750 2) Rs. 1,20,000 3) Rs. 1,10,500 4) Rs. 1,00,000
85. What is the effective rate of interest per annum for 20% p.a. compound interest compounded half yearly?
 1) 20 % 2) 22 % 3) 21 % 4) 23%

86. What is the effective rate of interest per annum for 80% p.a. compound interest, compounded quarterly?
 1) 40 % 2) 44 % 3) 46.41 % 4) none of these
87. What is the rate of simple interest that is equal to 20% p.a. compound interest compounded half yearly?
 1) 20 % 2) 21 % 3) 22 % 4) none of these
88. What is the sum that yields a compound interest in 3 years of Rs. 2,020.40 at 5%, 6% and 8% per annum rate of interest respectively for three consecutive years?
 1) Rs. 15000 2) Rs. 12500 3) Rs. 10000 4) Rs. 11500
89. A man borrows Rs. 5000 at 12 % compound interest per annum, interest payable after six months. He pays back Rs. 1800 at the end of every six months. Find the third payment he has to make at the end of eighteen months in order to clear the entire loan.
 1) Rs. 1500 2) Rs. 1250.50 3) Rs. 1900.25 4) Rs. 2024.60
90. A loan of Rs. 48800 is to be paid, back in three equal installments. If the rate of interest is 25% per annum compounded annually, find the installments.
 1) Rs. 18000 2) Rs. 25000 3) Rs. 21000 4) Rs. 21950
91. A television set is available for Rs. 39,300 cash or for Rs. 12,820 cash down payment and three equal half yearly installments. If the bank charges interest at the rate of 20% per annum compounded half yearly, calculate each installment.
 1) Rs. 12000 2) Rs. 10500 3) Rs. 11736 4) Rs. 10648
92. An article is sold for Rs. 19200 cash for Rs. 4800 cash down payment and five equal monthly installments. If the rate of interest is charged at 12% p.a., find each installment.
 1) Rs. 1840.50 2) Rs. 2598.30 3) Rs. 2964.70 4) Rs. 1950
93. A computer is sold for Rs. 30000 cash or Rs. 17500 cash down payment and 8 monthly installments of Rs. 1700 each. Find the rate of interest (approx. value) being charged under this installment scheme.
 1) 25 % 2) 24 % 3) 30 % 4) 26%
94. A person borrowed some money on compound interest and returned it in three equal yearly installments. Find the sum borrowed, if the annual installment is Rs. 486680 and the rate of interest is 15%.
 1) Rs, 1327000 2) Rs. 1050000 3) Rs. 1111200 4) Rs. 1064800
95. An article is sold for Rs. 5000 cash or for Rs. 2500 down payment followed by Rs. 2600 after three months. Find the rate of interest.
 1) 25 % 2) 14 % 3) 16 % 4) 26%

96. A sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. The sum is:
 A.Rs 650 B.Rs 690 C.Rs 698 D.Rs 700
97. Mr. Thomas invested an amount of Rs. 13,900 divided in two different schemes A and B at the simple interest rate of 14% p.a. and 11% p.a. respectively. If the total amount of simple interest earned in 2 years be Rs. 3508, what was the amount invested in Scheme B?
 A.Rs. 6400 B. Rs. 6500 C.Rs. 7200 D.Rs. 7500 E. None of these
98. A sum fetched a total simple interest of Rs. 4016.25 at the rate of 9 p.c.p.a. in 5 years. What is the sum?
 A.Rs. 4462.50 B.Rs. 8032.50 C.Rs. 8900 D.Rs. 8925 E. None of these
99. How much time will it take for an amount of Rs. 450 to yield Rs. 81 as interest at 4.5% per annum of simple interest?
 A. 3 5 years B.4 years C 4.5 years D.5 years
100. Reena took a loan of Rs. 1200 with simple interest for as many years as the rate of interest. If she paid Rs. 432 as interest at the end of the loan period, what was the rate of interest?
 A.3.6 B.6 C.18 D. Cannot be determined E. None of these
101. A sum of Rs. 12,500 amounts to Rs. 15,500 in 4 years at the rate of simple interest. What is the rate of interest?
 A.3% B.4% C.5% D.6% E. None of these
102. A person takes a loan of Rs. 200 at 5% simple interest. He returns Rs. 100 at the end of 1 year. In order to clear his dues at the end of 2 years, he would pay:
 A.Rs. 105 B.Rs. 110 C.Rs. 115 D.Rs. 115.50
103. An automobile financier claims to be lending money at simple interest, but he includes the interest every six months for calculating the principal. If he is charging an interest of 10% the effective rate of interest becomes:
 A. 10% B. 10.25% C.10.5% D. None of these
104. A lent Rs. 5000 to B for 2 years and Rs. 3000 to C for 4 years on simple interest at the same rate of interest and received Rs. 2200 in all from both of them as interest. The rate of interest per annum is:
 A. 5% B.7% C.71/8% D.10%
105. A sum of Rs. 725 is lent in the beginning of a year at a certain rate of interest. After 8 months, a sum of Rs. 362.50 more is lent but at the rate twice the former. At the end of the

- year, Rs. 33.50 is earned as interest from both the loans. What was the original rate of interest?
- A.3.6% B.4.5% C.5% D.6% E. None of these
106. A man took loan from a bank at the rate of 12% p.a. simple interest. After 3 years he had to pay Rs. 5400 interest only for the period. The principal amount borrowed by him was:
A.Rs. 2000 B.Rs. 10,000 C.Rs. 15,000 D.Rs. 20,000
107. A sum of money amounts to Rs. 9800 after 5 years and Rs. 12005 after 8 years at the same rate of simple interest. The rate of interest per annum is:
A. 5% B.8% C.12% D.15%
108. What will be the ratio of simple interest earned by certain amount at the same rate of interest for 6 years and that for 9 years?
A. 1:3 B.1:4 C.2: 3 D. Data inadequate E. None of these
109. A certain amount earns simple interest of Rs. 1750 after 7 years. Had the interest been 2% more, how much more interest would it have earned?
A.Rs. 35 B.Rs. 245 C.Rs. 350 D. Cannot be determined E. None of these
110. A person borrows Rs. 5000 for 2 years at 4% p.a. simple interest. He immediately lends it to another person at $6\frac{1}{4}$ p.a for 2 years. Find his gain in the transaction per year.
A.Rs. 112.50 B.Rs. 125 C.Rs. 150 D.Rs. 167.50

Exercise2(Higher Skill Level Questions)

1. A sum of money becomes 3 times in 12 years. In how many years it will become 5 times at the same rate of interest?
a) 20 years b) 16 years c) 24 years d) 30 years
2. If a sum of money placed at compound interest becomes 3 times of itself in 3 year. In how many years will it be 9 times at the same rate of interest?
a) 6 years b) 9 years c) 12 years d) 5 years
3. The difference between simple interest and compound interest on a sum for 2 years at 8% when the interest is compounded annually is Rs. 16. If the interest were compounded half yearly the difference between in two interests would be nearly.....
a) Rs. 16 b) Rs. 16.80 c) Rs. 21.85 d) Rs. 24.64
4. A man lends Rs. 10000 in four parts. If he gets 8% on Rs. 2000, $7\frac{1}{2}$ % on Rs. 4000 and $8\frac{1}{2}$ % on Rs. 1400. What percent must he get for the remainder if the average interest is 8.13%?
a) 7% b) 9% c) $9\frac{1}{4}$ % d) $10\frac{1}{2}$ %

5. Out of a sum of Rs. 625, apart was lent at 5% SI and the other at 10% SI. If the interest on the first part after 2 years is equal to the interest on the second part after 4 years, then the second sum(in Rs.) is:
- a) 250 b) 300 c) 125 d) 275
6. The difference between the simple and the compound interest compounded every six months at the rate of 10 per cent per annum at the end of two years is Rs. 124.05. What is the sum?
- a) Rs. 10000 b) Rs. 6000 c) Rs. 12000 d) Rs. 8000
7. Ajay borrows Rs. 1500 from two money lenders. He pays interest at the rate of 12% per annum for one loan and at the rate of 14% per annum for the other. The total interest he pays for the entire year is Rs. 186. How much does he borrow at the rate of 12%?
- a) Rs. 1200 b) Rs. 1300 c) Rs. 1400 d) Rs. 300
8. A man invests an amount of Rs. 15860 in the names of his three sons A,B and C in such a way that they get the same amount after 2,3 and 4 years respectively. If the rate of simple interest is 5%. Then the ratio of amounts invested among A,B and C will be:
- a) 10:15:20 b) 22:23:24 c) 6:4:3 d) 2:3:4
9. Rs. 2189 are divided into three parts such that their amounts after 1,2 and 3 years respectively may be equal, the rate of simple interest being 4% in all cases. The smallest part is:
- a) Rs.702 b) Rs.597 c) Rs. 756 d) Rs. 1093
10. A scooty is sold by an automobile agency for Rs. 19200 cash for Rs. 4800 cash down payment together with five equal monthly installments. If the rate of interest charged by the company is 12% per annum find each installment.
- a) Rs. 2964.70 b) RS 2900 c) Rs. 2845.60 d) None of these
11. A sum of Rs. 1100 was taken as a loan. This is to be repaid in two equal installments. If the rate of interest be 20% compounded annually , then the value of each installments is:
- a) Rs. 842 b) Rs. 792 c) Rs. 720 d) Rs. 700
12. What annual payment will discharge a debt of Rs. 7620 due in 3 years at $16\frac{2}{3}$ % per annum compound interest?
- a) Rs. 2540 b) Rs. 3430 c) Rs. 3260 d) Rs. 3380
13. The compound interest on a certain sum for 2 years is Rs. 756 and SI is Rs. 720. If the sum is invested such that the SI is Rs. 900 and the number of years is equal to the rate percent per annum, find the rate percent:
- a) 4 b) 5 c) 6 d) 1.0

14. Data Ram lends equal sum of money at the same rate of interest to A and B. The money lends to A becomes twice of the original amount in just four years at simple interest. While Data Ram lends to B for the first two years at compound interest and for the rest two years at simple interest . If the difference between the amount of A and B after 4 years is Rs. 2750. What is the amount of money that Data Ram lends to each one?
- a) Rs. 40000 b) Rs. 6000 c) Rs. 8000 d) Rs. 80000
15. Satyam took loan from IDIDI bank for his 2 years course of MBA at IMD. He took the loan of Rs. 6 lakh such that he would be charged at 8% per annum at CI during his course and at 10% CI after the completion of course. He returned half of the amount which he had to be paid on the completion of his studies and remaining after 2 years. What is the total amount returned by Satyam?
- a) Rs. 7.73323 lakh b) Rs. 7.58 lakh c) Rs. 7.336 lakh d) none of these
16. We had 1000 goats at the beginning of year 2001 and the number of goats each year increases by 10% by giving birth (compounded annually). At the end of the each year we double the number of goats by purchasing the same number of goats as there is the number of goats with us at the time. What is the number goat at the beginning of 2004?
- a) 106000 b) 10648 c) 8848 d) 8226
17. Hari Lal and Hari Prasad have equal amounts. Hari Lal invested his entire amount at 10% compounded annually for 2 years and Hari Prasaad invested $\frac{1}{4}$ at 10% compound interest (annually) and rest at $r\%$ per annum at simple interest for the same 2 years period. The amount received by both at the end of 2 year is same. What is the value of r ?
- a) 14% b) 12.5% c) 10.5% d) 11%
18. ICICI lent Rs. 1 lakh to Captain Ram Singh @ 6% per annum of simple interest for 10 years period. Meanwhile ICICI offered a discount in rate of interest for armed forces. Thus the rate of interest ICICI decreased to 4%. In this way Ram Singh had to pay total amount 1.48 lakh. After how many years Ram Singh got the discount in rate of interest?
- a) 3 years b) 4 years c) 6 years d) 5 years
19. Sanjay purchased a hotel worth Rs. 10 lakh and Barkha purchased a car worth Rs. 16 lakh. The value of hotel every year increases by 20% of the previous value and the value of car every year depreciates by 25%. What is the difference between the price of hotel and car after 3 years?
- a) Rs. 92500 b) RS. 10,53,000 c) remains constant d) can't be determined

TIME, DISTANCE & SPEED

1. A man is walking at the rate of 10 kmph. After every kilometer he takes rest for 5 min. How much time will be taken to cover a distance of 5km?
a) 55min b) 50 min c) 45 min d) 60 min
2. The distance between two stations from A to B is 300 km. One train leaves station A towards station B at an average speed of 40 kmph. At the same time another train leaves station B towards station A at an average speed of 80 kmph. The distance from station A where the two trains will meet is
a) 150 b) 200 c) 90 d) 100
3. A train running at an average speed of 30 kmph covers a distance in 6 hours. Find the speed of another train which covers the same distance in 5 hours.(in kmph)
a) 18 b) 25 c) 36 d) 30
4. A goods train leaves a station at a certain time and at fixed speed. After 6 hours, the express train leaves the same station and moves in the same direction at a uniform speed of 90 kmph. This train catches up the goods train in 4 hours. Find the speed of goods train is.....
a) 27 b) 30 c) 36 d) 26
5. Train A took 35 min to cover a distance of 50 km. If the speed of train B is 25% faster than train A, it will cover the same distance inmin
a) 24 b) 21 c) 18 d) 28
6. A man covers 28 km at 7 kmph, 16 km at 4 kmph and 6 km at 3 kmph . Find the avg speed is ...
a) 7 b) 6 c) 9 d) 5
7. A man is walking at a speed of $\frac{3}{4}$ of the usual speed, reaches his office late by 2 hours. Find the usual time.....
a) 6 b) 2 c) 3 d) 5
8. A man is walking at $\frac{5}{4}$ of the usual speed, reaches his office 12 min too early. What is the usual time
a) 1 b) 3 c) 2 d) 3
9. A theft is reported to a policeman .The thief starts running and the police man chases him. When the police man starts chasing the thief was at a distance of 250 m. The thief and the police man run at the speed of 8 kmph and 9 kmph. Find the time the policeman will take to the thief is.....
a) 15 min b) 8 min c) 20 min d) 11 min

10. A train leaves a station A towards station B at an average speed of 60 kmph at 9.00 am. After 2 hours another train leaves a station A at an average speed of 100 kmph. When the two trains will meet is
 a) 12 pm b) 11 am c) 2pm d) 3 pm
11. A starts from X towards y and B starts from Y towards X respectively. If they cover the distance in 4 h and 6 h respectively. When will they meet is
 a) 1.4 b) 4 c) 3 d) 2.4
12. A starts from X towards y at 10.00 am. B starts from Y towards x at 11.00 am. If they reach their destinations at 2 pm and 5 pm respectively. At what time will they meet is...
 a) 11.48 b) 12.48 c) 11.40 d) 12.40
13. Peter can cover a certain distance in 1 hr 24 min. by covering two-third of the distance at 4 kmph and the rest 5 kmph . Find the total distance.
 a) 6 km b) 4 km c) 3 km d) 2 km
14. A man travelled from the village to the post office at the rate of 25 kmph and walked back at the rate of 4 kmph. If the whole journey took 5 hours 48 minutes, find the distance of the post
 a) 6 km b) 4 km c) 3 km d) 2 km
15. If a man walks at the rate of 5 kmph , he misses a train by 7 minutes. However if he walks at the rate of 6 kmph , he reaches the station 5 minutes before the arrival of the train . Find the distance covered by him to reach the station.
 a) 7 km b) 8 km c) 6 km d) 5 km
16. I walk a certain distance and ride back taking a total time of 37 minutes. I could walk both ways in 55 minutes. How long would it take me to ride both ways?
 a) 17 b) 18 c) 19 d) 11
17. If a train runs at 40 kmph , it reaches its destination late by 11 minutes but if it runs at 50 kmph , it is late by 5 minutes only . The correct time for the train to complete its journey is....
 a)37 b)3 8 c) 4 9 d) 40
18. Narayan murthy walking at a speed of 20 kmph reaches college 10 minutes late. Next time he increases his speed by 5 kmph, but finds that he is still late by 4 minutes. What is the distance of his college from his house...
 a) 10 km b) 8 km c) 9 km d) 11 km
19. An express train travelled at an average speed of 100 kmph, stopping for 3 min after every 75 km. How long did it take to reach its destination 600 km from the starting point?
 a) 6hrs21min b)6hrs24min c) 6hrs27min d)6hrs30min

20. Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?
 a) 9 b) 10 c) 12 d) 20
21. A train can travel 50% faster than a car. Both start from point A at the same time and reach point B 75 kms away from A at the same time. On the way, however the train lost about 12.5 minutes while stopping at the stations. The speed of the car is :(in kmph)
 a) 100 b) 110 c) 120 d) 130 kmph
22. In a flight of 600km and aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 kmph and the time of flight increased by 30 min. The duration of the flight is?
 a) 1hr b) 2hrs c) 3 hrs d) 4hrs
23. It takes 8 hrs for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 min more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the car is?
 a) 2:3 b) 3:2 c) 3:4 d) 4:3
24. A and B are two stations 390 km apart. A train starts from A at 10 a.m and towards B at 65 kmph. Another train starts From B at 11 a.m and travels towards A at 35 kmph. At what time do they meet?
 a) 1 p.m b) 1.15 c) 2.15 d) 3
25. A person crosses a 600 m long street in 5 minutes. What is his speed in km per hour?
 A. 3.6 B. 7.2 C. 8.4 D. 10
26. An aeroplane covers a certain distance at a speed of 240 kmph in 5 hours. To cover the 2 same distances in $1\frac{2}{3}$ hours, it must travel at a speed of:
 A. 300 kmph B. 360 kmph C. 600 kmph D. 720 kmph
27. If a person walks at 14 km/hr instead of 10km/hr, he would have walked 20 km more. The actual distance travelled by him is:
 A. 50 km B. 56 km C. 70 km D. 80 km
28. A man complete a journey in 10 hours. He travels first half of the journey at the rate of 21 km/hr and second half at the rate of 24 km/hr. Find the total journey in km.
 A.220 km B. 224 km C. 230 km D. 234 km
29. The ratio between the speeds of two trains is 7 : 8. If the second train runs 400 kms in 4hours, then the speed of the first train is:
 A. 70 km/hr B. 75 km/hr C. 84 km/hr D. 87.5 km/hr
30. A man on tour travels first 160 km at 64 km/hr and the next 160 km at 80 km/hr. The average speed for the first 320 km of the tour is:

- A. 35.55 km/hr B. 36 km/hr C. 71.11 km/hr D. 71 km/hr
31. A car travelling with $\frac{1}{4}$ of its actual speed covers 42 km in 1 hr 40 min 48 sec. Find the actual speed of the car.
A. $17\frac{6}{7}$ km/hr B. 25 km/hr C. 30 km/hr D. 35 km/hr
32. In covering a distance of 30 km, Abhay takes 2 hours more than Sameer. If Abhay doubles his speed, then he would take 1 hour less than Sameer. Abhay's speed is:
A. 5 kmph B. 6 kmph C. 6.25 kmph D. 7.5 kmph
33. Robert is travelling on his cycle and has calculated to reach point A at 2 P.M. if he travels at 10 kmph, he will reach there at 12 noon if he travels at 15 kmph. At what speed must he travel to reach A at 1P.M.?
A. 8 kmph B 11 kmph C. 12 kmph D. 14 kmph
34. It takes eight hours for a 600 km journey, 120 km is done by train and the rest by car takes 20 minutes more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the cars is:
A. 2:3 B.3:2 C. 3: 4 D. 4 : 3
35. A farmer travelled a distance of 61 km in 9 hours. He travelled partly on foot @ 4 km/hr and partly on bicycle @ 9 km/hr. The distance travelled on foot is:
A. 14km B. 15km C. 16 km D. 17km
36. A man covered a certain distance at some speed. Had he moved 3 kmph faster, he would have taken 40 minutes less. If he had moved 2 kmph slower, he would have taken 40 minutes more. The distance (in km) is:
A. 35 B. $36\frac{2}{3}$ C. $37\frac{1}{2}$ D. 40

Exercise2(Higher skill Level Questions)

1. A plane left half an hour late than the scheduled time and in order to reach its destination 1500 kilometer away in time. It had to increase its speed by 33.33 per cent over its usual speed. Find its increased speed.
a)250 kmph b) 500 kmph c) 750 kmph d) None of these
2. Rakesh sets out to cycle from Delhi to Mumbai and at the same time Suresh starts from Mumbai to Delhi. After passing each other they complete their journey in 9 and 16 hrs respectively. At what speed does Suresh cycle if Rakesh cycles at 16 km/hr?
a)12 km/hr b) 16 km/hr c) 14 km/hr d) None of these

3. Two stations A and B are 100 km part on a straight line. One train starts from A at 7 A.M and travels towards B at 20 km/hr speed. Another train starts from B at 8 A.M and travels towards A at 25 km/hr speed. At what time will they meet?
a) 10.30 A.M b) 11 A.M c) 10 A.M d) None of these
4. Two trains start at the same time from Mumbai and Pune and proceed towards each other at the rate of 60 km and 40 km per hour. Respectively. When they meet, it is found that one train has travelled 20 km more than the other. Find the distance between Mumbai and Pune.
a) 150 km b) 100 km c) 120 km d) None of these
5. Shambu drives his car very fast at 360 m/s. moving ahead for some hours he finds some problem in headlights of the car. So he takes 20 seconds in changing the bulb of the head-light by stopping the car. Mean while he notices that another car which was 400 m back is now 200 m ahead of his car. What is the speed of this car?
a) 100 km/hr b) 92 km/hr c) 108 km/hr d) 300 km/hr
6. Einstein walks on an escalator at a rate of 5 steps per second and reaches the other end in 10 seconds. While coming back, walking at the same speed he reaches the starting point in 40 seconds. What is the number of steps on the escalator?
a) 40 b) 60 c) 120 d) 80
7. Abdul starts in a car from Ahmadabad towards Bangalore. After some time he realizes that he will cover only 75% of the distance in the scheduled time and he therefore doubles his speed immediately and thus manages to reach Bangalore exactly on time. Find the time after which Abdul changed his speed, given that he could have been late by 3 hours if he had not changed his speed:
a) 3 h b) 4 h c) 5 h d) 6 h
8. In a circus there was a lion and a tiger walking in the two different rings of same radii. There I observed that when lion moved 3 steps, tiger moved 5 steps in the same time, but the distance traversed by lion in 5 steps is equal to the distance traversed by tiger in 4 steps. What is the number of rounds that a lion made when tiger completed 100 rounds?
a) 120 b) 48 c) 75 d) None of these

9. A thief sees a jeep at a distance of 250 m, coming towards him at 36 km/hr. Thief takes 5 seconds to realize that there is nothing but the police is approaching him by the jeep and start running away from police at 54 km/hr. But police realized after 10 seconds, when the thief starts running away, that he is actually a thief and gives chase at 72 km/hr. How long after thief saw police did police catch up with him and what is the distance police had to travel to do so?
a) 50 s, 1000 m b) 65 s, 1150 m c) 65 s, 1300 m d) 45 s, 1050 m
10. A and B are running on a circular track of radius 175 meters. A can complete a round in 100 seconds and the speed of B is twice the speed of A. They started simultaneously towards each other from two points 350 meters diametrically opposite on the circular path. If they first meet at a point they called it love point, which is between the two points P and q from where they have started their race, after how much time from the start do they meet at love point for the third time?
a) $218 \frac{2}{5}$ s b) $216 \frac{2}{3}$ s c) 221 s d) None of these

PROBLEMS ON TRAINS

1. A train 280 m long , running with a speed of 63 kmph will pass an electric pole in..
a)20 sec b) 15 sec b)16 sec d) 18 sec
2. A train is moving at a speed of 132 kmph. If the length of the train is 110 meters, how long will it take to cross a railway platform 165 m long?
a)5 sec b) 10 sec c)7.5 sec d) 15 sec
3. A train 700 m long is running at 72 kmph. If it crosses a tunnel in 1 minute, the length of the tunnel is
a)700 m b) 550 m c)600 m d) 500 m
4. I f 200m long train crosses a platform of the same length as that of the train in 20 sec, then the speed of the train is
a)50kmph b) 72 kmph c)60 kmph d) 80 kmph
5. A train speeds past a pole in 15 seconds and a platform 100 m long in 25 seconds. Its length is..
a)200 m b) 50 m c)150 m d) none
6. If a train 110 m long passes a telegraph pole in 3 sec, then the time taken by it to cross a railway platform 165m long is..
a)3 sec b) 5 sec c)4 sec d) 7.5 sec
7. A train 150 m long moving at a speed of 25 meters per second over takes a man moving at 5 m/sec in opposite direction. The train will pass the man in....
a)5 sec b) $4\frac{2}{7}$ sec c)6 sec d) 8 sec
8. Two trains 126 m and 114 m long are running in opposite directions , one at the rate of 30 kmph and another one at 42 kmph . From the moment they meet will cross each other in..
a)10 sec b) 12 sec c)11 sec d) 13 sec
9. A train 110 m long passes a man, running at 6 kmph in the direction opposite to that of the train in 6 sec. The speed of the train is ...
a)60 kmph b) 54 kmph c)66 kmph d) 72 kmph
10. A train 108 m long moving at a speed of 50 kmphcrosses another train 112 m long coming from opposite direction in 6 sec. The speed of the second train is...
a)48 kmph b) 66 kmph c)54 kmph d) 72 kmph
11. Two trains travel in opposite directions at 36 kmph and 45 kmph and a man sitting in slower train passes the faster train in 8 sec. The length of the faster train is ..
a)80 m b) 120 m c)100 m d) 180 m

12. A train running at certain speed crosses a stationary engine in 20 sec . to find out the speed of the train ,which of the following information is necessary
- Only the length of the train
 - Only the length of the engine
 - Either the length of the train or the length of the engine
 - Both the length of the train and the length of the engine
13. A train over takes two persons who are walking in the same direction in which the train is going, at the rate of 2 kmph and 4 kmph and passes them completely in 9 sec and 10 sec .The length of the train is
- 72 m
 - 50 m
 - 54 m
 - 45 m
14. Two stations A and B are 110 km apart on a straight line. One train starts from A at 7 a.m and travels towards B at 20 kmph. Another train starts from B at 8 a.m and travels towards A at a speed of 25 kmph. At what time will they meet?
- 9 a.m
 - 11 a.m
 - 10 a.m
 - 10.30 a.m
15. A train travelling at 48 kmph completely crosses another train having half its length and travelling in opposite direction at 42 kmph in 2 seconds.It also passes a railway platform in 45 sec. The length of the platform is...
- 560m
 - 600m
 - 400m
 - 450
16. A man sees a train passing over a bridge 1km long . The length of the train is half that of the bridge . If the train clears the bridge in 2 min, the speed of the train is..
- 30 kmph
 - 50 kmph
 - 45 kmph
 - 60 kmph
17. A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train?
- 120 meters
 - 180 meters
 - 324 meters
 - 150 meters
18. A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10seconds. The speed of the train is:
- 45 km/hr
 - 50 km/hr
 - 54 km/hr
 - 55 km/hr
19. The length of the bridge, which a train 130 meters long and travelling at 45 km/hr can cross in 30 seconds, is:
- 200 m
 - 225 m
 - 245 m
 - 250 m
20. Two trains running in opposite directions cross a man standing on the platform in 27 seconds and 17 seconds respectively and they cross each other in 23 seconds. The ratio of their speeds is:
- 1 : 3
 - 3 : 2
 - 3:4
 - None of these

21. A train passes a station platform in 36 seconds and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/hr, what is the length of the platform?
 A. 120m B. 240m C. 300 m D. None of these
22. A train 240 m long passes a pole in 24 seconds. How long will it take to pass a platform 650 m long?
 A. 65 sec B. 89 sec C. 100 sec D. 150 sec
23. Two trains of equal length are running on parallel lines in the same direction at 46 km/hr and 36 km/hr. The faster train passes the slower train in 36 seconds. The length of each train is:
 A. 50 m B. 72 m C. 80 m D. 82 m
24. A train 360 m long is running at a speed of 45 km/hr. In what time will it pass a bridge 140m long?
 A. 40 sec B. 42 sec C. 45 sec D. 48 sec
25. Two trains are moving in opposite directions at 60 km/hr and 90 km/hr. Their lengths are 1.10 km and 0.9 km respectively. The time taken by the slower train to cross the faster train in seconds is:
 A. 36 B. 45 C. 48 D. 49
26. A jogger running at 9 kmph alongside a railway track in 240 meters ahead of the engine of a 120 meters long train running at 45 kmph in the same direction. In how much time will the train pass the jogger?
 A. 3.6 sec B. 18 sec C. 36 sec D. 72 sec
27. A 270 meters long train running at the speed of 120 kmph crosses another train running in opposite direction at the speed of 80 kmph in 9 seconds. What is the length of the other train?
 A. 230 m B. 240 m C. 260 m D. 320 m E. None of these
28. A goods train runs at the speed of 72 kmph and crosses a 250 m long platform in 26 seconds. What is the length of the goods train?
 A. 230 m B. 240 m C. 260 m D. 270 m
29. Two trains, each 100 m long, moving in opposite directions, cross each other in 8 seconds. If one is moving twice as fast the other, then the speed of the faster train is:
 A. 30 km/hr B. 45 km/hr C. 60 km/hr D. 75 km/hr
30. Two trains 140 m and 160 m long run at the speed of 60 km/hr and 40 km/hr respectively in opposite directions on parallel tracks, the time (in seconds) which they take to cross each other, is:
 A. 9 B. 9.6 C. 10 D. 10.8

31. A train 110 meters long is running with a speed of 60 kmph. In what time will it pass a man who is running at 6 kmph in the direction opposite to that in which the train is going?
A. 5 sec B. 6 sec C. 7 sec D. 10 sec
32. A train travelling at a speed of 75 mph enters a tunnel 3 miles long. The train is 1 mile long. How long does it take for the train to pass through the tunnel from the moment the front enters to the moment the rear emerges?
A. 2.5 min B. 3 min C. 3.2 min D. 3.5 min
33. A train 800 meters long is running at a speed of 78 km/hr. If it crosses a tunnel in 1 minute, then the length of the tunnel (in meters) is:
A. 130 B. 360 C. 500 D. 540
34. A 300 meter long train crosses a platform in 39 seconds while it crosses a signal pole in 18 seconds. What is the length of the platform?
A. 320 m B. 350 m C. 650 m D. Data inadequate
35. A train speeds past a pole in 15 seconds and a platform 100 m long in 25 seconds. Its length is:
A. 50 m B. 150 m C. 200 m D. Data inadequate
36. A train moves past a telegraph post and a bridge 264 m long in 8 seconds and 20 seconds respectively. What is the speed of the train?
A. 69.5km/hr B. 70 km/hr C. 79 km/hr D. 79.2 km/hr
37. How many seconds will a 500 meter long train take to cross a man walking with a speed of 3 km/hr in the direction of the moving train if the speed of the train is 63 km/hr?
A. 25 B. 30 C. 40 D. 45
38. Two goods train each 500m long, are running in opposite directions on parallel tracks. Their speeds are 45 km/hr and 30 km/hr respectively. Find the time taken by the slower train to pass the driver of the faster one.
A. 12 sec B. 24 sec C. 48 sec D. 60 sec
39. Two trains are running in opposite directions with the same speed. If the length of each train is 120 meters and they cross each other in 12 seconds, then the speed of each train (in km/hr) is:
A. 10 B. 18 C. 36 D. 72
40. Two trains of equal lengths take 10 seconds and 15 seconds respectively to cross a telegraph post. If the length of each train be 120 meters, in what time (in seconds) will they cross each other travelling in opposite direction?
A. 10 B. 12 C. 15 D. 20

41. A train 108 m long moving at a speed of 50 km/hr crosses a train 112 m long coming from opposite direction in 6 seconds. The speed of the second train is:
A. 48 km/hr B. 54 km/hr C. 66 km/hr D. 82 km/hr
42. Two trains are running at 40 km/hr and 20 km/hr respectively in the same direction. Fast train completely passes a man sitting in the slower train in 5 seconds. What is the length of the fast train?
A. 23 m B. $23 \frac{2}{9}$ m C. $27 \frac{7}{9}$ m D. 29 m
43. A train overtakes two persons who are walking in the same direction in which the train is going, at the rate of 2 kmph and 4 kmph and passes them completely in 9 and 10 seconds respectively. The length of the train is:
A. 45 m B. 50 m C. 54 m D. 72 m
44. A train overtakes two persons walking along a railway track. The first one walks at 4.5 km/hr. The other one walks at 5.4 km/hr. The train needs 8.4 and 8.5 seconds respectively to overtake them. What is the speed of the train if both the persons are walking in the same direction as the train?
A. 66 km/hr B. 72 km/hr C. 78 km/hr D. 81 km/hr
45. A train travelling at 48 kmph completely crosses another train having half its length and travelling in opposite direction at 42 kmph, in 12 seconds. It also passes a railway platform in 45 seconds. The length of the platform is
A. 400 m B. 450 m C. 560 m D. 600m
46. Two stations A and B are 110 km apart on a straight line. One train starts from A at 7 a.m. and travels towards B at 20 kmph. Another train starts from B at 8 a.m. and travels towards A at a speed of 25 kmph. At what time will they meet?
A. 9a.m. B. 10 a.m. C. 10.30a.m. D. 11 a.m.
47. Two, trains, one from Howrah to Patna and the other from Patna to Howrah, start simultaneously. After they meet, the trains reach their destinations after 9 hours and 16 hours respectively. The ratio of their speeds is:
A. 2:3 B. 4:3 C. 6 : 7 D. 9:16

RACES AND GAMES OF SKILLS

1. In a 100 m race, A can give B 10m and C 28 m. In the same race B can give C:
A. 18m B.20m C.27m D.9 m
2. A and B take part in 100 m race. A runs at 5 kmph. A gives B a start of 8 m and stillbeats him by 8 seconds. The speed of B is:
A. 5.15 kmph B.4.14kmph C. 4.25 kmph D.4.4 kmph
3. In a 500m race, the ratio of the speeds of two contestants A and B is 3 : 4. A has a start of 140m. Then, A wins by:
A.60m B.40m C.20m D.10m
4. In a 100 m race, A beats B by 10 m and C by 13 m. In a race of 180 m, B will beat C by:
A. 5.4 m B.4.5 m C.5m D.6m
6. At a game of billiards, A can give B 15 points in 60 and A can give C to 20 points in 60. How many points can B give C in a game of 90?
A.30 points B.20 points C.10 points D.12 points
6. In a race of 200 m, A can beat B by 31 m and C by 18 m. In a race of 350 m, C will beat B by:
A.22.75m B.25 m C.19.5m D.74/7m
7. In 100 m race, A covers the distance in 36 seconds and B in 45 seconds. In this race A beats B by:
A.20m B.25m C.22.5m D.9m
8. In a game of 100 points, A can give B20 points and C 28 points. Then, B can give C:
A.8 points B.10 points C. 14 points D. 40 points.
9. In a 200 meters race A beats B by 35 m or 7 seconds. A's time over the course is:
A.40 sec B.47 sec C.33 sec D. None of these
10. A can run 22.5 m while B runs 25 m. In a kilometer race B beats A by:
A.100m B.111 1/9m C.25m D.50m
11. In a 300 m race A beats B by 22.5 m or 6 seconds. B's time over the course is:
A.86sec B.80 sec C.76 sec D. None of these
12. A runs $1\frac{2}{3}$ times as fast as B. If A gives B a start of 80 m, how far must the winning post be so that A and B might reach it at the same time?
A.200 m B.300 m C.270 m D.160 m
13. In a 100 m race, A can beat B by 25 m and B can beat C by 4 m. In the same race, A can beat C by:
A.21 m B.26m C.28 m D.29m

BOATS & STREAMS

1. A man can row upstream at 7 kmph and downstream at 10 kmph. Find man's rate in still water and the rate of current ..(in kmph)
 a) 8.5, 1.5 b) 9.5, 7 c) 6.5, 7 d) 1.5, 8.5
2. A boat can travel with a speed of 13 kmph in still water, if the speed of the stream is 4 kmph, find the time taken by the boat to go 68 km downstream.
 a) 2 hours b) 3 hours c) 4 hours d) 5 hours
3. A motor boat, whose speed in 15 kmph in still water goes 30 km downstream and comes back in a total of 4 hours 30 min. the speed of the stream(in kmph) is.
 a) 4 b) 5 c) 6 d) 10
4. A boat takes 90 min less to travel 36 miles downstream than to travel the same distance upstream. If the speed of the boat in still water is 10 mph, the speed of the stream is ...
 a) 2 mph b) 3 mph c) 2.5 mph d) 4 mph
5. A man can row at 5 kmph in still water. If the speed of the stream is 1 kmph and it takes him 1 hour to a place and come back, how far is the place?
 a) 2.4 km b) 3 km c) 2.5 km d) 3.6 km
6. A man can row at 8 kmph in still water. It takes him thrice as long to row down the river. Find the rate of stream?(in kmph)
 a) 8 b) 7 c) 9 d) 10
7. A man can travel with a speed of 13 kmph in still water. If the speed of the stream is 4 kmph, find the time taken by the boat to go 68 km downstream.
 a) 2 hours b) 3 hours c) 4 hours d) 5 hours
8. A man takes twice as long to row a distance against the stream as to row the same distance in favor of the stream. The ratio of the speed of the boat (in still water) and stream is..
 a) 2:1 b) 3:2 c) 3:1 d) 4:3
9. A boat running upstream takes 8 hours 48 min to cover a certain distance, while it takes 4 hours to cover the same distance running downstream. What is the ratio between the speed of the boat and speed of the water current respectively?
 a) 2:1 b) none c) 3:2 d) 4:3
10. A boat takes 19 hours for travelling downstream from point A to point B and coming back to point C midway between A and B. If the velocity of the stream is 4 kmph and the speed of the boat in still water is 14 kmph, what is the distance between A and B?
 a) 160 km b) 200 km c) 180 km d) 220 km

11. A man can row 40 km upstream and 55 km downstream in 13 hours. Also he can row 30 km upstream and 44 km downstream in 10 in hours. Find the speed of the man in still water and the speed of the current.(in kmph)
- a) 8 , 3 b) 3 , 8 c) 8 , 6 d) 6 , 8
12. There is a road beside a river. Two friends started from a place A, moved to a temple situated at another place B and then returned to A again. One of them moves on a cycle at a speed of 12kmph , while the other sails on a boat at a speed of 10 kmph. If the river flows at the speed of 4 kmph, which of the two friends will return to place A first?

TIME AND WORK

1. A can do $(\frac{1}{3})$ of a work in 8 days and B can do $(\frac{2}{5})$ of the work in 16 days. In how many days both A and B together can do the work?
1) 15 days 2) 20 days 3) 25 days 4) 30 days
2. If 4 men or 6 boys can finish a piece of work in 120 days, in how many days can 6 men and 11 boys finish it?
1) 32 days 2) 42 days 3) 36 days 4) 46 days
3. A, B and C can do a piece of work in 12, 16 and 24 days respectively, they start working together but A leaves 2 days and B, 6 days before the completion of work. In how many days is the work finished?
1) $\frac{74}{9}$ days 2) $\frac{71}{9}$ days 3) $\frac{75}{9}$ days 4) $\frac{65}{9}$ days
4. A can do a piece of work in 28 days. B is 40% more efficient than A. The number of days, it takes B to do the same piece of work is.
1) 15 days 2) 30 days 3) 25 days 4) 20 days
5. A, B and C can do a piece of work in 12, 24 and 6 days respectively. A is assisted by B on one day and by C on the next day alternately. How long the work would take to finish?
1) $\frac{16}{3}$ days 2) $\frac{14}{3}$ days 3) $\frac{11}{3}$ days 4) 9 days
6. A and B can do a piece of work in 30 days. They worked together for 10 days and then A left off. If B finished the remaining work in 40 days. In how many days A alone could do it?
1) 40 days 2) 50 days 3) 60 days 4) 65 days
7. If 16 men and 2 boys working together can do four times as much work per hour as a man and a boy together. The ratio of the work done by a man and that of a boy for a given time is
1) 1:2 2) 1:4 3) 1:6 4) 1:8
8. A works twice as fast as B and thrice as fast as C. If C can finish the work in 22 days, in how many days can A, B and C together finish the work?
1) 2 days 2) 4 days 3) 6 days 4) 8 days
9. A is three times as fast as B and is able to finish a work 48 days earlier than B. In how many days A and B will together do the work?
1) 12 days 2) 14 days 3) 16 days 4) 18 days
10. A and B together can do a piece of work in 48 days. Their skills of doing the work are in the ratio of 6:5. How many days will A take alone?
1) 66 days 2) 77 days 3) 88 days 4) 55 days

11. A man, a woman or a boy can do a piece of work in 20 days, 40 days or 80 days respectively. How many boys must assist one man and 2 women to do the work in 2 days?
 1) 32 boys 2) 24 boys 3) 16 boys 4) 8 boys
12. If factory A turns out 4 cars an hour and factory B turns out 20 cars every 2 hours, the number of cars which both factories turn out in 18 hours is
 1) 250 2) 252 3) 254 4) 256
13. Anil can copy 80 pages in 10 hours, Anil and Sunil can copy 120 pages in 12 hours. In how many hours Sunil shall copy 26 pages?
 1) 10 hours 2) 11 hours 3) 12 hours 4) 13 hours
14. 80 workers can reap a field in 12 days. If the work is to be completed 4 days, the extra workers required are
 1) 120 2) 140 3) 160 4) 240
15. Rohan can mow his lawn in x hours. After 4 hours it begins to rain. The unmowed part of the lawn is
 1) $(x-4)/4$ 2) $(x-4)/x$ 3) $(4-x)/x$ 4) $(4-x)/4$
16. A and B can complete a task individually in 8 and 24 days respectively. After 'A' had worked for 2 days, B joined him and then they completed the work. How much should 'A' enjoy in the total amount of Rs.16,000 paid for the work?
 1) Rs.3000 2) Rs.4000 3) Rs.9000 4) Rs.13000
17. A tap can fill half of a cistern in 4 hours and another can empty $(1/4)$ th of a tank in 4 hours. If both the taps are opened simultaneously, the time taken to fill the tank is
 1) 4 hours 2) 8 hours 3) 12 hours 4) 16 hours
18. There is a leak in the bottom of a tank. When the tank is thoroughly repaired, it can be filled in 8 hours. It now takes 2 hours more. If the tank is full, how long will the leak take to empty the tank?
 1) 20 hours 2) 30 hours 3) 40 hours 4) 45 hours
19. Two pipes 'A' and 'B' can fill a tank in 20 hours and 15 hours respectively while a third pipe 'C' can empty the full tank in 25 hours. All the three pipes are opened in the beginning. After 10 hours 'C' is closed. Find in how much time will the tank be full?
 1) 2 hours 2) 18 hours 3) 10 hours 4) 12 hours
20. Three pipes A, B and C can fill $(1/3)$ rd of a tank in 6 hours. After working together for 9 hours, A is closed and B and C fill the tank in 18 hours. The time taken by pipe 'A' to fill the tank is
 1) 18 hours 2) 36 hours 3) 54 hours 4) 72 hours

21. One pipe 'A' is 5 times faster than second pipe 'B' and takes 96 hours less than B. When will the cistern be full if both pipes are opened.
 1) 10 hours 2) 15 hours 3) 20 hours 4) 25 hours
22. Two pipes A and B can fill $(\frac{1}{4})$ th of a tank in 5 hours and 6 hours respectively. If both the pipes are opened simultaneously, after how much time A should be closed so that the tank is full in 12 hours?
 1) 8 hours 2) 10 hours 3) 12 hours 4) 14 hours
23. A water tank of 1900 liters capacity is connected to a tap which can fill it at the rate of 10 liters per minute and water is let out at the same time at the rate of 2.5 liters per minute. After 2 hours the outlet is shut off. Find how long will it take now for the tank to become full?
 1) one hour 40 minutes 2) one hour 20 minutes
 3) one hour 15 minutes 4) one hour
24. If three taps are opened together, a tank is filled in 15 hours. One of the taps can fill it in 10 hours and the other in 20 hours. How does the third tap work?
 1) It fills the tank in 10 hours 2) It empties the tank in 10 hours
 3) It fills the tank in 12 hours 4) It empties the tank in 12 hours
25. Two taps 'A' and 'B' can fill a tank I 9 hours and 15 hours respectively. Another tap 'C' can empty it in 5 hours. If three taps are opened at 5 A.M, 7 A.M. and 8 A.M. respectively, the time taken to empty the tank is
 1) 18 hours 2) 30 hours 3) 38 hours 4) 45 hours
26. In what time will a tank be filled by three pipes whose diameters are 2 cm, 3 cm, 4 cm, running together, when the largest alone fills it in 87 hours, the amount of water flowing in by each pipe being proportional to the square of its diameter?
 1) 32 hours 2) 48 hours 3) 16 hours 4) 64 hours
27. Pipe A can fill a tank in 8 hours and pipe B can fill it in 10 hours. If they are opened for one hour alternately and pipe B is opened first, when will the tank be full?
 1) $8\frac{4}{5}$ hours 2) 9 hours 3) $9\frac{4}{5}$ hours 4) 12 hours
28. Wages of 30 men for 20 days are Rs.30, 000. If the daily wage of a boy is three-fifth that of a man. How many boys must work for 50 days to earn the same?
 1) 10 2) 15 3) 20 4) 25
29. A, B and C together earn Rs.1650 in 11 days. A and C together earn Rs.900 in 9 days. B and C together earn Rs.1280 in 8 days. Find the daily earning of C.
 1) Rs.100 2) Rs.110 3) Rs.120 4) Rs.130

30. A, B and C together undertook some work at Rs.22, 000. A and B together did $\frac{9}{11}$ of the work and the rest was done by C alone. How much did C share in earnings?
- 1) Rs.14,000 2) Rs.4,000 3) Rs.8,000 4)Rs.18,000

Exercise2(Higher Skill Level Questions)

- A group of men decided to do a job in 4 days. But Since 20 men dropped out every day, the job completed at the end of the 7th day. How many men were there at the beginning?

a)240 b) 140 c) 280 d) 150
- Ramesh takes twice as much time as Mahesh and thrice as much time as Suresh to complete a job. If working together, they can complete the job in 4 days, then the time taken by each of them separately to complete the work is

a)36,24 and 16 days c) 20,16 and 12 days
b)24,42 and 18 days d) None of these
- Ganga, Jamuna and Saraswathi can do a piece of work, working together, in 1 day. Ganga is thrice efficient as Jamuna and Jamuna takes the twice the twice number of days as Saraswathi takes to do it alone. What is the difference between the number of days taken by Ganga and Saraswathi?

a)1 b) 2 c) 3 d) 4
- A and B can complete a task in 30 days when working together after A and B have been working together for 11 days, b is called away and A, all by himself complete the task in the next 28 days. Had A been working alone, the number of days taken by him to complete the task would have been:

a)33 $\frac{3}{19}$ b) 19 $\frac{6}{25}$ c) 44 $\frac{4}{19}$ d) None of these
- Sonu can do a piece of work in 20 days. He started the work and left after some days, when 25% work was done. After it Abhijeet joined and completed it working for 10 days. In how many days Sonu and Abhijeet can do the complete work, working together?

a)6 b) 8 c) 10 d) 12

6. A and B can do a piece of work in 45 and 40 days respectively. They began the work together, but A leaves after some days and B finished the remaining work in 23 days. After how many days, did A leave?
- a) 6 days b) 8 days c) 9 days d) 12 days
7. Anand can do a piece of work in 45 days, but Bahuguna can do the same work in 5 days less, than Anand, when working alone. Anand and Bahuguna both started the work together but Bahuguna left after some days and Anand finished the remaining work in 56 days with half of his efficiency but he did the work with Bahuguna with his complete efficiency. For how many days they had worked together?
- a) 6 b) 8 c) 9 d) 12
8. $(X-2)$ men can do a piece of work in X days and $(x+7)$ men can do 75% of the same work in $(X-10)$ days. Then in how many days can $(X+10)$ men finish the work?
- a) 27 days b) 12 days c) 25 days d) 18 days
12. There was a leakage in the container of the refined oil. If 11 kg oil is leaked out per day then it would have lasted for 50 days, if the leakage was 15 kg per day, then it would have lasted for only 45 days. For how many days would the oil have lasted, if there was no leakage and it was completely used for eating purpose?
- a) 80 days b) 72 days c) 100 days d) 120 days
13. A, B and C three weavers have to supply an order of 100 shawls. A can weave a shawl in 2 hours, B in 3 hours and C in 4 hours respectively. It is known that even being a joint contract each one weaves his own shawl completely i.e., other weaver help to the rest weavers. In how many hours they will complete the order irrespective of day or night?
- a) 93 hours b) 100 hours c) $92\frac{4}{13}$ hours d) 94 hours
14. Arun and Satyam can complete a work individually in 12 working days and 15 working days respectively with their full efficiencies. Arun does work only on Monday, Wednesday and Friday while Satyam does the work on Tuesday, Thursday and Saturday. Sunday is always off. But Arun and Satyam both work with half of their efficiencies on Friday and Saturday respectively. If Arun

started the work on 1st January which falls on Monday followed by Satyam on the next day and so on(i.e., they work collectively in alternate days), then on which day work will be completed?

- a) Tuesday b) Wednesday c) Thursday d) Friday

15. A and b can complete the work individually in 24 days and 30 days respectively, working 10 hours a day. Work is to be done in two shifts. Morning shift lasts for 6 hours and evening shifting last for 4 hours. On the first day A works in the morning shift while B works in the evening shift. Next day A works in the evening shift while b works in the morning shift and so on. It means they work alternatively with respect to their shifts. Thus they work on this pattern till the work is completed. On which day the work got completed?

- a) 26th day b) 27th day c) 28th day d) 30th da

16. At Technosys PVT. LTd. There are some engineering students employed as trainee engineers, being to two eminent institutions of India. One group belongs to MIT and another to NIT. Each student of MIT works for 10 hours a day till 60 days and each student of NIT works for 8 hours till 80 days on the two same projects. The ratio of number of students of MIT and that of NIT is 4:5 respectively. Students of which institution is slower in work and by how much?

- a) Each student of MIT is 20% less efficient than that of NIT.
 b) Each student of NIT is 33.33% less efficient than that of MIT.
 c) Each student of NIT is 25% less efficient than that of MIT.
 d) Each student of MIT is 33.33% less efficient than that of NIT.

17. The total number of men, women and children working in a factory is 18. They earn Rs. 4000 in a day. If the sum of the wages of all men, all women and all children is in the ratio of 18;10:12 and if the wages of an individual man , woman and child is in the ratio 6:5;3, the how much a woman earn in a day?

- a) Rs. 400 b) Rs. 250 c) Rs. 150 d)Rs. 120

18. Progressive Company PVT. Ltd. hired some employees in a fix pattern. On the first day it hired one person; on the second day one more joined him. On the third, fourth etc (i.e. every next day) one person increased in this group. The capacity of each person was same. The whole work was completed on the 24th day then out of total Rs. 5000, maximum how much a person had earned?

- a) Rs.500 b) Rs. 400 C) Rs. 200 d) Rs. 25

19. Boston, Churchill and David are three workers, employed by a contractor. They completed the whole work in 10 days. Initially all of them worked together, but the last 60% of the work was completed by only Churchill and David together. Boston worked with Churchill and David only for initial two days then he left the work due to his poor health. Also Churchill takes 20% less time to finish the work alone than that of David working alone. If they were paid Rs. 3000 for the entire work, then what is the share of least efficient person?

- a) Rs. 900 b) Rs. 1200 c) Rs. 1000 d) None of these

20. There are three boats B1,B2 and B3 working together they carry 60 people in each trip. One day an early morning B1 carried 50 people in few trips alone. When it stopped carrying the passengers B2 and B3 started carrying the people together. It took a total of 10 trips to carry 300 people by B1,B2 and B3. It is known that each day on an average 300 people cross the river using only one of the 3 boats B1,b2 and B3. How many trips it would take to B1 to carry 150 passengers alone?

- a) 15 b) 30 c) 25 d) 10

ALLIGATION OR MIXTURE

1. Find the ratio in which rice at Rs 7.20 per kg be mixed with rice at Rs 5.70 a kg to produce a mixture worth Rs 6.30 per kg.
a)1:3 b) 2:3 c)3:4 d) 4:5
2. The average of students of a class is 11 years. If the average age of boys is 11.2 years and that of girls is 10.9 years. Find the total no. of students, if there are 50 boys in the class.
a)150 b) 250 c)100 d) 200
3. A shopkeeper sold 45 kg of goods. If he sells some quantity at a loss of 3% and rest at 17% profit. Making 5% profit on the whole. Find the quantity sold at profit.
a)37 b) 18 c)21 d) 19
4. A shopkeeper sold 40 kg of goods. If he sells some quantity at a loss of 5% and rest at 7% profit. Suffering 2% loss on the whole. Find the quantity sold at profit.
a)10 b) 12 c)40 d) 30
5. In an examination a student get 3 marks for every correct answer and he losses one mark for wrong answer. If he score 0 marks in a paper of 100 questions. How many of his answers were correct?
a)75 b) 20 c)25 d) 35
6. A mixture of a certain quantity of milk with 8 liters' of water is worth Rs 4.50 p a liter. If pure milk be worth Rs 5.40p a liter, how much milk is in the mixture?
a)20 b) 30 c)10 d) 40
7. How much water must be added to 60 liters' of milk at 1 ½ liters' for Rs 20, so as have a mixture worth Rs 10 2/3 a liter?
a)14 b) 10 c)15 d) 25
8. In what proportion must water be mixed with milk to gain 12 ½ % by selling the mixture at the cost price?
a)8:1 b) 7:8 c)8:7 d) 1:8
9. In what proportion must water be mixed with milk to gain 20%by selling the mixture at the cost price?
a)1:5 b) 5:1 c)1:3 d) 3:1
10. In what ratio grocers mix tea at Rs 26 a kg and Rs 32 a kg so that by selling the mixture at Rs.30 he may gain 10%?
a)26:7 b) 25:7 c)3:1 d) 7:26.
11. How many kgs of wheat costing Rs 8 per kg must be mixed with 36 kgs of wheat costing Rs 5.40 per kg so that at 20% gain may be obtained by selling the mixture at Rs 7.20 per kg?
a)9.64 kgs b) 10.85 kgs c)12 kg d) 10 kgs

- 12.** The milk and water in two vessels A and B are in the ratio 4:3 and 2:3 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C containing half milk and half water?
a)1:3 b) 5:7 c)7:3 d) 7:5
- 13.** The milk and water in two vessels A and B are in the ratio 5:2 and 8:5 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C containing in the ratio of milk and water is 9:4?
a)1:3 b) 5:7 c)7:2 d) 7:5.
- 14.** Tea worth Rs 126 per kg and Rs 135 per kg is mixed with a third variety in the ratio 1:1:2. If the mixture is worth Rs 153 per kg, the price of the third variety per kg will be..
a)Rs169.50 b)Rs175.50 c)Rs 170 d) Rs.180
- 15.** A container contains 40 liters of milk . From this container 4 liters of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?
a)26.34 b) 28 c)27.36 d) 29.16
- 16.** 8 liters are drawn from a cask full of wine and is then filled with water . This operation is performed three more times. The ratio of the quantity of wine now left in cask to that of the water is 16 : 65. How much wine did the cask hold originally?
a)18 ltrs b) 32 ltrs c)24 ltrs d) 42 ltrs
- 17.** In what ratio must a person mix three kinds of wheat costing him Rs 1.20, Rs 1.44 and Rs 1.74 per kg . So that the mixture may be worth Rs 1.41 per kg?
a)11:77:7 b)7:11:77 c) 11:7:77 d) None

PERMUTATIONS AND COMBINATIONS

1. From a group of 7 men and 6 women , five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways it be done?
a)564 b) 645 c) 735 d) 756
2. In how many different ways can the letters of the word " LEADING" be arranged in such a way that the vowels always come together?
a)360 b) 480 c) 720 d) 5040
3. In how many way s can the letters of the word "CORPORATION" be arranged so that the vowels always come together?
a)810 b) 1440 c) 2880 d) 50400
4. Out of 7 consonants and 4 vowels , how many words of 3 consonants and 2 vowels can be formed?
a)210 b) 1050 c) 25200 d) 21400
5. In how many ways can the letters of the word "LEADER" be arranged?
a)72 b) 144 c) 360 d) 720
6. In a group of 6 boys and 4 girls, four children are to be selected . In how many different ways can they be selected such that at least one boy should be there?
a)159 b) 194 c) 205 d)209
7. How many 3-digit numbers can be formed from the digits 2,3,5,6,7 and 9, which are divisible by 5 and none of the digits is repeated?
a)5 b) 10 c) 15 d) 20
8. In how many ways a committee, consisting of 5 men and 6 women can be formed from 8 men and 10 women?
a)266 b) 5040 c) 11760 d) 86400
9. A box contain 2 white balls, 3 black and 4 red balls. In how many ways can 3 balls be drawn from the box , if at least one black ball is to be included in the draw?
a)32 b) 48 c) 64 d)96
10. In how many 4-letter words with or witj out meaning, can be formed out of the letters of the word," LOGARITHMS", if repetition of letters is not allowed?
a)40 b) 400 c) 5040 d) 2520
11. How many number of 3 digits can be formed with the digits 1,2,3,4(repetition of digits not allowed)?
a)125 b) 120 c) 60 d) 150

12. How many numbers between 2000 and 3000 can be formed with the digits 0,1,2,3,4,5,6,7(repetition of digits not allowed)
a) 42 b) 210 c) 336 d) 440
13. In how many ways can a person send invitation cards to 6 of his friends if he has four servants to distribute the cards?
a) 6^4 b) 4^6 c) 24 d) None of these
14. In how many ways can 7 Indians , 5 Pakistanis and 6 Dutch be seated in a row so that all persons of the same nationality sit together?
a) $3!$ b) $7!5!6!$ c) $3!7!5!6!$ d) $18!$
15. How many straight lines can be formed from 8 non-collinear points on the X-Y plane?
a) 28 b) 56 c) 18 d) 19860
16. In how many ways can the letters of the word PATNA be arranged?
a) 60 b) 120 c) 119 d) 59
17. In the above question , how many words would be there which would start with the letter P?
a) 24 b) 12 c) 60 d) 18
18. How many numbers of four digits can be formed with the digits 0,1,2,3(repetition of digits being allowed)?
a) 12 b) 108 c) 256 d) 192
19. In how many ways can Ram choose a vowel and a consonant from the letter ALLAHABAD?
a) 4 b) 6 c) 9 d) 5
20. How many new words are possible from the letters of the word PERMUATATION?
a) $11!/2!$ b) $11!/2! - 1$ c) $11! - 1$ d) None of these
21. A man has 3 shirts , 4 trousers and 6 ties. What are the number of ways in which he can dress himself with a combination of all the three?
a) 13 b) 72 c) $13!/3!4!6!$ d) $3!4!6!$
22. There are 15 buses running between Delhi and Mumbai. In how many ways can a man go to Mumbai and return by a different bus?
a) 280 b) 310 c) 240 d) 210
23. A teacher of a class wants to set one question from each of two exercise in a book. If there are 15 and 12 questions in the two exercises respectively . Then in how many ways can the two questions be selected?
a) 160 b) 140 c) 180 d) 120
24. Ten students are participating in a race. In how many ways can the first three prizes be won?
a) 920 b) 680 c) 820 d) 720

25. A cricket team of 11 players is to be formed from 20 players including 6 bowlers and 3 wicketkeepers. The number of ways in which a team can be formed having exactly 4 bowlers and 2 wicket keepers is
a) 20790 b) 6930 c) 10790 d) 360
26. A code word is to consist of two English alphabets followed by two distinct numbers between 1 and 9. For example , CA23 is a code word. How many such code words are there?
a) 615800 b) 46800 c) 719500 d) 410800
27. In an examination paper there are two groups, each containing 4 questions. A candidate is required to attempt 5 questions but not more than 3 questions from any group .In how many ways can 5 questions be selected?
a) 24 b) 48 c) 96 d) None of these
28. Seven points lie on a circle. How many chords can be drawn by joining these points
a) 22 b) 21 c) 23 d) 24
29. How many triangles can be formed by 18 points if all re non collinear.
a) 816 b) 209 c) 120 d) 967
30. In the above situation how many triangle can be formed if 5 points are collinear.
a) 106 b) 806 c) 1020 d) 820

PROBABILITY

1. From a well shuffled pack of 52 cards, three cards are drawn at random. Find the probability of drawing an ace, a king and a jack.
 a) $\frac{16}{5525}$ b) $\frac{16}{625}$ c) $\frac{16}{3125}$ d) None of these
2. Four cards are drawn at random from a pack of 52 cards. Find the probability of getting all the four cards of same number.
 a) $\frac{17}{1665}$ b) $\frac{1}{20825}$ c) $\frac{7}{25850}$ d) None of these
3. From a well shuffled pack of 52 playing cards. Four cards are accidentally dropped. Find the probability that one card is missing from each suit.
 a) $\frac{17}{20825}$ b) $\frac{2197}{20825}$ c) $\frac{197}{1665}$ d) None of these
4. Four cards are drawn at random from a pack of 52 cards. Find the probability of getting all the four cards of different numbers.
 a) $\frac{141}{4165}$ b) $\frac{117}{833}$ c) $\frac{264}{4165}$ d) None of these
5. What is the probability that a number selected from the numbers 1,2,3,.....20, is a prime number when each of the given numbers is equally likely to be selected?
 a) $\frac{7}{10}$ b) $\frac{2}{15}$ c) $\frac{2}{5}$ d) $\frac{3}{5}$
6. Tickets are numbered from 1 to 18 are mixed up together and then is drawn at random. Find the probability that the ticket has a number, which is a multiple of 2 or 3.
 a) $\frac{1}{3}$ b) $\frac{3}{5}$ c) $\frac{2}{3}$ d) $\frac{5}{6}$
7. In a lottery of 100 tickets numbered 1 to 100, two tickets are drawn simultaneously. Find the probability that both the tickets drawn have prime numbers.
 a) $\frac{2}{32}$ b) $\frac{7}{50}$ c) $\frac{7}{20}$ d) $\frac{5}{65}$
8. The odds in favor of an event are 2:7. Find the probability of occurrence of this event.
 a) $\frac{2}{9}$ b) $\frac{5}{12}$ c) $\frac{7}{12}$ d) $\frac{2}{5}$
9. The odds against of an event are 5:7, find the probability of occurrence of this event.
 a) $\frac{3}{8}$ b) $\frac{7}{12}$ c) $\frac{2}{7}$ d) $\frac{2}{5}$
10. A box contains 5 defective and 15 non-defective bulbs. Two bulbs are chosen at random. Find the probability that both the bulbs are non-defective.
 a) $\frac{5}{19}$ b) $\frac{3}{20}$ c) $\frac{21}{38}$ d) None of these
11. In the previous question, find the probability that at least 3 bulbs are defective when 4 bulbs are selected at random.
 a) $\frac{31}{969}$ b) $\frac{7}{20}$ c) $\frac{1}{2}$ d) None of these
12. The probability of occurrence of two events A and B are $\frac{1}{4}$ and $\frac{1}{2}$ respectively. The probability that either A or B must occur.

- a) $\frac{61}{100}$ b) $\frac{29}{100}$ c) $\frac{39}{100}$ d) $\frac{56}{99}$
13. Two dice are tossed once. Find the probability of getting an even number on first die, or a total of 8.
a) $\frac{4}{9}$ b) $\frac{2}{3}$ c) $\frac{5}{9}$ d) $\frac{1}{3}$
14. In a single throw of two dice, find the probability that neither a doublet nor a total of 8 will appear.
a) $\frac{7}{15}$ b) $\frac{5}{18}$ c) $\frac{13}{18}$ d) $\frac{3}{16}$
15. Two cards are drawn at random from a well-shuffled pack of 52 cards. What is the probability that either both are red or both are queens?
a) $\frac{17}{112}$ b) $\frac{55}{221}$ c) $\frac{55}{121}$ d) $\frac{33}{221}$
16. A natural number is chosen at random from the first 100 natural numbers. What is the probability that the number chosen is a multiple of 2 or 3 or 5?
a) $\frac{30}{100}$ b) $\frac{1}{33}$ c) $\frac{74}{100}$ d) $\frac{7}{10}$
17. A box contains 5 red balls, 8 green balls and 10 pink balls. A ball is drawn at random from the box. What is the probability that the ball drawn is either red or green?
a) $\frac{13}{23}$ b) $\frac{10}{23}$ c) $\frac{11}{23}$ d) $\frac{13}{529}$
18. A basket contains 10 apples and 200 oranges out of which 3 apples and 5 oranges are defective. If we choose two fruits at random, what is the probability that either both are oranges or both are non defective?
a) $\frac{136}{345}$ b) $\frac{17}{87}$ c) $\frac{316}{435}$ d) $\frac{158}{435}$
19. A coin is tossed twice if the coin shows head it is tossed again but if it shows a tail then a die is tossed. If 8 possible outcomes are equally likely. Find the probability that the die shows a number greater than 4, if it is known that the first throw of the coin results in a tail.
a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) $\frac{2}{5}$ d) $\frac{4}{15}$
20. A die is thrown twice and the sum of the numbers appearing is observed to be 9. What is the conditional probability that the number 4 has appeared at least once
a) $\frac{1}{2}$ b) $\frac{2}{3}$ c) $\frac{3}{4}$ d) None of these
21. In a class 45% students read English, 30% read French and 20% read both English and French. One student is selected at random. Find the probability that he reads English, if it is known that he reads French.
a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) $\frac{5}{6}$ d) None of these
22. Two balls are drawn from a bag containing 2 white, 3 red and 4 black balls one by one without replacement. What is the probability that at least one ball is red?
a) $\frac{7}{12}$ b) $\frac{5}{12}$ c) $\frac{3}{1}$ d) None of these

23. A bag contains 6 red and 9 blue balls. Two successive drawing of four balls are made such that the balls are not replaced before the second draw. Find the probability that the first draw gives 4 red balls and second draw gives 4 blue balls.
a) $3/715$ b) $7/715$ c) $15/233$ d) None of these
24. A box contains 25 tickets numbered 1,2,3.....25. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will show odd numbers.
a) $37/50$ b) $13/50$ c) $13/25$ d) None of these
25. The probability that A hits a target is $1/3$ and the probability that B hits it is $2/5$. What is the probability that the target will be hit, if each one of A and B shoots the target?
a) $5/6$ b) $3/5$ c) $11/15$ d) $1/6$
26. An air gun can take a maximum of 4 shots at a balloon at some distance. The probabilities of hitting the balloon at the first, second, third and fourth shots are 0.1, 0.2, 0.3 and 0.4 respectively. What is the probability that the balloon is hit?
a) 0.6976 b) 0.6576 c) 0.786 d) None of these
27. An article manufactured by a company consists of two parts X and Y. In the process of manufacture of the part X, 9 out of 100 parts may be defective. Similarly, 5 out of 100 are likely to be defective in the manufacture of the part Y. Calculate the probability that the assembled product will not be defective.
a) 0.6485 b) 0.6565 c) 0.8645 d) None of these
28. In a toy making factory, machine A,B and C manufacture respectively 25%, 35% and 40% of the total toys. Of their output 5%,4% and 2% respectively are defective toys. A toy is drawn at random from the product. What is the probability that the toy drawn is defective?
a) 0.225 b) 0.345 c) 0.235 d) None of these
29. A box contains 20 bulbs. The probability that the box contains exactly 2 defective bulbs is 0.4 and the probability that the box contains exactly 3 defective bulbs is 0.6. Bulb are drawn at random one by one without replacement and testes till the defective bulbs are found. What is the probability that the testing procedure ends at the twelfth testing?
a) 0 b) 1 c) can't be determined d) None of these
30. An architecture company built 200 bridges 400 hospitals and 600 hotels. The probability of damage due to earthquake of a bridge, hospital and hotel is 0.01, 0.03 and 0.15 respectively. One of the constructions gets damaged with earthquake. What is the probability that it is bridge?
a) $1/26$ b) $1/52$ c) $7/52$ d) None of these

NUMBERS SYSTEM

Natural numbers

The set of counting numbers 1, 2, 3, 4,are called as the natural numbers, denoted by N.

$$N = \{1, 2, 3, \dots\}$$

Whole numbers

The set of natural numbers together with the number '0' is known as the set of whole numbers, denoted by W.

$$W = \{0, 1, 2, 3, \dots\}$$

Integers

The negative whole numbers, the number '0' and the natural numbers together form the set of Integers, denoted by Z.

$$Z = \{\dots -3, -2, -1, 0, 1, 2, 3, \dots\}$$

Rational numbers

Numbers which can be written in the form p/q where p and q are integers and $q \neq 0$ are called as rational numbers, denoted by Q.

Decimal representation of rational numbers

- ❖ *If a fraction (rational number) in its lowest terms has no other prime factors except 2 and 5. we get a terminating decimal.*

Example :-

$$1/4 = 0.25; 1/5 = 0.20$$

- ❖ *If a rational number in its lowest terms has prime factors other than 2 and 5, we get a non-terminating (division does not end) decimal.*
 - *Every non-terminating, recurring decimal fraction is a rational number.*

The recurring part is called the period, and the number of digits in the recurring part is called the periodicity of the-decimal.

Example :

$$1/3 = 0.333... \text{ (Period-3, periodicity- 1)}$$

$$5/13 = 0.384615384615...(period = 384615, periodicity = 6)$$

Irrational numbers

The numbers, which cannot be expressed as rational numbers is called as an irrational number.

Note:

Every non-terminating, non-recurring decimal is an irrational number.

Example :

0.12345...

$e, \pi, \sqrt{2}, \sqrt{3}, \sqrt{5}, \log_7 6, \log_3 8, \dots$

Note :

A number may be a rational number or an irrational number, but! it cannot be both.

Real numbers

The set of all numbers comprising rational numbers and irrational numbers is known as the set of real numbers, denoted by R.

Note :

- ❖ *On the number line, there is a point corresponding to every real number and to every point on the number line, there is a real number. Hence the number line is called the Real Number line.*
- ❖ *Real numbers are so called because they can be seen as points representing them on the number line.*

Complex numbers

There is no real number, whose square is a negative number.

E.g. $x = \sqrt{-1}$ is not a real number.

Such numbers are called as imaginary numbers.

The set of numbers comprising of real numbers and imaginary numbers is known as the set of complex numbers, denoted by C .

The ordered pair (a, b) where a and b are real numbers, when expressed in the form $a + ib$, is called a complex number.

a is called the real part, and b is called the imaginary part.

Note:

- ❖ Every real number a can be represented as a complex number, $(a, 0)$.
- ❖ The complex numbers $a + ib$ and $a - ib$ are called conjugate complex numbers. Each is called the conjugate of the other.
- ❖ The sum and product of two conjugate complex numbers are real.
- ❖ Every complex number can be represented as a point in the coordinate plane, by taking real part on the x -axis and the imaginary part on the y -axis.

Hence, x axis is called real axis

y -axis called imaginary axis.

Place values

123 - 3 in units place (3),

2 in tens place (20), $123 = 100 + 20 + 3$

1 in hundreds place (100)

$$0.456 = 0.4 + 0.05 + 0.006$$

123456789.123

$$= 1 \times 10^9 + 2 \times 10^8 + 3 \times 10^7 + 4 \times 10^6 + 5 \times 10^5 + 6 \times 10^4 + 7 \times 10^3 + 8 \times 10^2 + 9 \times 10 + 1 \times 10^{-1} + 2 \times 10^{-2} + 3 \times 10^{-3}$$

Indian Place Value Chart

Periods	Crores		Lakhs		Thousands		Hundred	Ten	Unit
Places	Ten Crores	Crore	Ten Lakhs	Lakhs	Ten thousand	Thousand			
	100000000	10000000	1000000	100000	10000	1000	100	10	1

International Place Value Chart

Periods	Billions		Millions			Thousands				
Places	Ten Billions	Billions	Hundred Million	Ten Million	Million	Hundred Thousands	Thousand	Hundred	Ten	Unit
	10000000000	1000000000	100000000	10000000	1000000	100000	1000	100	10	1

Example :

123456789 = 12, 34, 56, 789 (Indian place value)

= 123, 456, 789 (International place value)

Example : Find the difference of the place values of two 4 's in 57489245.

Solution : The place value of 4 in the ten's place = 40

The place value of other 4 - 400000

The difference in the place values = 400000 - 40 = 399960

Note : -

One billion = one million millions.

Properties/ Operations on real numbers**I. Addition**

❖ *Sum of the first n natural numbers* = $\frac{n(n+1)}{2}$

❖ *Sum of the squares of the first w natural numbers* = $\frac{n(n+1)(2n+1)}{6}$

❖ *Sum of the cubes of the first n natural numbers* = $[n(n+1)/2]^2$

❖ *Sum of the first n odd natural numbers* = n^2

❖ *Sum of the first n even natural numbers* = $n(n+1) = n^2 + n$

II. Subtraction

Subtraction is the process of finding how much the larger number is greater than the smaller number (removing one from the other) $A - B = A + (- B)$

III. Multiplication

Multiplication is repeated addition.

Example :

$$5 \times 3 = 5 + 5 + 5 = 15$$

$$= 3 + 3 + 3 + 3 + 3 = 15$$

Squares of some numbers

$1^2 = 1$

$11^2 = 121$

$21^2 = 441$

$2^2 = 4$

$12^2 = 144$

$22^2 = 484$

$3^2 = 9$

$13^2 = 169$

$23^2 = 529$

$4^2 = 16$

$14^2 = 196$

$24^2 = 576$

$5^2 = 25$

$15^2 = 225$

$25^2 = 625$

$6^2 = 36$

$16^2 = 256$

$26^2 = 676$

$7^2 = 49$

$17^2 = 289$

$27^2 = 729$

$8^2 = 64$

$18^2 = 324$

$28^2 = 784$

$9^2 = 81$

$19^2 = 361$

$29^2 = 841$

$10^2 = 100$

$20^2 = 400$

$30^2 = 900$

Cubes of some numbers

$1^3 = 1$

$11^3 = 1331$

$2^3 = 8$

$12^3 = 1728$

$3^3 = 27$

$13^3 = 2197$

$4^3 = 64$

$14^3 = 2744$

$5^3 = 125$

$15^3 = 3375$

$6^3 = 216$

$16^3 = 4096$

$7^3 = 343$

$17^3 = 4913$

$8^3 = 512$

$18^3 = 5832$

$9^3 = 729$

$19^3 = 6859$

$10^3 = 1000$

$20^3 = 8000$

Squares roots of some numbers :

2 = 1.414	11 = 3.316	20 = 4.472
3 = 1.732	12 = 3.3464	21 = 4.582
4 = 2	13 = 3.605	22 = 4.690
5 = 2.236	14 = 3.741	23 = 4.795
6 = 2.449	15 = 3.873	24 = 4.898
7 = 2.649	16 = 4	25 = 5
8 = 2.828	17 = 4.123	
9 = 3	18 = 4.242	
10 = 3.162	19 = 4.358	

Note: -

❖ *Multiplication of a number with 5.*

$$N \times 5$$

If N is even, Place 0 in the units place.

Place $N/2$ in the tens place.

If N is odd, Place 5 in the units place.

Place, $(N - 1)/2$ in the tens place

Example : $8 \times 5 = (8/4)0 = 40$

$$166 \times 5 = (166/2)0 = 830$$

Example : $9 \times 5 = [(9 - 1)/2]5 = 45$

$$231 \times 5 = [230/2]5 = 1155$$

❖ *Multiplication of a number with 11*

(A, A + B, B) procedure is followed,

Example :

$$26 \times 11 = (2, 2 + 6, 6) = 286$$

$$37 \times 11 = (3, 3 + 7, 7) = (3 + 1, 0, 7) = 407 \text{ [1 carried over]}$$

$$456 \times 11 = (4, 4 + 5, 5 + 6, 6) = 5016$$

❖ *Multiplication of a number with 9, 99, 999, 9999*

Place as many zeros after the given number as the number of 9s and subtract the number from it.

Example :

$$15 \times 999 = 15000 - 15 = 14985$$

❖ *Multiplication of a number with 25*

$$N \times 25$$

Place two zeros at the right end of the number N, i.e. multiply N with 100

Divide the resultant number by 4.

Example :

$$256 \times 25 = 25600/4 = 6400$$

❖ *Multiplication of a number with 50*

$$N \times 50$$

Place two zeros at the right end of the number N, i.e. multiply N with 100

Divide the resultant number by 2.

Example :

$$256 \times 50 = 25600/2 = 12800$$

❖ *Multiplication of a number with 125*

$$N \times 125$$

Place three zeros at the right end of the number N. i.e. multiply N with 1000

Divide the resultant number by 8.

Example :

$$256 \times 125 = 256000/8 = 32000$$

IV. Division**Rules of divisibility**

1. A number is divisible by 2 if its last digit is either 0 or even.

Example : 120, 252, 344, 576, 1008 are divisible by 2

2. A number is divisible by 3, if the sum of the digits is divisible by 3 (3 or multiple of 3).

Example : 369 ($3 + 6 + 9 = 15$), 96, etc.

3. A number is divisible by 4, if the last two digits of the number are divisible by 4.

Example : 924, 1036, etc.

4. A number is divisible by % 5, if the last digit of the number is either 0 or 5.

Example : 55, 620, etc.

5. A number is divisible by 6, if it is divisible by both 2 and 3.

Example : 36, 126, etc.

6. A number is divisible by 8, if the last 3 digits of the number is divisible by 8.

7. A number is divisible by 9, if the sum of the digits of the number is divisible by 9.

8. A number is divisible by 10, if the last digit of the number is 0.

9. A number is divisible by 11, if the sum of the digits at odd places and even places are equal, or differ by a multiple of 11.

10. A number is divisible by 12, if the number is divisible by both 4 and 3.

11. A number is divisible by 14, if it is divisible by both 2 and 7. 12.

12. A number is divisible by 15, if it is divisible by both 3 and 5.

Even and odd numbers

The number, which is exactly divisible by 2, is called an even number.

It is represented by $2n$

The number, which is not exactly divisible by 2, is called an odd number.

It is represented by $2n + 1$ or $2n - 1$.

In the first n natural numbers,

- ❖ *If 'n' is even, there are $n/2$ even numbers and $n/2$ odd numbers*
- ❖ *If n is odd, there are $\frac{1}{2}(n - 1)$ even numbers and $\frac{1}{2}(n + 1)$ odd numbers.*

Note : -

- ❖ *Sum of two even numbers is even.*
- ❖ *Difference of two even numbers is even.*
- ❖ *Sum of two odd numbers is even.*
- ❖ *Difference of two odd numbers is even.*
- ❖ *Sum of an even number and an odd number is odd.*
- ❖ *Difference of an even number and an odd number is odd.*
- ❖ *Product of two even numbers is even.*
- ❖ *Product of two odd numbers is odd.*
- ❖ *Product of an even number and an odd number is even.*
- ❖ *Difference between the squares of two consecutive numbers is always an odd number (it is the sum of those two numbers).*

Example : $7^2 - 6^2 = 7 + 6 = 13$

- ❖ *Every even number greater than 4 can be expressed as a sum of two odd prime numbers.*

Example :

$$6 = 3 + 3, 8 = 3 + 5, 10 = 5 + 5 \dots\dots\dots$$

Prime numbers and Composite numbers

Natural numbers are classified into three types

- ❖ *Numbers having exactly one factor*
- ❖ *Numbers having exactly two distinct factors*

❖ *Numbers having more than two factors*

A natural number, having only one factor is 1.

A natural number, other than 1, having no other factor except itself and 1, is called a prime number.

Example : 2, 3, 5, 7, 11, etc.

A natural number, other than 1, which is not a prime number, is called a composite number.

Example : 4, 6, 8, 10, 12, 14, 15

Note :- 1 is neither prime nor composite

Note :-

❖ *There are 25 prime numbers, in the first 100 natural numbers.*

2 3 5 7 11 13 17 19 23 29 37 41 43
 47 53 59 61 67 71 73 79 83 89 97

❖ *There are 21 prime numbers between 100 and 200*

101 103 107 109 113 127 131 137 139 149 151 157 163 173
 179 181 191 193 197 199

❖ *There are 16 prime numbers between 200 and 300*

211 223 227 229 233 239 241 251 257 263 269 271
 277 281 283 293

Twin primes

Two prime numbers are said to be twin primes, if there is only one composite number between them. Twin prime numbers below 200

3, 5 5, 7 11, 13 17, 19 29, 31 41, 43 59, 61
 71, 73 101, 103 107, 109 137, 139 179, 181 191, 193

Note :-

To find whether a given number N is prime or not, find the smallest number greater than or equal to the square root (approximate value, if exact value cannot be found) of the number.

Then identify all the prime numbers below this number. If the given number N is divided by any of the prime numbers exactly, then the number N is not prime.

Example : Is 221 a prime?

Solution : 221 has a square root between 14 and 15.

The prime numbers below 15 are 2, 3, 5, 7, 11, 13.

221 is exactly divisible by it (13 x 17=221)

Relatively prime or Co-primes

Two natural numbers are said to be relatively prime or co-prime, if they do not have any common factor other than 1.

Note :-

Two numbers are said to be co-prime, if their G.C.D is 1.

(G.C.D is dealt in further topics)

Perfect number

A number that has the sum of all its factors, excluding itself, equal to itself is called a perfect number. **Example :** $6(1 + 2 + 3 = 6)$

$28(1 + 2 + 4 + 7 + 14 = 28)$

$496(1 + 2 + 4 + 8 + \dots + 62 + 124 + 248)$

Note :-

A perfect number ends with 6 or 8.

Ramanujan's number

The number 1729 is called Ramanujan's number.

It is the smallest number that can be expressed as a sum of two cubes in two different ways

$$1729 = 12^3 + 1^3 = 10^3 + 9^3$$

Fibonacci numbers

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144. ... is a fibonacci series.

Starting from the third number, every number is the sum of the two immediately preceding numbers.

Factorial

The factorial of a whole number N is the continued product of all numbers from 1 to N.

It is denoted by N! or IN .

Example :

$$1! = 1$$

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

$$2! = 2 \times 1 = 2$$

$$6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$$

$$3! = 3 \times 2 \times 1 = 6$$

$$7! = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5040$$

$$4! = 4 \times 3 \times 2 \times 1 = 24$$

$$8! = 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 40320$$

$$9! = 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 362880$$

$$10! = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 =$$

3628800

Note : –

$$0! = 1$$

Prime Factorization of a given number

Prime factorization is expressing (or representing) a number N as the product of its prime factors.

Example :

$$15 = 3 \times 5$$

$$360 = 2 \times 2 \times 2 \times 3 \times 3 \times 5$$

Numbers of divisors (factors) of a composite number N

If N is a composite number, and $N = a^p b^q c^r \dots$ where a, b, c are different prime numbers and p, q, r are positive integers.

then the number of divisors of $N = (p + 1)(q + 1)(r + 1) \dots$

This number includes the two trivial divisors, 1 and the number itself.

Example :

$$1) \quad 96 = 2^5 \times 3 \Rightarrow (5 + 1)(1 + 1) = 6 \times 2 = 12 \text{ factors}$$

(1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96)

$$2) \quad 196 = 2^2 \times 7^2 \Rightarrow (2 + 1)(2 + 1) = 3 \times 3 = 9 \text{ factors}$$

(1, 2, 4, 7, 14, 28, 49, 98, 196)

Number of ways in which a composite number N may be resolved into two factors

If N is a composite number, and $N = a^p b^q c^r \dots$ where a, b, c are different prime numbers and p, q, r are positive integers, then the number of ways N can be expressed as the product of two factors is

$$= \frac{1}{2} (p + 1) (q + 1) (r + 1) \dots \quad [\text{If } N \text{ is not a perfect square}]$$

$$= \frac{1}{2} [(p + 1) (q + 1) (r + 1) \dots] \quad [\text{If } N \text{ is a perfect square}]$$

Example :

$$1) \quad 96 = 2^5 \times 3 \Rightarrow \frac{1}{2} (5 + 1)(1 + 1) = \frac{1}{2} (6 \times 2) = 6 \text{ ways}$$

(1 × 96, 2 × 48, 3 × 32, 4 × 24, 6 × 16, 8 × 12)

$$2) \quad 196 = 2^2 \times 7^2 \Rightarrow \frac{1}{2} (2 + 1)(2 + 1) = \frac{1}{2} [(3)(3) + 1] = \frac{1}{2} (10) = 5 \text{ ways}$$

(1 × 196, 2 × 98, 4 × 49, 7 × 28, 14 × 14)

Number of ways in which a composite number N may be resolved into two factors which is prime to each other

If N is a composite number, and $N = a^p b^q c^r \dots$ where a, b, c are different prime numbers and p, q, r are positive integers, then the number of ways N can be expressed as the product of two factors which are prime to each other is

$$= \frac{1}{2} (1 + 1)(1 + 1)(1 + 1) \dots = 2^{n-1} \text{ where } n \text{ is the number of different prime factors of } N.$$

Example :

1) $96 = 2^5 \times 3 \Rightarrow (1 + 1) (1 + 1) = \frac{1}{2} (2 \times 2) = 2 \text{ ways}$

$$(1 \times 96, 3 \times 32)$$

2) $196 = 2^2 \times 7^2 \Rightarrow \frac{1}{2}(1 + 1) (1 + 1) = \frac{1}{2} (2 \times 2) = 2 \text{ ways}$

$$(1 \times 196, 4 \times 49)$$

Sum of the divisors of a number N

If N is a composite number, and $N = a^p b^q c^r$ where a, b, c are different prime numbers and p, q, r are positive integers, then the sum of all the divisors is given by

$$\text{Sum of the divisors of } N = \left[\frac{a^{p+1} - 1}{a - 1} \right] \left[\frac{b^{q+1} - 1}{b - 1} \right] \left[\frac{c^{r+1} - 1}{c - 1} \right]$$

Example :

1) $96 = 2^5 \times 3$

$$\text{Sum} = \frac{(2^{5+1} - 1)}{(2 - 1)} \frac{(3^{1+1} - 1)}{(3 - 1)} = 63 \times 4 = 252$$

$$(1 + 2 + 3 + 4 + 6 + 8 + 12 + 16 + 24 + 32 + 48 + 96) = 252$$

2) $196 = 2^2 \times 7^2$

$$\text{Sum} = \frac{(2^{2+1} - 1)}{(2 - 1)} \frac{(7^{2+1} - 1)}{(7 - 1)} = 7 \times 57 = 399$$

$$(1 + 2 + 4 + 7 + 14 + 28 + 49 + 98 + 196) = 399$$

Product of the divisors of a number $N = N^{(p+1)(q+1)(r+1)/2}$

Example : $96 = 2^5 \times 3$

Product of the divisors of $96 = 96^{(5+1)(1+1)/2} = 96^6 = 782757789696$

$(1 \times 2 \times 3 \times 4 \times 6 \times 8 \times 12 \times 16 \times 24 \times 32 \times 48 \times 96 = 782757789696)$

Finding the digit in the units place in an exponential N^P

Let N^P be the given number.

For all values of p ,

if N ends in 0, N^P has 0 in the units place.

if N ends in 1, N^P has 1 in the units place.

if N ends in 5, N^P has 5 in the units place.

if N ends in 6, N^P has 6 in the units place.

If the units place of N has other values (other than 0, 1, 5, 6), then divide p by 4. Let r be the remainder. Then find the units digit, when units digit of N is raised to the power of r .

Example : Find the number in the units place 729^{59} .

Solution. 59 when divided by 4 , leaves a remainder 3 .

$$9^3 = 729$$

\Rightarrow The units digit of 729^{59} is 9 .

Factors and multiples

If a number a divides the number b exactly, then

a is called the factor or divisor of b .

b is called the multiple of a .

Factor of a number is an exact divisor of that number, i.e. leaves no remainder.

A number is said to be a multiple of any of its factors.

Example : $15 = 5 \times 3$ [$5, 3$ are the factors of 15 and 15 is the multiple of $3, 5$]

Note :-

- ❖ *1 is a factor of every number.*
- ❖ *Any number is a factor of itself*
- ❖ *If 'a' is a factor of 'b' and 'b' is a factor of 'a', then $a = b$.*

Absolute value of an integer

The absolute value of an integer is the numerical value of the integer regardless of its sign, i.e. the absolute value of an integer is always positive. If a is an integer, then the absolute value of a is given by $|a| = a$ if $a \geq 0$

$$= a \text{ if } a \leq 0$$

Example :

$$|4| = 4$$

$$|0| = 0$$

$$|-7| = -(-7) = 7$$

HCF and LCM**Highest Common Factor (HCF)**

HCF of two or more numbers is the largest factor of each of them. i.e. the greatest number that divides each of the number exactly.

It is also known as Greatest Common Divisor (GCD)

HCF is found by the following methods

- ***Prime factorization***

Each of the given numbers is expressed as the product of prime factors. The product of the prime factors common to each of the number is the required HCF.

Example : Find the HCF of 144, 192 and 180.

$$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$180 = 2 \times 2 \times 3 \times 3 \times 5$$

$$192 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

Therefore, the HCF of 144, 180 and 192 = $2 \times 2 \times 3 = 12$

Successive division

- ❖ Divide the greater number by the smaller number.
- ❖ Then divide the divisor by the remainder.
- ❖ Then divide the remainder by the next remainder.
- ❖ Repeat the process of dividing the preceding divisor by the remainder obtained, until the remainder is zero.
- ❖ The last divisor is the required HCF.

Example : Find the HCF of 144, 192 and 180.

$$\begin{array}{r}
 144 \overline{) 180} \quad (1 \\
 \underline{144} \\
 36
 \end{array}
 \qquad
 \begin{array}{r}
 36 \overline{) 192} \quad (5 \\
 \underline{180} \\
 12
 \end{array}$$

$$\begin{array}{r}
 36 \overline{) 144} \quad (4 \\
 \underline{144} \\
 0
 \end{array}
 \qquad
 \begin{array}{r}
 12 \overline{) 192} \quad (3 \\
 \underline{192} \\
 0
 \end{array}$$

Therefore, the HCF of 144, 190 and 180 is 12.

Note :-

- ❖ HCF of the numbers a , b and c is the greatest number that exactly divides each of a , b and c .
- ❖ The greatest number that divides a , b and c leaving r_1 , r_2 and r_3 respectively is the HCF of $(a - r_1)(b - r_2)(c - r_3)$
- ❖ HCF of fractions = $\frac{\text{HCF of the numerators}}{\text{LCM of the denominators}}$
- ❖ The HCF of given numbers is not greater than any of the numbers.
- ❖ HCF of two prime or co prime numbers is 1.

Least Common Multiple (LCM)

LCM of two or more numbers is the least number that is exactly divisible by each of the given numbers.

LCM is found by the following methods

- *Prime factorization*

Each of the given numbers is expressed as the product of prime factors. The LCM of the given numbers is the product of the highest powers (obtained from the factors of the numbers) of all the factors.

Example : Find the LCM of 40, 72 and 132.

$$40 = 2 \times 2 \times 2 \times 5 = 2^3 \times 5$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2$$

$$132 = 2 \times 2 \times 3 \times 11 = 2^2 \times 3 \times 11 = 3960$$

Therefore, the LCM of 40, 72 and 132 = $2^3 \times 3^2 \times 5 \times 11 = 3960$

Successive division

Write the given numbers in a line.

Select a prime factor common to atleast two of the given numbers.

Divide the numbers (in line) with that prime factor.

- write the quotient below the respective number.
- if any number is not divisible, write the number itself under it.

Then select a prime factor that is common to at/least two of the obtained quotients (in second line), and repeat the process, until the quotients are all prime. LCM is the product of all the divisors (/actors) and (the quotients (in the last line)

Example : Find the LCM of 40, 72 and 132.

$$\begin{array}{r|l} 2 & 40, 72, 132 \\ \hline \end{array}$$

2	20, 36, 66
2	10, 18, 33
3	5, 9, 33
	5, 3, 11

Therefore, the LCM of 40, 72 and 132 = $2 \times 2 \times 2 \times 3 \times 5 \times 3 \times 11 = 3960$.

Note :-

- ❖ *LCM of the numbers a, b and c is the least number that is exactly divided by each of a, b and c.*
- ❖ *The least number which when divided by a, b and c leaving r in each case is (the LCM of a, b and c) + r*
- ❖ *LCM of fractions = $\frac{\text{LCM of the numerators}}{\text{HCF of the denominators}}$*
- ❖ *The LCM of given numbers is not less than any of the numbers.*
- ❖ *The LCM of two or more prime or co primes is their product.*

Note :-

- *If a number A is a factor of another number B, then*

$$\text{HCF of A and B} = A$$

$$\text{LCM of A and B} = B$$
- *HCF of given numbers is the factor of the LCM of the given numbers.*
- *The product of HCF and LCM of two numbers = the product of the given numbers*

Fractions

If a unit is divided into equal number of parts, then one or more than one of these parts is called a fraction of that unit.

Example : If a unit is divided into 5 equal parts, then

One part of it is represented as $\frac{1}{5}$

Two parts of it is represented as $\frac{2}{5}$

Three parts of it is represented as $\frac{3}{5}$ and so on.

The number of parts into which the unit is divided is called as the denominator, and the number indicating the number of parts taken is called as the numerator. (In $\frac{2}{5}$, 2 – numerator, 5 – denominator)

Note: -

- ❖ *If numerator = zero, then the fraction = zero*
- ❖ *If denominator = zero, then the fraction cannot be determined (i.e. denominator is always a non-zero number)*
- ❖ *If both numerator and denominator are equal, then fraction is unity.*

Fraction in its lowest terms : If the numerator and the denominator have no common factor other than 1, the fraction is said to be in lowest terms.

Example : $\frac{3}{7}$, $\frac{19}{31}$, etc.

Proper fraction : If the numerator of the fraction is less than the denominator, then the fraction is said to be a proper fraction.

Example : $\frac{2}{5}$, $\frac{5}{30}$, etc.

Improper fraction : If the numerator of the fraction is greater than or equal to the denominator, then the fraction is said to be an improper fraction.

Example : $\frac{6}{6}$, $\frac{8}{5}$, etc.

Mixed fraction : Every improper fraction can be expressed as mixed fraction, which consists of an integer and a proper fraction.

Example : $6\frac{1}{4} = \frac{[(6 \times 4) + 1]}{4} = \frac{25}{4}$

$$\frac{11}{5} = 2 + \frac{1}{5} = \frac{11}{5} \text{ [On dividing 11 by 5, quotient = 2, remainder = 1]}$$

Compound fraction : A fraction of a fraction is called a compound fraction.

Example : $\frac{1}{2}(\frac{1}{3}) = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$.

Comparison of fractions

- **Two fractions**

Let a/b and c/d be two fractions.

Multiply the numerator of each fraction with the denominator of the other ad , bc .

If $ad > bc$, then $a/b > c/d$

If $ad < bc$, then $a/b < c/d$

Example : $3/4$, $4/5$

$$3 \times 5, 4 \times 4 \Rightarrow 15 < 16$$

$$\Rightarrow 3/4 < 4/5$$

- **3 or more fractions**

Example : $5/7$, $7/9$, $3/5$

The LCM of the denominators 7, 9, 5 is 315.

$$5/7 \times 315 = 225$$

$$7/9 \times 315 = 245$$

$$3/5 \times 315 = 189$$

$$= 7/9 > 5/7 > 3/5$$

Equivalent fractions

If two or more fractions have the same value, then they are said to be equivalent.

Example : $1/3 = 2/6 = 3/9 = \dots$

Addition and subtraction of fractions

- *If the denominators of the fractions are same, then*

Sum = (sum of the numerators)/(common denominator) Difference = (difference of – the numerators)/(common denominator)

Example : $11/5$ and $7/5$

$$\text{Sum} = (11 + 7)/5 = 18/5 = 3 \frac{3}{5}$$

$$\text{Difference} = (11 - 7)/5 = 4/5$$

- *Denominators of the fractions are different*

Example : 7/9, 2/3, 11/12.

LCM of the denominators 9, 3, 12 is 36 [$9 \times 4 = 3 \times 12 = 12 \times 3 = 36$]

$$\frac{7}{9} + \frac{2}{3} + \frac{11}{12}$$

$$\frac{7 \times 4 + 2 \times 12 + 11 \times 3}{36} = \frac{85}{36}$$

Multiplication of the fractions

Product of the fractions = (Product of the numerators)/(Product of the denominators)

Note: - Reduce the fractions during multiplication (look for the common factors) so that multiplication would not be of larger numbers.

Division of the fractions

Division is similar to multiplication.

Example : $(a/b)/(c/d) = (a/b) \times (d/c)$

$$\frac{25}{27} \div \frac{5}{9} = \frac{25}{27} \times \frac{9}{5} = \frac{5}{3}$$

Decimals

If the denominators of the fractions are powers of 10, then those fractions can be expressed as decimals.

Example : $255/100 = 2.55$

$$3/10 = 0.3$$

Converting a decimal into fraction

Example : $0.53 = 53/100$ (Since, there are two decimal places, write 1 followed by two zeros in the Denominator)

$$0.121 = 121/1000 \text{ (3 decimal places - 1 followed by 3 zeros)}$$

$$1/(0.77) = 1/(77/100) = 100/77$$

$$0.23/0.31 = (23/100)/(31/100) = 23/31$$

$$0.11/0.237 = (11/100)(237/1000) = 110/237$$

Addition/Subtraction

Example : Add 7.892, 3.93, and 0.1234

7.8920
3.9300
0.1234

11.9454

Example : Subtract 21.2391 from 43.56

43.5600
21.2391

22.3209

Multiplication

- i. Multiplying with 10, 100, ...

Example : $23.452 \times 100 = 2345.2$

$$31.23 \times 1000 = 31230$$

Move the decimal point to as many places to the right in the multiplicand as there are zeros in the multiplier.

- ii. Multiplying with any other number (except with a decimal)

Multiplying as in the case of the integers.

Place as many decimals as there in the multiplicand.

Example : $34.678 \times 19 = 658.882$

$$123.2 \times 12 = 1478.4$$

iii. Multiplying with a decimal

Multiplying as in the case of the integers.

Place as many decimals as the total number of decimals in the multiplicand and multiplier.

Example : $23.45 \times 48.962 = 1146.1589$

$$32.4 \times 12.46 = 403.704$$

Division

Dividing by 10, 100,

Example : $23.452/10 = 2.3452$

$$31.23/1000 = 0.031230$$

Move the decimal point to as many places to the left in the multiplicand as there are zeros in the multiplier.

BINARY NUMBERS

The number systems commonly used are

- | | | |
|------------------------------|---|-------------------------|
| ❖ <i>Binary system</i> | } | <i>(POSITIONAL)</i> |
| ❖ <i>Octal system</i> | | |
| ❖ <i>Decimal system</i> | | |
| ❖ <i>Hexadecimal system</i> | | |
| ❖ <i>Roman number system</i> | | <i>(NON-POSITIONAL)</i> |

Binary system

Base = 2

(0, 1)

Octal system

Base = 8

(0, 1, 2, 3, 4, 5, 6, 7)

Decimal system

Base- 10

(0, 1, 2, 3, 4, 5, 6, 7, 8, 9)

Hexadecimal system

Base = 16

(0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F)

Roman numerals

I	1	XI	11	XXV	25	C	100
II	2	XII	12	XXIX	29	D	500
III	3	XIII	13	XXX	30	M	1000
IV	4	XIV	14	XL	40		
V	5	XV	15	L	50		
VI	6	XVI	16	LX	60		
VII	7	XVII	17	CD	400		
VIII	8	XVIII	18	DC	600		
IX	9	XIX	19				
X	10	XX	20				

Conversion of binary number to decimal

$2^n \dots\dots 2^3 2^2 2^1 2^0 . 2^{-1} 2^{-2} 2^{-3} \dots\dots 2^{-n}$

Example 1 : Convert the binary number 1101 to decimal.

Solution : Binary number 1 1 0 1

	2^3	2^2	2^1	2^0
Decimal value	8	4	2	1

$$(1101)_2 = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$

$$= (1 \times 8) + (1 \times 4) + (0 \times 2) + (1 \times 1) = 8 + 4 + 0 + 1 = (13)_{10}$$

Example 2 : Convert the binary number 11.1101 to decimal.

Solution :

Binary number	1	1	0	1
	2^{-1}	2^{-2}	2^{-3}	2^{-4}
Decimal value	0.5	0.25	0.125	0.0625

$$= (1 \times 2^1 + 1 \times 2^0).(1 \times 0.5 + 1 \times 0.25 + 0 \times 0.125 + 1 \times 0.0625)$$

$$= (2 + 1).(0.5 + 0.25 + 0 + 0.0625) = (3.8125)$$

Conversion of a decimal to binary

To convert decimal to binary, repeated division by 2 is done as shown in the following example. First remainder is the least significant bit in the binary number. The last remainder is the most significant bit in the binary number.

Example : Convert the decimal number 24 into binary

Solution :

2		24
2		12 - 0
2		6 - 0
2		3 - 0
		1 - 1

$(24)_{10} = 11000_2$ [the last remainder is the most significant bit, and the first remainder 0 is the least significant bit in the binary number]

Example : Convert 0.625_{10} to binary

Solution :

$$0.625 \times 2 = 1.25 [1 + .25, 1 \text{ is the most significant digit in the binary}]$$

$$1.25 \times 2 = 2.50 [0 + .50, 0 \text{ is the next significant digit in the binary}]$$

$$0.50 \times 2 = 1.00 [1 + .00, 1 \text{ is the next significant digit in the binary}]$$

Note :- To convert decimal fraction 0.625 to binary, multiply 0.625 with 2, then multiply each resultant fractional part of the product with 2 until the fractional part of the product is zero.

Conversion of octal to decimal

$$8^n \dots 8^3 8^2 8^1 8^0 . 8^{-1} 8^{-2} 8^{-3} \dots 8^{-n}$$

Example 1. Convert 3427_8 to decimal. Solution.

Octal number	3	4	2	7
	8^3	8^2	8^1	8^0
Decimal value	512	64	8	1

$$\begin{aligned} (3427)_8 &= 3 \times 8^3 + 4 \times 8^2 + 2 \times 8^1 + 7 \times 8^0 \\ &= (3 \times 512) + (4 \times 64) + (2 \times 8) + (7 \times 1) \\ &= 1536 + 256 + 16 + 7 = (1815)_{10} \end{aligned}$$

Conversion of a decimal to octal

To convert decimal to octal, repeated division by 8 is done as shown in the following example. First remainder is the least significant bit in the binary number.

The last remainder is the most significant bit in the binary number.

Example : Convert the decimal number 248 into binary

Solution :

8	248	
8	31 – 0	(least sig. digit)
8	3 – 7	
	0 – 3	(most sig. Digit)

$$(248)_8 = 3702$$

Conversion of binary to octal, octal to binary

Each octal digit is represented by three bits as given below

Octal digit	Binary equivalent
0	000
1	001
2	010
3	011
4	100
5	101
6	110
7	111

Example : Convert 120_8 to binary Solution.

$$120_8 = (001)(010)(000) = 0010100002$$

Example : Convert 101001_2 to octal.

Solution :

$$101001_2 = (101)(001) = 51_8$$

1's complement, 2's complement

1's complement of a binary number is the number that results when each 0 is changed to 1 and each 1 is changed to 0.

Example :

1's complement of 1010 is 0101

1's complement of 1100 is 0011

2's complement of a binary number is the number that results when 1 is added to its 1's complement.

Example :

2's complement of 1010 is $0101 + 1 = 0110$

2's complement of 1100 is $0011 + 1 = 0100$

Exercise

1. Find the square of the following,
 - a. 132

1) 18246	2) 16736	3) 17546	4) 1742
----------	----------	----------	---------
 - b. 29.03

1) 859.8409	2) 842.7409	3) 911.3009	4) None of these
-------------	-------------	-------------	------------------
2. Find the square root of the following.
 - a. 289.3401

1) 17.11	2) 17.01	3) 17.19	4) 17.09
----------	----------	----------	----------
 - b. 63001

1) 259	2) 251	3) 249	4) 261
--------	--------	--------	--------
3. Find the cube of the following.
 - a. 121

1) 1771651	2) 1693711	3) 1771561	4) None
------------	------------	------------	---------
 - b. 17.9

1) 5564.229	2) 5735.339	3) 6110.339	4) None
-------------	-------------	-------------	---------
4. Find the cube root of the following,
 - a. 11697083

1) 219	2) 217	3) 227	4) 247
--------	--------	--------	--------

- b. 2460.375
 1) 14.5 2) 12.5 3) 13.5 4) None of these
5. Which of the following numbers is divisible by
- a. 3 and 9
 1) 9453 2) 6579 3) 7322 4) 7401
- b. 2 and 9
 1) 6724 2) 59348 3) 8431 4) 12378
- c. 11
 1) 7289 2) 8376 3) 9272 4) 2343
- d. 2, 3, 4, and 6
 1) 30830 2) 13330 3) 28272 4) 1454
- e. 2, 3, 4, 6 and 8
 1) 6142 2) 6736 3) 5486 4) 4240
- f. 2, 3, 5, 9
 1) 82460 2) 67360 3) 56880 4) 17424
- g. 3, 7, 9, 11
 1) 8246 2) 2079 3) 7543 4) 1424
- h. 22 and 36
 1) 396 2) 488 3) 746 4) 424
- i. 33 and 44
 1) 8264 2) 6376 3) 3432 4) 5642
6. The number 555555 is divisible by
 1) 17 2) 19 3) 7 4) 23
- 7.
- a. How many numbers between 500 and 1000 are divisible by 11?
 1) 37 2) 35 3) 45 4) 55
- b. How many numbers between 600 and 1800 are divisible by 3 and 4 together?
 1) 150 2) 99 3) 50 4) 125
- c. How many numbers below 900 are divisible by 4?
 1) 225 2) 250 3) 315 4) 216
- d. How many natural numbers from 600 to 800 contain the digit 7 once and only once?
 1) 98 2) 99 3) 100 4) None of these

8. The digit in the unit's place of a number is 5. If the number lies between 200 and 250, it is
a
1) Prime number 2) composite number 3) either 1 or 2 4) can't be determined
9. Which of the following is a prime number?
a.
1) 1737 2) 1437 3) 1531 4) 1813
b. 1) 377 2) 387 3) 357 4) 389
10. Which of the following is not a prime number?
a.
1) 307 2) 359 3) 397 4) 301
b.
1) 229 2) 251 3) 191 4) 213
11. Which of the following pair of numbers are relatively prime?
a.
1) 81,54 2) 159, 147 3) 24, 53 4) 189, 84
b.
1) 276,207 2)379, 223 3) 213, 781 4) 3471, 1599
12. Which of the following are not relatively prime?
1) 229, 379 2) 117, 299 3) 251, 293 4) 307, 181
13. Which of the following is not a perfect number?
1) 496 2) 28 3) 8128 4) 33550338
14. Which of the following is incorrect?
1) The G.C.D of any two fibonacci numbers is a flbonacci number.
2) Any two consecutive fibonacci numbers are relatively prime.
3) The sum of the first n fibonacci numbers is one less than the $(n * 2)$ th number.
4) None of these
15. If a and b are both odd numbers, then which of the following is incorrect?
1) $a + b$ is always even 2) ab is always odd
3) $ab + 2$ is always odd 4) $a + b + 1$ is always even
16. Find the units digits in the product of

- a. $6^{36} \times 7^{49} \times 8^{64}$
 1) 9 2) 2 3) 7 4) 6
- b. $9243 \times 6876 \times 3564 \times 978$
 1) 6 2) 8 3) 4 4) 6
- c. $7^{4n} \times 6^n \times 2^{4n} \times 8^{4n} \times 5^n$, n is any natural number.
 1) 5 2) 2 3) 0 4) 3
- d. $3^{4n} \times 1^n \times 4^{2n} \times 9^{2n}$, n is any natural number.
 1) 5 2) 9 3) 6 4) 3
- 17.
- a. Find the sum of the first 100 natural numbers.
 1) 5050 2) 5151 3) 4949 4) 5340
- b. Find the sum of the first 50 odd numbers.
 1) 2601 2) 2500 3) 4410 4) None of these
- c. Find the sum of the first 25 even numbers.
 1) 577 2) 576 3) 626 4) 676
- d. Find the sum of the first 25 prime numbers.
 1) 1577 2) 1060 3) 956 4) 876
- e. Find the sum of all the even numbers between 1 and 200.
 1) 40200 2) 10100 3) 12956 4) None of these
- f. Find the sum of all the odd numbers between 23 and 103.
 1) 1574 2) 2060 3) 2560 4) 2876
- g. Find the sum of the first 100 whole numbers.
 1) 3950 2) 4950 3) 4620 4) 3676
- h. Find the sum of the square of first 25 natural numbers.
 1) 5787 2) 5564 3) 4626 4) 5525
- i. Find the sum of the cubes of the first 10 natural numbers.
 1) 3045 2) 3525 3) 3025 4) None of these
- j. Find the sum of the cubes of the first 10 prime numbers.
 1) 1577 2) 2397 3) 3629 4) None of these
- k. Find the difference of the largest and the smallest number that can be formed by using the digits 3, 0, 1, 5, 8.
 1) 83952 2) 74952 3) 76780 4) None of these

18. Find the number such that its excess over 90 is lesser by 6 than its deficit from 112?
1) 100 2) 104 3) 106 4) None of these
- 19.
- a. What least number must be added to 7039 to make it exactly divisible by 73?
1) 3 2) 42 3) 22 4) 50
- b. What least number must be added to 14649 to make it exactly divisible by 11?
1) 5 2) 2 3) 3 4) 4
- c. What least number must be subtracted from 31588 to make it exactly divisible by 256?
1) 105 2) 117 3) 100 4) 60
- d. What least number must be, subtracted from 11378 to make it exactly divisible by 6?
1) 5 2) 3 3) 2 4) None of these
- e. What is the least number by which 19404 must be multiplied or divided so as to make it a perfect square?
1) 9 2) 7 3) 2 4) 11
- f. Find the least number of 5 digits, which is exactly divisible by 56?
1) 10025 2) 10046 3) 10024 4) None of these
- g. Find the greatest number of 4 digits, which is exactly divisible by 98?
1) 9956 2) 9972 3) 9926 4) 9996
- h. Find the least number with which 217800 should be multiplied to make it a perfect square.
1) 5 2) 7 3) 2 4) 0
- i. Find the value of 'a' in 8a49, so that the given number is a multiple of 33.
1) 5 2) 3 3) 2 4) 7
- j. What is the value of 'a' in 6a89 if it is exactly divisible by 73?
1) 5 2) 3 3) 2 4) 7
- k. What is the value of 'a' in 15a51 if it is exactly divisible by 11?
1) 5 2) 8 3) 1 4) 7
- l. Find the number less than 1000, by which 56892 must be multiplied so that the last three figures to the right of the product may be 044?
1) 892 2) 657 3) 567 4) 702
- m. Find the least number that should be added to 29201 to make it a perfect square.
1) 31 2) 40 3) 36 4) 41
- n. Find the least number that should be subtracted from 8289 to make it a perfect square.

- 1) 6 2) 8 3) 41 4) 33
- o. Find the least number with which 9770992 should be multiplied or divided so as to make it a perfect square.
- 1) 11 2) 7 3) 13 4) None of these
- 20.
- a. A number when divided by 123 leaves a remainder 2. Find the remainder when it is divided by 9.
- 1) 5 2) 7 3) 2 4) 0
- b. A number when divided by 141 leaves a remainder 16. Find the remainder when it is divided by 7.
- 1) 5 2) 6 3) 5 4) 0
- c. A student was asked to multiply 23659 by 72348. But during the multiplication, he read one of the numbers wrongly and obtained the product as 1710971562. Find the wrongly read digit.
- 1) 9 2) 3 3) 4 4) 2
- 21.
- a. Find the greatest number that will divide 964, 1238 and 1400 leaving remainders 41, 31, and 51 respectively.
- 1) 56 2) 61 3) 71 4) 67
- b. Find the greatest number that will divide 19409 and 43037 leaving remainders 17 and 29 respectively.
- 1) 156 2) 178 3) 192 4) None of these
- c. Find the greatest number that will divide 12288, 28200 and 44333 so as to leave the same remainder in each case.
- 1) 221 2) 256 3) 157 4) 172
- d. Find the greatest number of four-digits which when divided by 15, 20 and 28 leave a remainder 2 in each case.
- 1) 9653 2) 9662 3) 9077 4) 1090
- e. Find the greatest number of five digits which when added to 8321, is exactly divided by 15, 20, 24, 27, 32 and 36.
- 1) 96534 2) 99679 3) 99639 4) 98474
- f. On dividing 24345 and 33334 by a certain three-digit number, the remainder is same in both the cases. Find the remainder.

- 1) 5 2) 6 3) 3 4) 4
- g. On dividing a number by 5, 7 and 6 successively the remainders are respectively 2, 1 and 3. If the order of the divisors is reversed, what will be the remainders in order?
- 1) 3, 1, 2 2) 4, 4, 2 3) 2, 3, 4 4) 3, 2, 2
- h. Find the least number which when divided by 9, 12, 16 and 30 leaves a remainder 3 in each case.
- 1) 653 2) 728 3) 723 4) 847
- i. Find the least number which being increased by 1 will be exactly divisible by 17, 22, 33 and 102.
- 1) 1001 2) 1728 3) 1121 4) None of these
- j. Find the least number which when divided by 48, 60, 72, 108, and 140 leaves the remainders 38, 50, 62, 98 and 130 respectively.
- 1) 16532 2) 15110 3) 17120 4) 18474
- k. Find the greatest number less than 10000, which is divisible by 48, 60 and 64.
- 1) 6530 2) 8570 3) 7230 4) 9600
- l. Find the least multiple of 11 which when divided by 8, 9, 12 and 14 leave 4 as remainder in each case.
- 1) 1650 2) 1012 3) 1023 4) 1122
22. Find the LCM of
- a. 12, 15, 24 and 30
- 1) 180 2) 120 3) 240 4) 90
- b. 23 and 31
- 1) 653 2) 713 3) 723 4) 817
- c. 0, 7, 0, 9, 0, 12.
- 1) 16.40 2) 17.20 3) 12.40 4) None of these
23. Find the HCF of
- a. 72 and 108
- 1) 6 2) 12 3) 36 4) 18
- b. 2460, 4920 and 1435
- 1) 185 2) 60 3) 195 4) 205
- c. 1 kg 735 g. 2 kg 560 g.

- 1) 25g 2) 15g 3) 5 g 4) None of these
- d. 15.5, 9.5, 23.85
- 1) 0.05 2) 0.15 3) 0.25 4) 0.035
- 24.
- a. Find the LCM of $\frac{1}{3}$, $\frac{5}{6}$, $\frac{7}{9}$.
- 1) $\frac{35}{3}$ 2) $\frac{5}{28}$ 3) 35 4) $\frac{35}{144}$
- h. Find the LCM of $4\frac{1}{2}$, $5\frac{1}{4}$, 9.
- 1) $\frac{63}{8}$ 2) 63 3) $\frac{1701}{8}$ 4) None of these
- c. Find the HCF of $\frac{2}{3}$, $\frac{4}{5}$, $\frac{8}{9}$.
- 1) 2 2) $\frac{72}{135}$ 3) $\frac{2}{45}$ 4) None of these
- d. Find the HCF of $13\frac{2}{3}$, $\frac{27}{49}$, $\frac{35}{9}$.
- 1) $\frac{3}{14}$ 2) $\frac{28}{9}$ 3) $\frac{1386}{144}$ 4) $\frac{3}{144}$
- 25.
- a. If the L.C.M and G.C.D of two numbers is 8856 and 123 respectively, and one of the number is 1107, find the other number.
- 1) 784 2) 984 3) 720 4) 872
- b. Find the two three digit numbers whose L.C.M. and G.C.D. is 1860 and 310 respectively.
- 1) 240, 540 2) 720, 1040 3) 620, 930 4) 540, 870
- c. The LCM of two numbers is 12 times their HCF. The sum of the HCF and LCM is 403. If one of the numbers is 93, find the other number.
- 1) 136 2) 128 3) 124 4) 148
- d. In a seminar, the number of participants in Physics, Chemistry and Computers are 60, 84 and 108 respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.
- 1) 24 2) 18 3) 14 4) 21
- e. Three petrol tankers contain 1365 litres, 1755 litres and 1560 litres of petrol respectively. Find the maximum capacity of a measuring jar that can measure the petrol of each of the tanker in exact number of times.
- 1) 136 2) 183 3) 195 4) 145
26. Prime factorise
- a. 7236
- 1) $2^2 \times 3^3 \times 67$ 2) $2^3 \times 3^2 \times 31$ 3) $2^4 \times 3 \times 11$ 4) $2^2 \times 3^2 \times 13^2$

- b. 33957
 1) $7^2 \times 3^2 \times 11$ 2) $7^3 \times 3^2 \times 11$ 3) $7^4 \times 2^3 \times 13$ 4) None of these
- c. 10647
 1) $13^2 \times 7 \times 3^2$ 2) $13 \times 7^2 \times 3^3$ 3) $13 \times 7 \times 3^4$ 4) None of these
- a. If the sum of the two numbers is 26 and their difference is 12, find the their product.
 1) 133 2) 192 3) 276 4) None of these
- b. The sum of two numbers is thrice their difference. If one of the numbers is 30, find the other number.
 1) 50 2) 60 3) 30 4) 90
- c. Two numbers are in the ratio 2:7. If the number 7 is subtracted from each of them, they will be in the ratio 1 : 6, find the numbers.
 1) 7,42 2) 14,49 3) 12,42 4) 10,35
- d. Two numbers are in the ratio 4 ; 9. If the number 5 is added to each of them, they will be in the ratio 1 : 2. Find the numbers.
 1) 16, 36 2) 40, 90 3) 20, 45 4) None of these
- e. Two numbers are in the ratio 2 : 3. If each number is multiplied by 2, find the new ratio.
 1) 3:4 2) 2:3 3) 1:2 4) 4:7
- f. If half of one-third of one-fourth of a number is 45, find the number.
 1) 1250 2) 1080 3) 980 4) 1290
- g. If one-third of a number is more than $\frac{1}{6}$ th of the same number by 43, find the number.
 1) 356 2) 402 3) 258 4) None of these
- h. If $\frac{1}{8}$ of a number is less than $\frac{1}{4}$ of the same number by 155, find the number.
 1) 1224 2) 2564 3) 3966 4) 1568
- i. Three numbers are in the ratio 1:4:7. The sum of the largest and the smallest is thrice the sum of the third number. Find the largest number.
 1) 132 2) 112 3) 172 4) 96
- j. Sum and difference of two numbers is in the ratio 5 : 2. Find the ratio of the numbers.
 1) 7:3 2) 4:3 3) 5:2 4) 6:1
- k. If the difference between a two-digit number and the number obtained by interchanging the digits is 54, what is the difference of the two digits of the number?
 1) 3 2) 2 3) 6 4) 7

- l. If 20 % of a number is 240, what will be 40 % of 30 % of that number?
 1) 240 2) 280 3) 360 4) None of these
- 28.
- a. Find the number of different divisors of 2500.
 1) 8 2) 13 3) 15 4) 27
- b. Find the number of different divisors of 24255 excluding unity and itself.
 1) 35 2) 34 3) 18 4) 42
- c. Find the sum of all the divisors of 21600.
 1) 78120 2) 83679 3) 78924 4) 68974
- d. Find the number of prime numbers in $5^{11} \times 6^5 \times 27^3$.
 1) 35 2) 37 3) 30 4) 27
- e. Find the number of prime numbers in 237699.
 1) 45 2) 7 3) 26 4) 8
- f. In how many ways can 2778300 can be resolved into two factors prime to each other.
 1) 9 2) 13 3) 8 4) 13
- a. What is the highest power of 5 contained in 1000!?
 1) 179 2) 249 3) 187 4) 217
- b. What is the highest power of 3 contained in 100!?
 1) 48 2) 43 3) 38 4) 27
- 30.
- a. Find the number of zeros at the end of 100! if fully expanded.
 1) 19 2) 12 3) 24 4) 32
- b. Find the number of zeros at the end of 50! if fully expanded.
 1) 16 2) 6 3) 12 4) None of these
- 31.
- a. What is the remainder when 2^{999} is divided by 7?
 1) 2 2) 1 3) 3 4) 5
- b. What is the remainder when 3^{68} is divided by 8?
 1) 9 2) 13 3) 1 4) 7
- c. What is the remainder when 31^{256} is divided by 3?
 1) 5 2) 2 3) 1 4) 7

- 32.
- a. If n is a positive odd integer, then $n^3 - n$ is divisible by
1) 15 2) 18 3) 24 4) 32
- b. If $10^n - 1$ is exactly divisible by 11, then n is
1) odd number 2) even number 3) either odd or even 4) None of these
- c. The average of the four consecutive odd numbers is always
1) An even number 2) an odd number 3) divisible by 3 4) None of these
33. How many digits are required for numbering the pages of a book containing 301 pages?
1) 301 2) 602 3) 593 4) 578
34. Four bells are heard at intervals of 4. 6. 8. 12 seconds respectively since 8 am onwards. How many times will they be heard simultaneously within 8 minutes of time excluding the one at the start?
1) 9 2) 15 3) 20 4) 27
35. A decimal number has 16 decimal places. The number of decimal places in the square root of the number will be
1) 9 2) 8 3) 6 4) None of these
36. The ratio of two numbers is 2 : 3. If their sum is greater than their difference by 56, find the two numbers.
1) 26, 39 2) 28, 42 3) 30, 45 4) 32, 48
37. If the product of the three consecutive numbers is 7980, find the sum of the two larger numbers.
1) 39 2) 43 3) 40 4) None of these
38. If the difference of the square of two consecutive whole numbers is 23, find the difference of the cubes of those numbers.
1) 547 2) 369 3) 397 4) None of these
39. Find the difference between the largest four-digit number and the smallest three-digit number.
1) 9888 2) 9000 3) 9899 4) 9889
40. Out of the three numbers, first is twice the second and the second is twice the third. If the average of the three numbers is 21, find the largest number.
1) 27 2) 30 3) 36 4) 33

41. The sum of two digits of a number is 13. If 9 is added to the number, the digits are reversed. Find the number.
 1) 76 2) 85 3) 67 4) 49
42. The largest of $\sqrt[2]{3}$, $3\sqrt{2}$ and 11 is
 1) $2/1$ 2) $3/2$ 3) 11 4) both 2 and 3
43. Which of the following is incorrect?
 1) If a number is divisible by another number, then it must be divisible by each of the factors of that number.
 2) If a, b, c are three natural numbers such that, a is divisible by b and b is divisible by c, then a must be divisible by c
 3) If a number is divisible by each of the two or more co prime numbers, then it must be divisible by their product.
 4) None of these
44. Which of the following is incorrect?
 1) If a and b are two co prime numbers, and a and b are factors of c, then $a \times b$ is a factor of c.
 2) If a is a factor of b and c, then a is a factor of $b + c$.
 3) If a is a factor of b and c, then a is a factor of $b - c$.
 4) None of these
45. If any two irrational numbers are added, then which of the following is incorrect?
 1) The sum is always an irrational number. 2) The sum is always an integer
 3) The sum is always a rational number
 4) The sum may be a rational or an irrational number.
46. If n is odd, then which of the following is incorrect?
 1) n is odd 2) n^2 is even 3) n^2 is odd 4) None of these
47. The denominator of a rational number is one more than its numerator. If the numerator is increased by 2 and the denominator is decreased by 4, find the fraction.
 1) $4/5$ 2) $3/4$ 3) $2/3$ 4) None of these
48. Which of the following numbers whose some of the digits have, been represented by *, can possibly be the perfect square of
 a. a three-digit odd number?
 1) $1*2*3$ 2) $24**9$ 3) $14**7$ 4) $9*****5$

- b. a two-digit odd number?
 1) $1^{**}4$ 2) $2^{**}7$ 3) $5^{**}3$ 4) $4^{**}1$
49. The number of digits in the square root of a 23 digit perfect square is
 1) 11 2) 13 3) 14 4) 12
50. Consider a 99 digit number created by writing side by side the first fifty four natural numbers as follows 1234567891011 ...5354. What is the remainder it leaves, when it is divided by
- a. 8
 1) 4 2) 6 3) 0 4) 2
- b. 11
 1) 3 2) 7 3) 0 4) 10
51. Convert the following Roman numerals into decimal
- a. MDCXLV
 1) 1565 2) 1665 3) 1645 4) 1545
- b. CDLXIX
 1) 469 2) 569 3) 489 4) 579
52. Convert the following binary numbers into decimal
- a. 1111.001
 1) 9.475 2) 14.175 3) 15.125 4) None of these
- b. 1101101
 1) 169 2) 109 3) 211 4) None of these
53. Convert the following decimal numbers into binary
- a. 5.625
 1) 100.010 2) 101.0119 3) 101.10 4) None of these
- b. 122
 1) 1111010 2) 1111101 3) 1011101 4) None of these
54. Convert the following octal to decimal
- a. 0.325
 1) 0.41695 2) 0.56592 3) 0.48955 4) 0.41595
- b. 123
 1) 69 2) 83 3) 79 4) 59

55. Convert the following decimal to octal
- a. 560
1) 1164 2) 1060 3) 1235 4) None of these
- b. 16
1) 18 2) 20 3) 22 4) 21
56. Convert the following binary to octal
- a. 1011110.111
1) 169.4 2) 331.9 3) 136.7 4) None of these
57. Convert the following octal to binary
- a. 156
1) 001101110 2) 010101110 3) 001011110 4) None of these
- b. 234
1) 010011100 2) 010011101 3) 0100011001 4) 101011100
58. Find the 1's complement of 10110_2
1) 01011 2) 01001 3) 01101 4) None of these
59. Find the 2's complement of 1100_2
1) 1010 2) 0101 3) 0100 4) 0011
60. Find the 9's complement of 56_{10}
1) 44 2) 43 3) 65 4) 57
61. Find the 10's complement of 45_{10}
1) 54 2) 55 3) 68 4) None of these
62. Find the sum of 110101_2 and 100110_2
1) 1010011 2) 1011011 3) 1001100 4) 1111011
63. Subtract from 01101_2 from 11011_2 .
1) 01100 2) 01001 3) 01010 4) 01110
64. Find the product of 110_2 and 101_2
1) 101100 2) 101001 3) 101010 4) 101110



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