

## Unit-2

| S.No                             | Questions                                                                                                                                         | BT  | CO  | PO  |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|
| Part -A (Short Answer Questions) |                                                                                                                                                   |     |     |     |
| 1.                               | Mention the various losses that occur in DC machines?                                                                                             | BT2 | CO2 | PO2 |
| 2.                               | Explain the necessity of starter.                                                                                                                 | BT1 | CO2 | PO1 |
| 3.                               | List the application of DC shunt Motor                                                                                                            | BT3 | CO2 | PO2 |
| 4.                               | Derive the expression for condition for maximum efficiency                                                                                        | BT3 | CO2 | PO2 |
| 5.                               | Define critical field and critical speed of a d.c Generator                                                                                       | BT2 | CO2 | PO3 |
| 6.                               | State the Flemming's Left-hand rule                                                                                                               | BT2 | CO2 | PO1 |
| 7.                               | A D.C motor is connected to a supply voltage of 460v as an armature resistance 0.15 calculate the value of back emf when armature current of 120A | BT1 | CO2 | PO1 |
| 8.                               | What Is Back E.m.f Or Counter E.m.f                                                                                                               | BT3 | CO2 | PO2 |
| 9.                               | Mention The Methods for Starting an Induction Motor                                                                                               | BT3 | CO2 | PO2 |
| 10.                              | Why Is Swinburne's Test Conducted.                                                                                                                | BT2 | CO2 | PO3 |
| 11.                              | What are the Merits of Hopkinson's test?                                                                                                          | BT1 | CO2 | PO1 |
| 12.                              | Why is Swinburne's test preferred to determine the efficiency of a dc machine?                                                                    | BT1 | CO2 | PO2 |
| 13.                              | List different tests of DC Motor                                                                                                                  | BT2 | CO2 | PO2 |

| S.No                            | Questions                                                                                                                                                                                                                                                                                                                                                            | BT  | CO  | PO  |
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| Part -B (Long Answer Questions) |                                                                                                                                                                                                                                                                                                                                                                      |     |     |     |
| 1.                              | A) Explain the working principle of DC Shunt motor.<br>B) Explain Back EMF and its significance.                                                                                                                                                                                                                                                                     | BT2 | CO2 | PO2 |
| 2.                              | A) Derive the Torque equation of dc motor<br>B) Calculate the value of torque established by the armature of a 4 pole motor having 774 conductors, two paths in parallel, 24 mwb flux per pole, when the total armature current is 50A                                                                                                                               | BT2 | CO2 | PO2 |
| 3.                              | A) Discuss about the characteristics of DC series motor.<br>B) A 220 V, DC shunt motor is operating at a speed of 1440 r.p.m. The armature resistances $1.0 \Omega$ and armature current is 10 A. of the excitation of the machine is reduced by 10%, and find the value of extra resistance to be put in the armature circuit to maintain the same speed and torque | BT2 | CO2 | PO2 |
| 4.                              | Explain the construction and working of 3-point starter                                                                                                                                                                                                                                                                                                              | BT2 | CO2 | PO2 |
| 5.                              | A) Explain the Brake test in a dc machine.<br>B) A 200 V DC shunt motor with armature and field resistances of 0.25 ohm and 200 ohm respectively, takes a no load current of 5 A. If it takes 50 A under loaded conditions, find its efficiency as generator                                                                                                         | BT2 | CO2 | PO2 |
| 6.                              | A) Explain in detail about the purpose of conducting various tests on DC machines.<br>B) With the help of neat sketch, explain the Hopkinson's test                                                                                                                                                                                                                  | BT2 | CO2 | PO2 |
| 7.                              | A) Derive the condition for maximum efficiency of DC Motor.<br>B) A DC series motor is driving a fan load, whose torque varies a cube of speed. The total armature and series field resistance is $1 \Omega$ . It takes 10 Amp from 200 V mains and runs at 1000 RPM. Find the                                                                                       | BT3 | CO2 | PO2 |

|     |                                                                                                                                                                                                                                                                                                                                               |     |     |     |
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|     | resistance to be connected in series with the motor to make it run at 800 RPM.                                                                                                                                                                                                                                                                |     |     |     |
| 8.  | Explain with diagram how Hopkinson's test is performed on dc machines. What are the advantages and disadvantages of this test?                                                                                                                                                                                                                | BT2 | CO2 | PO2 |
| 9.  | A 200 V d.c. shunt motor takes 5 A at no-load. $R_a=0.5 \Omega$ and $R_{sh}=200 \Omega$ . Estimate the kW output and efficiency when the motor takes 25 A on full loads.                                                                                                                                                                      | BT3 | CO2 | PO2 |
| 10. | Explain the procedure to separate the stray losses in a DC Motor.                                                                                                                                                                                                                                                                             | BT2 | CO2 | PO2 |
| 11. | Two identical DC machines when tested by Back-to-back method gave the following test results: Field currents are 2.5 A and 2 A. Line voltage is 220 V. Line current including both field current is 10 A. Motor armature current is 73A. The armature resistance of each machine is $0.05\Omega$ . Calculate the efficiency of both machines. | BT3 | CO2 | PO2 |