

Hall Ticket No.:

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Question Paper Code: PH 102BS



**NARSIMHA REDDY ENGINEERING COLLEGE**  
 (UGC-AUTONOMOUS)  
 B.TECH I YEAR I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2022  
 (Regulation: NR20)  
**ENGINEERING PHYSICS**  
 (Common to CIVIL, ME)

Time: 3 hours

Max. Marks: 75

Answer any Five Questions  
 All Questions carry Equal Marks

		Marks	Bloom's Level
1.	a. Derive the equation of motion in Polar coordinates	10	L2
	b. A lift carries a weight of 150 N and is moving with a uniform acceleration of 2.45m/s <sup>2</sup> . Determine the tension in the cable i) when the lift is moving upwards. ii) When the lift moving downwards.	5	L3
2.	What is the power absorbed by an oscillator? Derive the relation between the power absorbed and the quality factor Q.	15	L2
3.	a. Give an account of standing waves and their Eigen frequencies.	8	L2
	b. Derive the plane acoustic equation and show that the velocity of sound wave in gas is $V = \sqrt{(\gamma P/\rho_0)}$ .	7	L4
4.	Explain principle, theory and working of Michelson interferometer.	15	L5
5.	a. Describe the construction and working of a Ruby laser.	10	L3
	b. Write the medical applications of LASERS.	5	L1
6.	a. Derive an expression for acceptance angle and numerical aperture.	10	L4
	b. An optical fiber has a core material of refractive index of 1.55 and cladding material of refractive index of 1.50. The light is launched into it in air. Calculate its numerical aperture.	5	L3
7.	a. Deduce expression for dispersive and resolving power of diffraction grating.	15	L2
8.	b. Discuss the phenomena of reflection and transmission of transverse waves at the boundary.	15	L6

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**NARSIMHA REDDY ENGINEERING COLLEGE**  
**(UGC-AUTONOMOUS)**  
**B.TECH I YEAR I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2022**  
**(Regulation: NR20)**  
**APPLIED PHYSICS**  
**(Common to ECE, CSE (AI&ML))**

Time: 3 hours

Max. Marks: 75

**Answer any Five Questions**  
**All Questions carry Equal Marks**

		Marks	Bloom's Level
1.	a. Explain Compton Effect?	5	L4
	b. Derive Schrodinger's wave Equation for the motion of an electron? Explain Born's interpretation of wave function.	10	L4
2.	a. What is the intrinsic Semiconductor? Explain the variation of Fermi energy level with temperature.	10	L4
	b. Differentiate between n-type and p-type extrinsic semiconductor	5	L2
3.	Discuss the construction, working, characteristics of a LED with neat diagrams and write some applications	15	L6
4.	a. Describe the construction and working of He - Ne laser?	10	L3
	b. Discuss the applications of lasers in various fields?	5	L6
5.	a. Explain the principle of an optical fiber? Describe the construction of an optical fiber?	10	L5
	b. An optical fiber has a core material of refractive index of 1.54 and cladding material of refractive index 1.51. The light is launched into in air. Calculate its numerical aperture.	5	L3
6.	What is Hysteresis? Explain in detail	15	L4
7.	a. What do you understand by Black body Radiation? Explain	10	L3
	b. Calculate the work function of sodium if its threshold wavelength is 5040 Ao.	5	L3
8.	Discuss the working of P-N-P and N-P-N Transistor	15	L6

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Question Paper Code: PH1102BS

**NARSIMHA REDDY ENGINEERING COLLEGE**

(UGC-AUTONOMOUS)

B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, APRIL-2022

(Regulation: NR21)

**ENGINEERING PHYSICS**

(Common to CIVIL, ME)

Time: 3 hours

Max. Marks: 70

Answer any Five Questions  
All Questions carry Equal Marks

		Marks	Bloom's Level
1.	a. Give a short note on forces in nature.	04	L1
	b. Describe Newton's law and their completeness in describing particle motion.	10	L3
2.	a. Write the properties of damped harmonic oscillator.	04	L1
	b. Solve the differential equation of a damped harmonic oscillator in cases like heavy, critical and light damping?	10	L6
3.	a. What are the properties of ultrasonics?	04	L1
	b. Explain the production of ultrasonic waves by piezo- electric method.	10	L1
4.	a. Explain briefly about factors affecting Acoustics of Building and their remedies.	10	L3
	b. What is meant by the reverberation and reverberation time?	04	L1
5.	a. Describe how Nicol prism working as polarizer as well as analyzer.	10	L5
	b. What is meant by double refraction?	04	L1
6.	a. Explain how Newton's rings are formed in the reflected light. Derive an expression for diameters of dark and bright rings.	10	L6
	b. A grating of length 10cm contains 5000 lines/cm. Find the resolving power of the grating in the first order.	04	L1
7.	a. With the help of suitable diagram explain the principle, construction and working of He-Ne laser	10	L1
	b. What are the various applications of lasers?	04	L4
8.	a. Define acceptance angle and derive expressions for it.	08	L3
	b. Explain the different losses in optical fiber.	06	L2

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Question Paper Code: AP1102BS



**NARSIMHA REDDY ENGINEERING COLLEGE**  
(UGC-AUTONOMOUS)  
B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, APRIL-2022  
(Regulation: NR21)  
**APPLIED PHYSICS**  
(Common to EEE, CSE)

Time: 3 hours

Max. Marks: 70

Answer any Five Questions  
All Questions carry Equal Marks

		Marks	Bloom's Level
1.	a. Derive Schrödinger time independent wave equation in one dimension & explain physical interpretation of wave function	10	L6
	b. Calculate de-Broglie wave length associated with an electron accelerated to a potential of 100 Volts	4	L4
2.	a. Analyze energy band diagram in PN junction diode in unbiased, forward biased and reverse biased condition	7	L4
	b. Differentiate between n- type and p-type extrinsic semiconductor	7	L4
3.	a. What is fill factor ? Discuss V-I characteristics of solar cell	8	L1, L6
	b. Discuss merits, demerits and application of solar cell	6	L6
4.	a. Describe construction and working of He-Ne laser	10	L6
	b. Write application of laser in medical field	4	L3
5.	a. Derive expression for internal fields in solids by Lorentz method	8	L6
	b. Discuss Ferro electricity & Piezo electricity in detail.	6	L4
6.	a. Differentiate Hard and soft magnetic materials	6	L4
	b. Explain Hysteresis Curve. Is all magnetic materials produce Hysteresis loop? Justify your answer	8	L4
7.	a. State and Explain Hall effect?	7	L4
	b. Discuss Zener Diode breakdown mechanism and characteristics	7	L4
8.	a. Write a short note on Compton effect.	7	L4
	b. What is photo electric effect? Explain briefly.	7	L4

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Question Paper Code:



**NARSIMHA REDDY ENGINEERING COLLEGE**  
**(UGC-AUTONOMOUS)**  
**I YEAR I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2021**  
**(Regulation: NR20)**  
**APPLIED PHYSICS**  
**(Common to ECE, CSE (AI&ML))**

Time: 3 hours

Max. Marks: 75

**Answer any Five Questions**  
**All Questions carry Equal Marks**

		Marks	Bloom's Level
1.	a. Derive De-Broglie wavelength associated with matter waves?	5	L4
	b. Summarize how did DAVISSON-GERMER in their experiment give the experimental verification of matter waves?	10	L2
2.	a. Derive an expression for the Carrier Concentration of electrons in conduction band.	10	L4
	b. State Hall Effect with its applications?	5	L2
3.	a. Discuss the construction, working, characteristics of a solar cell with neat diagrams and write some applications	15	L6
4.	a. Describe the construction and working of Ruby laser?	10	L3
	b. Discuss the applications of lasers in various fields?	5	L6
5.	a. Distinguish between step index and graded index optical fibers?	10	L4
	b. A glass fiber has core material of refractive index 1.47, cladding material of refractive index 1.45. If it is surrounded by air medium, calculate the critical angle at core-cladding interface?	5	L3
6.	a. Classify the magnetic materials and differentiate between them.	15	L4.
7.	a. Show that the energies of a particle in a potential box are quantized	10	L3
	b. Find the least energy of an electron moving in the infinite potential well of width 1 Å.	5	L3
8.	a. Discuss the construction, working, characteristics of a PIN diode with neat diagrams and write some applications.	15	L6

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Question Paper Code:



**NARSIMHA REDDY ENGINEERING COLLEGE**  
**(UGC-AUTONOMOUS)**  
**II YEAR I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2021**  
**(Regulation: NR20)**  
**ENGINEERING PHYSICS**  
**(Common to CIVIL, ME)**

Time: 3 hours

Max. Marks: 75

Answer any Five Questions  
 All Questions carry Equal Marks

		Marks	Bloom's Level
1.	a. Derive the equation of motion in cylindrical and spherical polar coordinates.	15	L4
2.	a. Deduce the expression for the total energy of a simple harmonic oscillator.	10	L2
	b. A mass of 2.5 kg is attached to a spring that has a value of k equal to 600 Nm <sup>-1</sup> . Determine the value of the damping constant b that is required to produce critical damping.	5	L3
3.	a. Discuss the phenomena of reflection and transmission of transverse waves at the boundary.	15	L6
4.	a. Describe the construction and working of a Mach-Zehnder interferometer.	15	L3
5.	a. Describe the construction and working of a He-Ne laser.	10	L3
	b. Write the medical applications of LASERS.	5	L1
6.	a. Give an account of step index and graded index fibers.	10	L4
	b. Explain the advantages of optical fibre communication.	5	L3
7.	a. Explain working of damped harmonic oscillator in various conditions like heavy, critical and light damping.	15	L2
8.	a. Explain Fraunhofer diffraction at single slit.	15	L2

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Question Paper Code:AP202BS



**NARSIMHA REDDY ENGINEERING COLLEGE**  
(UGC-AUTONOMOUS)  
B.TECH I YEAR II SEMESTER REGULAR EXAMINATIONS, SEPTEMBER-2021  
(Regulation: NR20)  
**APPLIED PHYSICS**

(Common to EEE, CSE, CSE (CS), CSE (DS))

Time: 3 hours

Max. Marks: 75

Answer any Five Questions  
All Questions carry Equal Marks

		Marks	Bloom's Level
1.	a) Summarize how did DAVISSON-GERMER in their experiment give the experimental verification of matter waves?	12	II
	b) Calculate the wavelength of an electron when it is accelerated through a potential difference of 10KV.	3	III
2.	a) Distinguish between extrinsic and intrinsic semiconductor	5	IV
	b) Derive an expression for the Carrier Concentration in N-Type extrinsic Semiconductor.	10	II
3.	a) Discuss about radiative and non-radiative recombination mechanisms in semi conductors?	5	VI
	b) Discuss the construction, working, characteristics of a solar cell with neat diagrams and write some applications	10	III
4.	a) Explain the interaction of radiation with matter.	5	II
	b) Describe the construction and working of He – Ne laser?	10	I
5.	a) Explain the terms: i) Electric field intensity ii) Polarization vector iii) Displacement vector and derive relation between them.	8	II
	b) Derive the expression for internal fields in solids?	7	IV
6.	a) Explain the principle of an optical fiber? Describe the construction of an optical fiber?	10	II
	b) Write the applications of optical fibers in medical field.	5	II
7.	a) Describe the construction and working of Co <sub>2</sub> laser?	12	I
	b) Discuss the applications of lasers in various fields?	3	IV
8.	a) What do you understand by Black body Radiation? Explain	10	II
	b) Calculate the de-Broglie wavelength associated with electron accelerated to a potential of 6400V.	5	III

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Question Paper Code: PH102BS



**NARSIMHA REDDY ENGINEERING COLLEGE**  
(UGC-AUTONOMOUS)  
B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, JULY-2021  
(Regulation: NR20)  
**ENGINEERING PHYSICS**  
(Common to CIVIL, ME)

Time: 3 hours

Max. Marks: 75

Answer any Five Questions  
All Questions carry Equal Marks

		Marks	Bloom's Level
1.	a. Explain Newton's second law. Solve newton's equation of motion in polar coordinates.	10	L2
	b. Write short notes on forces in nature.	5	L1
2.	a. Explain Damped harmonic oscillator and discuss heavy, critical and light damping oscillator.	10	L2
	b. Write short notes on Forced mechanical oscillators.	5	L1
3.	a) Analyze energy decay in damped harmonic oscillator.	8	L4
	b) List out the difference between mechanical and electrical oscillator	7	L1
4.	a. What is transmission of waves on a string? Discuss reflection and transmission of waves at a boundary.	10	L1
	b. Explain Standing waves and their Eigen frequencies.	5	L2
5.	a. Explain young's double slit experiment..	10	L2
	b. What are the differences between interference and diffraction?	5	L1
6.	a. Explain the formation of Newton's rings in reflected monochromatic light.	10	L2
	b. Explain resolving power of a grating.	5	L2
7.	a. Describe construction, principle and working of Ruby laser.	10	L6

	b. What are applications of lasers in different fields?	5	L1
8.	a. Define acceptance angle and Numerical aperture? Derive an expression for acceptance angle and numerical aperture.	10	L1
	b. What are the applications of optical fiber?	5	L1

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Question Paper Code: AP102 B5



**NARSIMHA REDDY ENGINEERING COLLEGE**  
(UGC-AUTONOMOUS)  
B.TECH I YEAR I SEMESTER REGULAR EXAMINATIONS, JULY-2021  
(Regulation: NR20)  
APPLIED PHYSICS  
(Common to ECE, CSE (AI&ML))

Time: 3 hours

Max. Marks: 75

**Answer any Five Questions**  
**All Questions carry Equal Marks**

		Marks	Bloom's Level
1.	a. Summarize how did Davisson & Germer in their experiment gave the proof for wave nature of electrons?	10	L2
	b. An electron is bound in one-dimensional box of size $4 \times 10^{-10}$ m. What will be its minimum energy?	5	L3
2.	a. What is an extrinsic semiconductor? Distinguish between n-type and p-type semiconductors.	8	L4
	a. Summarize how drift and diffusion of charge carriers will associate to flow of current in Extrinsic semiconductor.	7	L2
3.	a. Explain the radiative and non-radiative recombination mechanisms in a semiconductor	7	L2
	b. Explain how P-N junction diode can work in a solar cell?	8	L2
4.	a. Summarize in detail the working of Laser with all its components.	7	L2
	b. Explain the construction of Ruby laser in detail, with the help of a neat suitable diagram.	8	L2
5.	a. Summarise the differential and integral forms of Maxwell's equations	7	L2
	b. Explain a) Permeability b) Susceptibility c) Magnetisation d) Hysterisis	8	L2
6.	a. Derive an expression for the wavelength associated with electron, accelerated by a potential?	8	L4
	b. Calculate de-Broglie wavelength of neutron. (Given kinetic energy of the neutron is 0.025eV, mass of neutron = $1.674 \times 10^{-27}$ kg).	7	L3
7.	a. Explain the dependence of Fermi level on carrier-concentration and temperature with neat plots	8	L2
	b. Explain the characteristics of a Zener diode	7	L2

8.	a. Derive an expression for angle of acceptance and Numerical Aperture of an optical fiber in terms of refractive indices of core and cladding	10	L4
	b. Calculate the refractive indices of core & cladding of an optical fiber with a numerical aperture of 0.33 and their fractional differences of refractive indices being 0.02.	5	L3

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