

PRN No.

Total No. of
Questions: 09

QP Code:

JSPM's

Rajarshi Shahu College of Engineering, Tathawade, Pune- 411033

(An autonomous institute affiliated to Savitribai Phule Pune University)

Examination: End Semester Examinations (ESE)

Semester: II Academic Year: 2023-24

Class: F. Y. B. Tech. (All Programs)

Department: Engineering Sciences and Humanities

Subject Code: ES1206

Subject Name and pattern: Physics for Engineers (2023)

Duration: 2 Hour

Max. Marks: 50 Marks

Instructions to the Candidates

1. In Section A, Q.1, Q. 2 and Q.3 are compulsory.
2. In section B, Solve Q.4 or Q.5, Q.6 or Q.7 and Q.8 or Q.9.
3. Assume suitable and necessary data wherever required.
4. **Constants** Charge on electron(e)= 1.6×10^{-19} C, Mass of electron(m_e)= 9.1×10^{-31} Kg
Planck's Constant (h)= 6.626×10^{-34} J-sec, Avogadro's No. (N_A)= $6.02214076 \times 10^{23}$
Mass of Proton (m_p)= 1.6×10^{-27} Kg

Q. No.	Section-A	Marks	BL	CO
1	Solve any one			
	a Discuss the three types of damped oscillation.	3	BL1	CO1
	b Find the force constant if differential equation for linear SHM of a particle of mass 2 gm. is $\frac{d^2x}{dt^2} + 16x = 0$	3	BL2	CO1
2	Solve any one			
	a What are photometry and radiometry? Explain in short.	3	BL1	CO2
	b Calculate the reverberation time of hall having volume 6000 m^3 and surface area of sound absorbing material is 2800 m^2 . Given average coefficient of absorption 0.078 OWU.	3	BL1	CO2
3	Solve any one			
	a Define and write the formulae 1) Numerical aperture 2) Acceptance angle	3	BL1	CO3
	b Write a short note on LIDAR.	3	BL2	CO3

Section -B

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|---|---|---|-----|-----|
| 4 | a Deduce Schrodinger's time independent wave equation. | 6 | BL1 | CO4 |
| | b Explain physical significance of ψ and $ \psi ^2$. | 4 | BL2 | CO4 |
| | c The lowest energy of an electron trapped in an infinite potential well is 38 eV. Calculate the width of the well. | 3 | BL3 | CO4 |

OR

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| 5 | a State and explain Heisenberg's uncertainty principle and illustrate with an example of single slit electron Diffraction. | 6 | BL2 | CO4 |
| | b State De-Broglie's hypothesis. Express De Broglie's wavelength in terms of kinetic energy of the particle. | 4 | BL2 | CO4 |
| | c The lowest energy of an electron trapped in an infinite potential well is 38 eV. Calculate width of the well.
113 eV | 3 | BL3 | CO4 |

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| 6 | a Derive an expression for path difference between light rays reflected by a thin transparent parallel film of refractive index μ . Write the mathematical conditions for brightness and darkness of the thin film. | 6 | BL1 | CO5 |
| | b State and Explain Photoelectric effect. | 4 | BL2 | CO5 |
| | c A slit of width 'a' is illuminated by white light. For what value of 'a' will the first minimum for red light fall at an angle 30° ? Wavelength of red light is 6500\AA . | 4 | BL3 | CO5 |

OR

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| 7 | a Explain Fraunhofer diffraction at a single slit. Derive expressions for resultant amplitude and resultant intensity due to single slit. State the mathematical conditions for central (principal) maximum and minima | 6 | BL2 | CO5 |
| | b State and Explain Compton effect. | 4 | BL1 | CO5 |
| | c A parallel beam of sodium light strikes a film of oil floating on water. When viewed at an angle 30° from the normal, eighth dark band is seen. Calculate the thickness of the film. Refractive index of oil is 1.46 and wavelength of light is 5890\AA . | 4 | BL3 | CO5 |

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| 8 | a What is an earthquake? Enlist and describe different types of earthquakes. | 6 | BL2 | CO6 |
| | b Write any four differences between hazards and disasters. | 4 | BL1 | CO6 |
| | c Mention the short term and long term effects of landslides. | 4 | BL3 | CO6 |

OR

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| 9 | a What are the characteristics of Tsunamis? What are the engineering measures to mitigate Tsunami? | 6 | BL2 | CO6 |
| | b Discuss various types of natural and man-made disasters. | 4 | BL2 | CO6 |
| | c Describe the impacts of earthquake on the economic development of a nation. | 4 | BL2 | CO6 |

*****ALL THE BEST*****