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G H Raison College of Engineering and Management, Pune

(An Empowered Autonomous Institute affiliated to Savitribai Phule, Pune University, NAAC Accredited "A+" Grade)

First Year B. Tech.

CAE I / Term II / AY 2025-26 (2023 Pattern)

Engineering Physics (23UBSL1204)

(Time: - 01 Hour)

(Max. Marks : 20)

Instructions to the students:

- i) All questions are compulsory.
- ii) Neat diagrams must be drawn wherever necessary.
- iii) Figures to the right indicate full marks.
- iv) Assume suitable data, if necessary

Question No	Question	Marks	CO	BL
1a)	State and prove Bethe's law. Compare between Snell's law and Bethe's law	5	CO1	L2
OR				
1b)	State the Lorentz force and discuss the path travelled by an electron in a uniform transverse electric field.	5	CO1	L2
1c)	An electron of 60 eV energy enters a perpendicular magnetic field of 0.5 T. Find the velocity and radius of circular path of an electron. Compare between electron microscope and optical microscope.	5	CO1	L3
OR				
1d)	A proton has an initial velocity 2.3×10^5 m/s in the X- direction. It enters a uniform electric field of 1.3×10^4 N/C in a direction perpendicular to electric field. i) Find the time it takes for the proton to travel a distance of 5 cm in X-direction. ii) Find the vertical displacement of proton after it has travelled 5 cm in X-direction. (mass of proton = 1.67×10^{-27} kg and charge of proton = 1.6×10^{-19} C)	5	CO1	L3
2a)	Explain with diagram how interference principle is used to design antireflection coating.	5	CO2	L3
OR				
2b)	Obtain the equation of path difference between the reflected rays, when the monochromatic light is incident on optical thin film of uniform thickness. Also derive conditions of constructive and destructive interference.	5	CO2	L3
2c)	A parallel beam of light $\lambda = 5890 \text{ \AA}$ is incident on glass plate of refractive index $\mu = 1.5$ such that angle of refraction in to plate is 60° . Calculate the smallest thickness of the plate which will make it appear dark by reflection. State the conditions of constructive interference and destructive interference	5	CO2	L3
OR				
2d)	A monochromatic light emitted by a broad source of wavelength 5800 \AA falls normally on two glass plates of length 15 cm placed one over the other. A thin wire of diameter 0.05 mm is then inserted at one end to form air wedge. Find the fringe width.	5	CO2	L3

BL – Bloom's Taxonomy Levels (1- Remember, 2- Understand, 3 – Apply, 4 – Analyze, 5 –Evaluate, 6 – Create)