

Course : B. Tech

Sem. I

Subject Name : Engineering Physics

Subject Code : PHY1202

Max. Marks : 60

Date 13/12/2018

Duration: 3 Hrs.

Instructions:

1. All the questions are compulsory.
2. The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	Level/CO	Marks
Q.1 Solve any two of the following		
A) In case of forced vibration, prove that	CO1	6
$A = \frac{f}{\sqrt{(\omega^2 - P^2)^2 + 4b^2p^2}}$		
B) Explain Pizoelectric effect and Magnetostriction effect. What will be the Young's modulus of quartz plate if 5.5 mm thick quartz is used to produce an ultrasonic waves of frequency 0.4999 MHz. The density of the quartz is $2.65 \times 10^3 \text{ kg/m}^3$.	CO1	6
C) Explain with diagrams different types of polarization in dielectrics.	CO6	6
Q.2 Solve any two of the following		
A) In case of wedge shaped film, prove that $\beta = \lambda / 2\theta$.	CO2	6
B) Explain the principle and working of He-Ne Laser.	CO2	6
C) i. A 20 cm long glass tube filled with a sugar solution of 15 gm of cane sugar in 100 cc of water is kept in the path of polarized light . Calculate the angle of rotation of cane sugar, specific rotation of cane sugar is 66° .	CO3	3
ii. Calculate the refractive index of core and cladding of an optical fiber such that the numerical aperture of fiber is 0.27 and relative refractive index is 0.015.	CO3	3
Q.3 Solve any two of the following		
A) With neat diagram explain the construction and working of G.M. Counter.	CO3	6
B) What is Heseinberg's Uncertainty Principle? If the uncertainty in position of an electron is $4 \times 10^{-10} \text{ m}$. Calculate the uncertainty in its momentum	CO3	6
C) Derive Schrodinger's time independant wave equation	CO3	6
Q.4 Solve any two of the following.		
A) Deduce the relation between interplaner spacing d and lattice constant a. Calculate the interplaner spacing for a (311) plane in a simple cubic lattice whose lattice constant is $2.109 \times 10^{-10} \text{ m}$.	CO4	6
B) State and prove Moseley's law. What is its importance?	CO4	6

- C) Derive an expression for electromagnetic wave in free space and find the value of velocity of light in free space. CO6 6

Q.5 Solve the following.

- A) What are magnetic domain and domain wall? Explain the B-H curve based on domain theory. CO5 6
- B) Derive an expression for conductivity of a conductor in terms of relaxation time of electron. CO3 6

End