

FE - Applied physics-II

P1 is compulsory

* Attempt any four from 2 to 7

(OLD COURSE)

QP Code : 11830

(2 Hours)

[Total Marks : 75]

1. Solve any five from the following :— 15
- Explain why centre of Newton's rings is always dark.
 - What is optical fibre ? List out the advantages of an optical fibre.
 - Light of wavelength 5880 \AA is incident on a thin film of glass of $\mu = 1.5$ such that the angle of refraction in the plate is 60° . Calculate the smallest thickness of the plate which will make it dark by reflection.
 - State and explain Heisenberg's uncertainty principle.
 - Differentiate between soft and hard magnetic materials.
 - A bar magnet has a coercivity of $5 \times 10^3 \text{ amp/m}$. It is desired to demagnetize it by inserting it inside a solenoid 10 cm long and having 50 turns. What current should be sent through the solenoid ?
 - Explain pirani gauge.
2. (a) How lasers are different than ordinary light ? Explain following terms :— 7
- Induced absorption.
 - Spontaneous emission.
 - Stimulated emission.
 - Population inversion.
 - Metastable state.
- (b) Explain construction and working of Rotary pump. 8
3. (a) Derive the expression for Numerical Aperture of fibre optics cable. 7
What is acceptance angle ? The numerical aperture of an optical fibre is 0.5 and core refractive index is 1.54. Find R.I of the cladding.
- (b) Describe the construction and working of He-Ne laser with diagrams. 8
4. (a) In Newton's ring experiment the diameter of 4th and 12th dark rings are 0.40 cm and 0.70 cm respectively. Deduce the diameter of 20th ring. 5
- (b) If an electron is accelerated at potential V, find out the wavelength of matter wave ? 5
- (c) Explain Ohm's law for the magnetic circuit and hence derive a relation 5
between magnetomotive force and magnetic field strength for magnetic circuit due to solenoid ?

LM-Con.:7623-14.

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Correction Attached

5. (a) Monochromatic light of wavelength 6560 \AA falls normally on a grating 2 cm wide. The first order spectrum is produced at an angle of $16^\circ 17'$ from the normal. Calculate the total number of lines on the grating 5
- (b) Show that the energy of an electron in the box varied as the square of natural numbers. 5
- (c) Explain the working of Scanning Electron Microscope with a neat diagram. 5
6. (a) Write a brief note on the diffraction of light rays through a diffraction grating. 5
- (b) Explain physical interpretation of wave function. 5
- (c) Write a note on Scanning Tunnelling Microscope. 5
7. (a) Calculate the spacing between two consecutive bright bands in case of interference due to a wedge shaped film. 5
- (b) Discuss holography as an application of laser. 5
- (c) Explain various stages of Hysteresis curve. 5

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LM-Con.:7623-14.

Course : Prog. 516 F.E. (SEM. II) (OLD) (Morn)

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Correction :

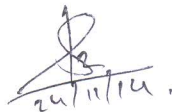
N.B.: 1) Question No. 1 is compulsory.

2) Attempt any four questions from Question Nos.2 to 7.


3) Figures to the right indicates full marks.

4) Use suitable data wherever necessary.

Query Update time : 24/11/2014

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