

COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra)

End Semester Examination

Semester-I

(AS102) Applied Science-I

Regular

Programme: F.Y.B.Tech

Year: 2006-07

Duration: 3 hr.

Date: 10/1 /2007

Max. Marks: 60

Instructions:

- 1 Solve all the questions
- 2 Figures to the right indicate full marks.
- 3 Do not keep mobile phones with you the handsets will be retained permanently by exam cell.

Section-I

- Q.1 a) Explain the experimental arrangement of Newton's rings experiment. 05
Explain the formation of Newton's rings. Why do interference fringes appear circular in this experiment?

OR

What is meant by resolving power? Give a statement of Rayleigh's criterion of resolution. Obtain an expression for the R. P. of plan transmission grating? 05

- b) i) A soap film of R. I. $\frac{4}{3}$ and the thickness 1.5×10^{-4} cm is illuminated by white light incident at an angle of 45° . The light reflected by it is examined by a spectroscope in which is found a dark band corresponding to a wavelength of 5×10^{-5} cm. Calculate the order of interference band. 03
- ii) Calculate the angular separation between the first order minima on either side of central maximum when the width of the slit is 6×10^{-4} cm and light illuminating it has a wavelength 6000 \AA . 02

- Q.2 a) Explain elliptical & circular polarisation. Obtain an equation for general ellipse and extend it for elliptical & circular polarization. 05

OR

Explain the principle, construction and working of semiconductor diode laser. 05

- b) i) How should the polarizer and analyzer be oriented to reduce natural 03

- beam of light to (a) 0.75 and (b) 0.25 of its original intensity? 02
- ii) Give any for applications of LASER. 02
- Q.3 a) What is mean by Hysterisis? Describe the behaviour of magnetisation of an iron piece as it's magnetising field varies. Draw BH curve and explain the terms (i) remanence, (ii) coercivity and (iii) saturation magnetisation. 05
- b) Describe atomic spectra of H-atom with energy level diagram and explain possible transitions with appropriate selection rule. 05

SECTION-II

- 4] A) Distinguish between bcc & fcc lattice. 08
- OR**
- A) Draw phase diagram of iron-iron carbide and explain its significance. 08
- B) Explain axis of Symmetry with respect to a cube. 02
- 5] Solve any two
- A) Explain the electronic transition occurring during uv absorption. 05
- B) IR spectrum of a sample is vibrational spectrum explain. 05
- C) State the applications of Differential Thermal Analysis. 05
- 6] Solve any two
- A) Discuss the preparation, properties & uses of epoxy resins. 05
- B) What are the ingredients used in compounding of plastics? What are their functions? 05
- C) Write a note on Pyroelectric ceramic. 05

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