

FACULTY OF ENGINEERING

B.E. I – Year (Suppl.) Examination, December 2016

Subject : Engineering Physics
(Common to all Branches)

Time : 3 hours

Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

- 1 Calculate the thickness of a soap bubble film (refractive index = 1.463) that will result in constructive interference in the reflected light, if the film is illuminated with light whose wavelength in free space is 6000 \AA . 2
- 2 Distinguish between Fresnel and Fraunhofer class of diffraction. 3
- 3 Define the terms Numerical Aperture and Acceptance angle. 2
- 4 Derive Rayleigh Jeans Law and Wien's Law from Planck's Law. 3
- 5 Calculate Packing Fraction of SCC, BCC and FCC. 3
- 6 What are the postulates of classical free electron theory? 3
- 7 Write a note on frequency and temperature dependence of dielectric polarization. 3
- 8 Mention few applications of superconductors. 2
- 9 Distinction between bulk, thin film and nano materials. 3
- 10 Match the following [] 1

1 Newton's rings	a) Diffraction
2 Einstein's Coefficients	b) Optical Fibre
3 Missing orders	c) Division of Amplitude
4 Pulse Dispersion	d) Lasers
	e) Polarization

i) 1 – e ; 2 – a ; 3 – c ; 4 – d	ii) 1 – c ; 2 – d ; 3 – a ; 4 – b
iii) 1 – d ; 2 – a ; 3 – b ; 4 – e	iv) 1 – a ; 2 – b ; 3 – c ; 4 – d

PART – B (50 Marks)

- 11 a) Describe and explain the formation of Newton's Rings in reflected monochromatic light. Prove that in reflected light the diameters of the dark rings are proportional to the square root of the natural number. 5
- b) A narrow slit, illuminated by monochromatic light produces Fraunhofer diffraction. Derive an expression for resultant intensity. Graphically show the intensity distribution in the diffraction pattern. 5

- 12 a) What are bosons and obtain the Bose-Einstein distribution function for bosons? 5
b) Explain the working principle of an optical fiber and calculate an expression for numerical aperture and acceptance angle. 5
- 13 a) What are Miller indices explain with example? 5
b) Explain qualitatively Kronig Penny model and discuss its conclusions. 5
- 14 a) Define electronic polarization and derive an expression for electronic polarizability. 5
b) Distinguish between soft and hard magnetic materials. 5
- 15 a) Explain chemical vapour deposition technique in preparing thin film. 5
b) What are carbon Nano tubes and mention few applications? 5
- 16 a) Explain the construction, working and limitations of Nicol Prism. 5
b) Derive the Schrodinger Time Dependent Wave Equation. 5
- 17 a) Distinguish between Type-1 and Type-2 superconductors. 5
b) State and explain Hall Effect. 5
