Code No. 3004/BL

FACULTY OF ENGINEERING & INFORMATICS

B.E. I – Year (Backlog) Examination, June 2017

Subject: Engineering Physics

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 Newton's rings are observed in reflected light of wavelength 5900 A^{o}. The diameter of the dark ring is 0.5 cm. Find the radius of curvature of the lens and the thickness of the corresponding air film. 2

2 Explain the phenomenon of double refraction. 3

3 What are different types of optical fibres. 2

4 An electron is bound in a one-dimensional potential box which has a width 2.5×10^{-10} m. Assuming the height of the box to be infinite, calculate the lowest two permitted energy values of an electron. 3

5 State and explain Bragg's law. 3

6 Distinguish between conductors, semiconductors and insulators. 3

7 What are ferrites and mention few applications? 3

8 Explain Meissner Effect. 2

9 Mention few applications of nano materials. 3

10 Match the following: 1

1 Coherent sources	a) Diffraction
2 Population inversion	b) Optical Fibre
3 Grating	c) Interference
4 Acceptance Angle	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 (5x10 = 50 Marks)

11 a) Discuss the phenomena of interference of light due to the thin film and calculate the conditions. 5

b) Discuss Fraunhofer's diffraction at a double slit and explain intensity distribution. 5

12 a) What are fermions and obtain the Fermi-Dirac distribution function for fermions? 5

b) A particle is in motion along a line between x=0 and x=a with zero potential energy. At points for which x<0 and x>a, the potential energy is infinite. Find the expression for wave function for the particle in the n^{th} state. 5

13 a) State Bragg's law and discuss the powder method for study of structure of crystalline solids by X-ray diffraction. 5

b) Find the carrier concentration of electrons in an intrinsic semiconductor. 5

14 a) Explain Weiss domain theory of ferromagnetism and hysteresis variation. 5

b) What are general properties of superconductors? 5

15 a) Explain physical vapour deposition technique in preparing thin films. 5

b) Mention optical, electrical and mechanical properties of nano materials. 5

16 a) What is holography and explain construction and reconstruction of hologram. 5

b) Explain construction and working of Ruby laser. 5

17 Write a note on any <u>two</u>:

a) BCS theory of superconductivity 5

b) Solar cells 5

c) LED. 5

****