Code No.: **5004/M**

FACULTY OF ENGINEERING & INFORMATICS

B.E. I/IV Year (Main) Examination, May/June 2012

ENGINEERING PHYSICS

(Common to all Branches)

Time : 3 Hours] [Max. Marks : 75

Note: (i) *Answer* **all** *questions in* Part-A and *any* **five** *questions from* Part-B.

(ii) *Answers to the questions of* Part A *must be at one place and in the same order as they occur in the question paper.*

(iii) *Missing data, if any may be suitably assumed.*

Part A — (Marks : 25)

1. Newton's rings formed by sodium light between glass plate and a convex lens are viewed normally. Find the order of the dark ring which will have double the diameter of that of 30th ring. 2

2. Calculate the minimum number of lines per cm in a 2.5 cm wide grating which will just resolve the sodium lines (5890 Å and 5896 Å) in the first order spectrum. 2

3. Obtain Rayleigh Jeans law and Wien's law from Planky's law. 3

4. Explain the types of point defects observed in crystals. 3

5. What do you understand by quantum tunneling? 3

6. State and explain Bragg's law in X-ray diffraction. 3

7. Explain the concept of spontaneous polarization in Ferroelectrics. 3

8. Distinguish between type I and type II superconductors. 2

[P.T.O.

9. Explain the principle of Auger process. 2

10. Match the following : 2

i. Pulsed Laser	(a) Kronig-Penney model
ii. BCS theory	(b) Bose-Einstein statistics
iii. Photon gas	(c) He-Ne Laser
iv. Band theory	(d) Superconductivity
	(e) Ruby Laser.

1. i (a), ii (d), iii (c), iv (e)
2. i (a), ii (b), iii (c), iv (d)
3. i (b), ii (a), iii (c), iv (e)
4. i (e), ii (d), iii (b), iv (a)

Part B — (Marks : 50)

11. (a) Describe Newton's rings experiment to determine the wavelength of a monochromatic source with a neat diagram. 5

(b) Explain the theory of Fraunhofer diffraction due to single slit quantitatively. 5

12. (a) Describe the working of a Ruby laser with suitable energy level diagram. 5

(b) Describe the infinite square well potential problem using wave mechanics. 5

13. (a) Derive Maxwell-Boltzmann distribution law and explain the limitations. 5

(b) State and explain Maxwell's equations in differential form. 5

14. (a) Describe the powder diffraction method for the determination of lattice constant of a cubic unit cell. 5

(b) What is Hall effect? Deduce the expression for Hall coefficient in case of a Semiconductor. 5

15. (a) Derive the expression for electronic polarizability in case of dielectrics. 5

(b) Describe Weiss molecular field theory of Ferromagnetism. 5

16. (a) Explain in detail thermal evaporation technique to prepare a thin film. 7

(b) Explain the ball milling method of preparing nanomaterials. 3

17. Write any **two** short note of the following : 10

(a) Photon gas

(b) Kronig-Penney model.

(c) Thermistor.