



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 \AA and 5896 \AA) 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

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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 :

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- (a) Photon gas.
 - (b) Kronig-Penney model.
 - (c) Thermistor.
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