Code: 15A56101 **R15**

B.Tech I Year II Semester (R15) Regular & Supplementary Examinations May 2018

ENGINEERING PHYSICS

(Common to IT, ECE, EIE & ME)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) What are the characteristics of a LASER?

(b) How many orders will be visible if the wavelength of the incident radiation is 5000 A and the number of lines on the grating is 2620 per inch?

(c) Name seven crystal systems in crystallography.

(d) What are the properties of ultrasonic waves?

(e) Explain the de-Broglie concept of matter waves.

(f) Explain the formation of bands in solid.

(g) Distinguish drift and diffusion currents.

(h) Define magnetic susceptibility and permeability.

(i) What is Meissner effect? Explain.

(j) What are nanomaterials? Classify them according to their dimensions.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) What is grating? Explain the spectra formed by a plane transmission grating with relevant theory.

(b) A plane transmission grating having 5500 lines per cm is used to produce a spectrum of mercury light. What will be the angular separation between two yellow lines 5770 A and 5790 A in a second order?

OR

3 (a) Discuss the types of optical fibre and their refractive index profiles.

(b) Calculate the numerical aperture, acceptance angle and critical angle of a fiber having refractive indices of core and cladding are 1.5 and 1.45 respectively.

UNIT – II

4 (a) Derive the expression for inter planar distance between two consecutive planes described by Miller indices.

(b) Calculate the glancing angle at which X-rays with wavelength of 0.59 nm are reflected in second order from a crystal with inter planar separation of 0.424 nm.

OR

5 (a) Explain Bragg's law with a neat sketch.

(b) Explain X-ray diffraction technique for a powder specimen with a suitable diagram.

UNIT – III

6 (a) Derive the independent and time dependent Schrodinger wave equations.

(b) Calculate the de-Broglie wavelength of an electron of energy 200 eV.

OR

7 (a) Show that the energy spectrum of an electron consisting of a number of allowed energy bands separated by forbidden bands with the help of Kronig-Penney model.

(b) What are Brillouin zones? Explain using E-K diagrams.

Contd. in page 2

UNIT – IV

8 (a) Explain the significance and importance of Hall effect. How Hall coefficient can be determined experimentally.

(b) Explain the formation of intrinsic and extrinsic semiconductors and how they can be distinguished.

OR

9 (a) Distinguish between dia, para, ferro, antiferro magnetic materials qualitatively.

(b) What are soft and hard magnetic materials? Write some applications of magnetic materials.

UNIT – V

10 (a) Write short notes on penetration depth and flux quantization.

(b) Explain the salient features of BCS theory of superconductivity.

OR

11 (a) Describe optical, thermal, mechanical and magnetic properties of nanomaterials.

(b) Write applications of nanomaterials.

*****