

Date: 18/05/2017,

GANPAT UNIVERSITY
B.Tech. Semester I & II (All Branch)
CBCS (New) Regular & Remedial Examination April-June 2017
2EC101: PHYSICS

Time: 3 Hrs.]

[Total Marks: 60

Instructions:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

- Q:1** (A) Explain the formation of depletion layer and the barrier potential for an unbiased p-n junction diode. 5
- (B) Classify different types of magnetic materials with examples. 5
- OR**
- Q:1** (A) Define the terms: Holes, Magnetic Susceptibility, Superconductivity, Curie Temperature, Doping 5
- (B) Explain the term Energy Hill for a p-n junction diode. 5
- Q:2** (A) List out the main defects of the roentgen tube and explain the construction and working of Coolidge X-ray tube. 5
- (B) The magnetic field intensity in Hg at $T = 0\text{K}$ is $4 \times 10^5 / 4\pi \text{ A/m}$ and $3.3 \times 10^5 / 4\pi \text{ A/m}$ at 3.2 K . Calculate the critical temperature. 5
- OR**
- Q:2** (A) Explain the method to calculate the size of Nucleus with appropriate examples. 5
- (B) Superconducting lead has a critical temperature of 7.26 K at zero magnetic field and a critical magnetic field of $8 \times 10^5 \text{ A/m}$ at 0K . Find the critical field at 5 K . 5
- Q:3** (A) List out the applications of superconductors. 5
- (B) Briefly explain the following: 5
- (i) Nanotechnology and its application
 - (ii) Plasma and its types

SECTION-II

- Q:4 (A)** Explain how optical fibers are classified. Discuss their characteristics features **5**
(B) A step index fiber has NA of 0.16, $n_1=1.45$ and core diameter of 60 μm . **5**
 Determine the normalized frequency if free space wavelength is 0.9 μm . Also, find out no. of modes supported by fiber

OR

- Q:4 (A)** Define thermal conductivity. Compare conduction, convection and radiation of heat transfer mode. **5**
(B) What is Doppler effect? Explain various cases of it when source and observer both are moving. **5**
Q:5 (A) Explain principle of spontaneous and stimulated emission. **5**
(B) Define 1) Critical angle 2) Refractive index .3) Acceptance angle 4) LASER 5) Ultrasonic **5**

OR

- Q:5 (A)** A person is standing near railway track and train moving with a speed of 36km/hr is approaching him. The apparent pitch of the whistle as heard by the person is 700hertz. Calculate the actual frequency of the whistle. Velocity of sound = 350 m/s. **5**
(B) Illustrate the nature of light. What are the various theories to explain the different laws? **5**
Q:6 (A) Explain intermodal, material and waveguide dispersion. **6**
(B) Define attenuation. **4**
 A certain optical fiber has an attenuation of 3.5dB/km at 850nm. If 0.5mW of optical power is initially launched in to the fiber, what is the power level in μW after 4km.

End of Paper