

S.No. : 170

BAS 202

No. of Printed Pages : 04

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 9907

Roll
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B.Tech. Examination 2018-2019

(Even Semester)

ENGINEERING PHYSICS II

Time : Two Hours]

[Maximum Marks : 50

Note :- (i) Attempt all questions.

(ii) Marks of each questions are shown against it.

SECTION – A

1. Attempt all parts of the following : $1 \times 10 = 10$

- Normalized wave function must bevalued.
- Maximum observed compton shift is \AA^0 .
- Bragg's usedradiation to study diffraction by crystals.
- The total electric field at the atom site is known as.....field.

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- (e) The smallest unit of magnetic movement is known as
- (f) The electric polarization in free space is
- (g) The flow of energy in a plane EM wave in a free space is along theof wave.
- (h) Superconducting state is more ordered state thanstate.
- (i) One atom thick layer of graphite is called
- (j) The fullerenes are class of allotropes of

SECTION – B

2. Attempt any three parts of the following : $5 \times 3 = 15$
- (a) Calculate the de-Broglie wavelength associated with a proton moving with a velocity equal to (1/20th) velocity of light.
- (b) X - rays of $\lambda = 0.3 \text{ \AA}$ are incident on a crystal with a lattice spacing 0.5 \AA . Find the angles at which second and third Bragg's diffraction maxima are observed.
- (c) Calculate the electronic polarizability of an Argon atom. Given $E_r = 1.0024$ at NTP and $N = 2.7 \times 10^{25}$ atoms/ m^3 .

- (d) A bar magnet has a coercivity 5×10^3 amp/m. It is desired to demagnetize it by inserting it inside a solenoid 10 cm long and having 50 turns. What current should be sent through the solenoid.
- (e) The critical field for niobium is 1×10^5 A/m at 8K and 2×10^5 A/m at ok. Calculate the transition temperature of the element.

SECTION – C

Note :- Attempt any two parts from each question:

$5 \times 5 = 25$

3. (a) Explain the phase velocity and group velocity and show that for a wave packet $V_p \times V_g = C^2$
- (b) What is Compton shift? Calculate the maximum change in wavelength in Compton scattering experiment.

OR

4. (a) What is meant by molecular field in the dielectrics? Show that it is given by :

$$\bar{E}_m = \bar{E} + \frac{\bar{P}}{3\epsilon_0}$$

OR

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- (b) Explain the term intrinsic and extrinsic semiconductor. Derive an expression for the conductivity of a semiconductor.
5. (a) What do hysteresis mean? Prove that energy dissipated is μ_0 times the area of $\bar{B} - \bar{H}$ curve.

OR

- (b) Describe Langerin's theory for diamagnetic materials and hence deduce expression for magnetic susceptibility.
6. (a) What is the Meissner effect? Explain how Meissner effect prove the super conductor to be a perfect materials.

OR

- (b) How does magnetization vary with applied magnetic field in type - I and type - II superconductors? Mention few applications of type- II Superconductors.
7. (a) What are bucky balls? Discuss their properties and application.

OR

- (b) What is meant by carbon nanotubes? Explain the potential applications of carbon nanotubes.
