



Engineering Physics - I (Old) (1010)

P. Pages : 2

Time : Two Hours

Max. Marks : 50

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Each question should be started on new page.
5. Figures to the right indicates full marks.
6. Use of non programmable electronic calculator is allowed.
7. Assume suitable data if necessary.

1. Solve **any two**. 10

- a) Define the term 'Fermi-level' & hence locate the position of Fermi level in Intrinsic & Extrinsic Semiconductor.
- b) Define the term 'Active Display' & describe LED Display.
- c) Calculate the no. of acceptor atoms which must be added to achieve resistivity $20\Omega\text{cm}$ of P-type semiconductor.

Given : Mobility of hole = $20\text{cm}^2/\text{V} - \text{sec}$

$$e = 1.6 \times 10^{-19}\text{C}$$

2. Solve **any three**. 15

- a) Compare Soft & Hard Magnetic Materials.
- b) What are ferrites? How are they prepared? Give its applications.
- c) Define the term 'Meissner's effect' & show that superconductor is a perfect diamagnetic material.
- d) Mention the types of 'Zeeman Effect'. Define the types (terms) separately. Sketch out experimental arrangement to study it.

3. Solve any one. **5**

- a) When current flows through a coil wound on a iron core gives magnetic flux $2 \times 10^{-5} \text{ wb}$. If the magnetising field is 1000 A/m & cross sectional area of the coil is $3 \times 10^{-4} \text{ m}^2$
Calculate :
i) Relative Permeability of core
ii) Flux density
iii) Intensity of magnetisation
iv) Susceptibility.
- b) Calculate the critical temperature of superconductor if its critical field is 10^5 A/m at 8°K & $2 \times 10^5 \text{ A/m}$ at 0°K

4. Solve any three. **15**

- a) Define the terms :
i) Metastable state
ii) Active System
iii) Population Inversion
iv) Pumping
v) Life time.
- b) Explain with neat diagram the working of 'Bainbridge Mass Spectrograph'
- c) What are X – rays? Show that $\lambda_{\min} = \frac{12400}{V} \text{ \AA}$ for continuous X-rays where $V \rightarrow$ excitation voltage.
- d) Write a short note on 'Holography'.

5. Solve any one. **5**

- a) Electrons are accelerated through potential diff. of 200 V & then projected of right angles into the magnetic field of strength 0.02 wb/m^2 . Calculate the velocity of electron on entering the field & radius of curvature described by the electron.
- b) An optical fibre consist of core glass of R. I. 1.48 & cladding glass of 1.47 . Calculate.
i) Critical angle
ii) Numerical Apperture
iii) Acceptance angle.
