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I/IV B.Tech (Regular\Supplementary – Repeat Exam) DEGREE EXAMINATION

January, 2021

First Semester

Time: Three Hours

Common to all Branches

Engineering Physics-II

Maximum: 60 Marks

Answer ALL Questions from PART-A.

(1X12 = 12 Marks)

Answer ANY FOUR questions from PART-B.

(4X12=48 Marks)

PART-A

1. a) List any two failures of classical free electron theory.
- b) Describe charge carrier hole in semiconductors.
- c) Explain diffusion current in semiconductors.
- d) What is Bohr Magneton?
- e) Classify soft and hard magnetic materials.
- f) Define dielectric constant.
- g) What is a carbon nano tube?
- h) Write the principle involved in solar cell.
- i) Give the relation between critical current and critical magnetic field of super conductors.
- j) What are ultrasonic waves?
- k) Write the expression for Bragg's law.
- l) Explain the principle involved in Scintillation counter.

PART-B

2. a) Explain Kronig- Penny Model for free electrons moving in solids 6M
- b) Obtain carrier concentration in intrinsic semiconductors 6M
3. a) Derive an expression for the effective mass of an electron moving in energy bands of a solid. 6M
- b) Distinguish between conductors, semiconductors and insulators. 6M
4. a) Explain domain theory of Ferro magnetism and the B-H hysteresis curve 6M
- b) Obtain Classius-Mossotti relation in dielectric materials 6M
5. a) Derive an expression for internal field seen by an atom in a dielectric material. 6M
- b) Distinguish between soft and hard magnetic materials. 6M
6. a) Explain the fabrication of Nano materials by chemical vapour deposition method 6M
- b) Describe the working principle of solar cell, LED and photo diode 6M
7. a) Explain any one method for the preparation of carbon nano tubes. 6M
- b) Write a note on a) Meissner effect and b) BCS theory 6M
8. a) Explain the properties and applications of ultrasonics 6M
- b) Describe the ultrasonic method of time of flight diffraction technique 6M
9. a) What are Miller indices? Draw (111) and (110) planes in a cubic lattice. 6M
- b) What are radio isotopes? Write its applications. 6M

