



B.Tech I Semester Regular Examinations, July 2021

APPLIED PHYSICS (ECE)

Maximum Marks: 70

Date: 16.07.2021 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What are the drawbacks of classical free electron theory?
- 2 What is an effective mass of electron?
- 3 Write the four properties semiconductors?
- 4 Mention the applications of Hall effect.
- 5 What is band gap?
- 6 Write any two compound semiconductors?
- 7 Distinguish between direct and indirect band gap semiconductor.
- 8 Explain quantum dot laser.
- 9 What is a photoconductor?
- 10 Mention the types of photo detector.

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 a) What is Fermi energy? [2]
b) Explain the term "density of states". Derive an expression for the number of allowed states for unit volume of a solid. [8]

OR

- 12 a) Mention any four postulates of classical free electrons theory. [4]
b) Distinguish between conductor, semiconductor and insulator. [6]
- 13 a) Explain the following i) Intrinsic semiconductor ii) extrinsic semiconductor [3+3]
b) Discuss various types of carrier generations and recombination with proper diagram [4]

OR

- 14 a) What is Hall Effect. [3]
b) Derive an expression for Hall voltage. [7]

- 15 a) Differentiate spontaneous and stimulated emissions. [5]
b) Explain about the density of states for photons. [5]

OR

- 16 Explain the following i) Hetero structures ii) Photovoltaic effect. [5+5]

- 17 Explain the construction and working of a LED with energy band diagram. [10]

OR

- 18 Describe the construction and working of laser diode. What are the advantages of this diode? [10]

- 19 a) Give the properties of photo detector. [5]
b) Describe the construction and working of photo detector. [5]

OR

- 20 a) What is Photodiode? [2]
b) Explain the construction and working of a Solar cell. [8]