

M.Sc. F.Y. (Electronics) (CBCS Pattern) Sem-I
PSCELET01 / PSELT101 - Paper-I - Core-I :
Fundamentals of Semiconductor Devices

P. Pages : 1

Time : Three Hours



GUG/W/22/11154

Max. Marks : 80

- Notes :
1. All questions are compulsory and carry equal marks.
 2. Draw neat and labelled diagrams wherever necessary.
 3. Use of calculator and log table is allowed.

Either:

1. a) Explain the difference between intrinsic and extrinsic semiconductors. 8
Explain the effect of temperature on the fermi energy level in the extrinsic semiconductor.
- b) Describe the construction and working of a PIN diode. 8

OR

- c) Explain the breakdown mechanism in a p-n junction. How does Zener breakdown differ from avalanche breakdown? 8
- d) What is IMPAT diode? Explain construction and working of it. 8

Either:

2. a) Explain the input & output characteristic of a common emitter configuration PNP transistor. 8
- b) Describe the CB, CE and CC configurations of a transistor and compare their salient features. 8

OR

- c) State the Ebers-Moll equations. Explain the transistor action using them. 8
- d) State the limitations of transistor at high frequency. Explain the design of high frequency transistors. 8

Either:

3. a) Describe the construction and working of JFET. 8
- b) Explain the Schottky effect? State the advantages of MOSFET over JFET. 8

OR

- c) What is CCD? Explain the construction and working of CCD. 8
- d) Explain I-V characteristics of MESFET operating in : 8
i) Depletion mode and ii) Enhancement mode.

Either:

4. a) What is photovoltaic effect? Explain the photovoltaic effect in a pn junction solar cell, indicating its I-V characteristic. 8
- b) What is a photoconductor? Explain the construction and working of photoconductor. 8

OR

- c) What is LED? Explain its construction. Explain the radiative and non radiative transitions. 8
- d) What is population inversion? Explain its importance. Explain the working of a semiconductor LASER. 8

5. a) Explain the working of a TRAPATT diode. 4
- b) Explain alpha and beta cut-off frequencies. 4
- c) State the advantages of JFET over BJT. 4
- d) Explain the p-n junction photodiode. 4
