

M.Sc.(Electronics) CBCS Pattern Semester-I
PSCELET01 / PSELT101-Paper-I : Fundamentals of Semiconductor Devices

P. Pages : 2

Time : Three Hours



GUG/W/23/11154

Max. Marks : 80

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

Either:

1. a) What are intrinsic and extrinsic semiconductors? Explain. 8
b) Describe Energy band model of a p-n junction. 8

OR

- c) What is IMPATT diode? Draw its structure and explain its operation. 8
d) Describe construction and working of TRAPATT diode. 8

Either:

2. a) Describe the possible bias modes of operation of bipolar junction transistor. 8
b) Draw Equivalent circuit for the Ebers-Moll model of a npn bipolar junction transistor and explain. 8

OR

- c) Describe the construction and operation of microwave transistor. 8
d) Describe high frequency performance of a bipolar junction transistor. 8

Either :

3. a) Describe the structure and transfer characteristics of MESFET. 8
b) Explain construction and working of p-channel depletion MOSFET. 8

OR

- c) What is CCD? Explain the basic structure and operation of CCD. 8
d) Define: 8
i) Ohmic region
ii) Cut-off region
iii) Saturation region
iv) Breakdown region in JFET

Either :

4. a) What is photovoltaic effect? Explain. 8
What is photo diode? Explain its construction and working.
- b) Draw the I-V and P-V characteristics of p-n junction solar cell. 8

OR

- c) What is Laser diode? Explain the structure of Laser diode and its characteristics. 8
- d) What are the photoconductors? Explain the construction and working of photoconductors. 8
5. a) Explain the structure of PIN diode. 4
- b) Explain construction of microwave transistor. 4
- c) Define 4
i) Ohmic Contacts
ii) Tunnel contacts
- d) What is population inversion and pumping? 4
