M.Sc.F.Y. (Electronics)(with Credits)-Regular-Semester 2012 (Old) / (CBCS Pattern) (New) Sem I

ELE 101 / PSCELET01 Core-I - Paper-I : Fundamentals of Semiconductor Devices

P. Pages : 2 **GUG/S/18/3449**

Time : Three Hours * 0 6 3 2 * Max. Marks : 80

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

Either.

1. a) What is semiconductor? Explain construction and working intrinsic semiconductor. **8**

b) Explain the construction of PIN Diode. Explain how PIN diode is different from PN diode. **8**

OR

c) What is an electrical breakdown in P-N junction diode? Explain Zener and avalanche breakdown. **8**

d) What is IMPATT diode? Explain principle and operation of IMPATT diode. **8**

Either.

2. a) Explain principle of operation of BJT. Describe input, output and transfer characteristics of BJT in CE mode. **8**

b) Describe Alpha and Beta cut off frequencies in transistor. **8**

OR

c) What is power transistor? Explain. **8**
i) High level injection effects.
ii) Emitter effects.
iii) Collector effects on power transistor.

d) Describe Ebers-Moll equation and model for PNP transistor. **8**

Either.

3. a) State the advantages of **8**
i) JFET over BJT. ii) MESFET over JFET.

b) What is CCD? Describe operation of CCD with suitable diagram. **8**

OR

c) Explain construction and working of junction field effect transistor (JFET). Draw its characteristics. **8**

d) Describe basic structures and the operating principle of MOSFET. **8**

Either.

4. a) Describe the construction and operation of the p-n junction solar cell. **8**

b) Explain construction and working of photodiode. List the factors that limits the response speed of a photodiode. **8**

OR

c) Describe the schematic diagram of a photo conductor. Explain optical excitation processes in it. **8**

d) Describe radiative and nonradiative transitions in LEDs. **8**

5. a) Explain the construction of TRAPATT diode. **4**

b) Explain the working of switching transistor. **4**

c) What is Schottky effect? Explain. **4**

d) Explain the basic structure of a avalanche photodiode. **4**

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