

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2022
(First Semester)

Branch - ELECTRONICS

SEMICONDUCTOR DEVICES

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

1. The forbidden energy gap for Silicon is _____.
(i) 1.1eV (ii) 0.67eV
(iii) 0.97eV (iv) 1.7eV
2. During reverse bias, a small current develops known as
(i) Forward current (ii) Reverse current
(iii) Reverse saturation current (iv) Active current
3. The field-effect transistors are used in _____.
(i) Amplifiers (ii) Analog switch
(iii) Oscillator (iv) All of the above
4. In which one of the following devices, the light energy is converted into the electrical energy
(i) Light emitting diode (ii) Transistor
(iii) Solar cell (iv) Laser diode
5. An SCR combines the features of _____.
(i) A rectifier and resistance (ii) A rectifier and transistor
(iii) A rectifier and capacitor (iv) None of the above

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a. What is meant by structure of semiconductor materials?
OR
b. Explain the formation of depletion region in a PN junction.
- 7 a. Explain the Ideal diode and its characteristics.
OR
b. Describe the zener as voltage regulator.
- 8 a. Explain the operation of NPN transistor.
OR
b. Show how FET acts as voltage Regulator?
- 9 a. Describe the operation of seven segment display with diagram.
OR
b. Explain the operation of LDR.

Cont...

10 a. Explain the principle behind the varactor diode and list out its application .

OR

b. What is TRIAC? Sketch its characteristics and describe its operation.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11 a. Describe the energy band structures of an insulator, a conductor and a semiconductor.

OR

b. Differentiate between P -type and N-type semiconductor.

12 a. Explain the V-I characteristics of a PN junction diode.

OR

b. Draw the V-I characteristic of zener diode and explain its operation.

13 a. Explain the I/P and O/P characteristics of a transistor in CB configuration.

OR

b. What is MOSFET ? Explain the operation of enhancement type MOSFET.

14 a. Describe with neat diagram the construction of an LED and explain its working.

OR

b. Distinguish between a photodiode and photovoltaic cell.

15 a. Explain the V-I characteristics of a tunnel diode using energy band diagram.

OR

b. Describe the working principle of an SCR with V-I characteristics.

Z-Z-Z

END