

Reg. No.

Question Paper Code

12126

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Second Semester

Electrical and Electronics Engineering

(Common to Electronics and Communication Engineering)

20BSPH201 - PHYSICS OF ELECTRONIC DEVICES

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|---|-------------------------------|
| 1. Define drift velocity and mobility. | 2,K1,CO1 |
| 2. What is Lorentz number? | 2,K1,CO1 |
| 3. Define saturation magnetization. | 2,K1,CO2 |
| 4. State Curie Weiss law. | 2,K2,CO2 |
| 5. List out the properties of dielectric materials. | 2,K1,CO3 |
| 6. What is meant by dielectric loss? | 2,K1,CO3 |
| 7. Write down the differences between intrinsic and extrinsic semiconductors. | 2,K1,CO4 |
| 8. Define drift and diffusion current. | 2,K1,CO4 |
| 9. What is meant by Base-Width modulation or Early effect? | 2,K1,CO5 |
| 10. Why BJT is called current controlled device? | 2,K2,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Deduce mathematical expression for electrical conductivity and thermal conductivity of a conducting material and hence obtain Wiedemann-Franz law. 13,K2,CO1
- OR**
- b) (i) Derive an expression for the effective mass of an electron moving in energy bands of a solid and show how it varies with the wave vector. 9,K2,CO1
- (ii) Explain the concept of hole. 4,K2,CO1
12. a) Discuss the domain theory of ferromagnetism. Also, explain the different types of energy involved in domain growth. 13,K2,CO2
- OR**
- b) What is Ferrite? Explain the structure, properties and applications of Ferrites with neat diagram. 13,K2,CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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13. a) Derive an expression for electronic and Ionic polarisability with neat diagram. *13,K2,CO3*

OR

- b) Give a detailed discussion on various types of dielectric breakdown that occur in dielectric material. *13,K2,CO3*
14. a) Derive an expression for the carrier concentration of electrons in an intrinsic semiconductor with neat energy band diagram. *13,K2,CO4*

OR

- b) Explain the construction, working and V-I characteristics of a Schottky diode. Also discuss the advantages and applications of Schottky diode. *13,K2,CO4*
15. a) Explain the construction, working of NPN transistor and discuss the input and output characteristic of CE configuration. *13,K2,CO5*

OR

- b) Explain h parameters of transistor and draw the equivalent circuit of a transistor. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Explain with a neat sketch the construction, working and characteristics of N-channel JFET. *15,K2,CO6*

OR

- b) Explain the construction, working operation and characteristics of UJT with a neat sketch. *15,K2,CO6*