B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Second Semester

Electronics and Communication Engineering

(Common to Electrical and Electronics Engineering)

20BSPH201 - PHYSICS OF ELECTRONIC DEVICES

(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

Marks, K-Level,CO

1. State Wiedemann-Franz law.   *2,K1,CO1*
2. What is a periodic potential?   *2,K1,CO1*
3. Differentiate soft and hard magnetic materials.   *2,K1,CO2*
4. What is magnetic moment?   *2,K1,CO2*
5. Define dielectric loss.   *2,K1,CO3*
6. What is defect breakdown?   *2,K1,CO3*
7. Define diffusion current.   *2,K1,CO4*
8. List any four advantages of tunnel diode.   *2,K1,CO4*
9. Draw the Eber Moll model in BJT.   *2,K2,CO5*
10. Define h parameter.   *2,K1,CO5*

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Derive the expression for electrical and thermal conductivity of metals   *13,K2,CO1*
        based on classical free electron theory.

    OR

    b) Obtain an expression for density of energy states.   *13,K2,CO1*

12. a) Describe the ferromagnetic domain theory in detail.   *13,K2,CO2*

    OR

    b) (i) Draw the B-H curve (hysteresis) for a ferromagnetic material and   *8,K2,CO2*
        explain the same on the basis of domain theory.

        (ii) Bring out the differences between soft and hard magnetic   *5,K2,CO2*
        materials.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **11738**

13. a) Discuss the electronic and ionic polarization and derive their suitable expression.   *13,K2,CO3*

<div align="center">OR</div>

    b) Starting with the internal field in a dielectric obtain Clausius –Mossotti equation.   *13,K2,CO3*

14. a) Explain the intrinsic semiconductor and deduce the expression for density of electrons in an intrinsic semiconductor.   *13,K2,CO4*

<div align="center">OR</div>

    b) Obtain an expression for the carrier concentration of holes in the valence band of a p-type semiconductor.   *13,K2,CO4*

15. a) Explain the construction and working of NPN transistor with neat sketch.   *13,K2,CO5*

<div align="center">OR</div>

    b) Draw the input and output characteristics of common emitter (CE) configuration and explain it.   *13,K2,CO5*

<div align="center">

PART - C (1 × 15 = 15 Marks)

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

<div align="center">OR</div>

    b) Explain the construction, working and operation characteristics of DIAC with neat diagram.   *15,K2,CO6*