

07 MAR 2023

Reg. No.

Question Paper Code

11742

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

Second Semester

Computer Sciences and Business Systems

20BSPH205 - PRINCIPLES OF ELECTRONICS

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | Marks,
K-Level,CO |
|--|------------------------------------|
| 1. Define Fermi energy. | 2,K1,CO1 |
| 2. Why do we prefer Silicon for transistor and GaAs for laser diodes? | 2,K1,CO1 |
| 3. What is the difference between diffusion and drift in P-N junction diode? | 2,K2,CO2 |
| 4. Define Ripple Factor and give its dimension. | 2,K1,CO2 |
| 5. What is channel length modulation in MOSFET? | 2,K1,CO3 |
| 6. What are the similarities between MOSFETs and JFETs? | 2,K2,CO3 |
| 7. The voltage gain of an amplifier without feedback is 3000. Calculate the voltage gain of the amplifier if negative voltage feedback is introduced in the circuit. Given that feedback fraction $m_v = 0.01$. | 2,K2,CO4 |
| 8. What is Barkhausen criterion for sustained oscillations? | 2,K2,CO4 |
| 9. What should be considered when selecting an operational amplifier? | 2,K1,CO5 |
| 10. Draw the integrator circuit using operational amplifier. | 2,K2,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) (i) Describe the band theory of solids and classify the solids into metals, semiconductors and Insulators on the basis of band theory. 8,K2,CO1
- (ii) Explain the variation of electrical properties with respect to the temperature in a intrinsic semiconductor. 5,K2,CO1
- OR**
- b) (i) Explain Energy band diagram for N type and also explain how the Fermi level varies with temperature. 8,K2,CO1
- (ii) Explain the difference between direct and indirect band gap semiconductor using energy momentum curve. 5,K2,CO1

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

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12. a) (i) Describe the construction of diode and explain V-I characteristics behavior. 8,K2,CO2
 (ii) Write a short note on clipper and clamper circuit. 5,K2,CO2
OR
- b) What are Full wave rectifier circuits? Explain its working and its parameter. 13,K2,CO2
13. a) Explain an experiment to determine the characteristics of a transistor in CE configuration. Explain how the transistor parameters can be evaluated 13,K2,CO3
OR
- b) Explain the construction, working and characteristics of JFET. 13,K2,CO3
14. a) What is negative feedback? Derive an expression for voltage gain of an amplifier with negative feedback. Give the advantage of negative feedback. 13,K2,CO4
OR
- b) Write down the various characteristics of topology. 13,K2,CO4
15. a) Explain synchronous counter with its neat diagram. 13,K2,CO5
OR
- b) What is operational amplifier? Explain Inverting and Non-inverting amplifier gain equation. 13,K2,CO5

PART - C (1 × 15 = 15 Marks)

16. a) (i) Explain Half subtraction and Full subtraction using basic logic gates. 10,K2,CO6
 (ii) Write a short note on Multiplexer? 5,K2,CO6
OR
- b) (i) Explain AND, OR, NOT, EXOR gates with circuits and truth table. 10,K2,CO6
 (ii) State and Prove DeMorgan's theorem. 5,K2,CO6