B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Second Semester

Computer Science and Business Systems

24BSPH205 – PRINCIPLES OF ELECTRONICS ENGINEERING

Regulations - 2024

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K–Level	CO
1.	The smallest portion of the lattice is known as _____	1	K1	CO1
	(a) Lattice structure (b) Lattice point (c) Bravais crystal (d) Unit cell			
2.	Conduction band comprises of electrons that are	1	K1	CO1
	(a) Always near the top of the crystal			
	(b) Always at the surface of the crystal			
	(c) Anywhere in the solid moving freely			
	(d) Always bound to its parent atom in outermost orbit			
3.	If the doping level of a crystal diode is increased, the breakdown voltage _____.	1	K1	CO2
	(a) remains the same (b) is increased (c) is decreased (d) none of the above			
4.	Zener diode is designed to specifically work in which region without getting damaged?	1	K1	CO2
	(a) Active region (b) Breakdown region (c) Forward bias (d) Reverse bias			
5.	If alpha=0.98, I_{co} =6μA, & I_B =100μA for a transistor, then the value of I_c will be_____	1	K2	CO3
	(a) 2.3mA (b) 3.1mA (c) 4.6mA (d) 5.2mA			
6.	For n-JFET, the channel is a/an -------------channel and gates are---------	1	K1	CO3
	(a) N-type; P-type (b) P-type P-type (c) N-type N type (d) bP-type: N-type			
7.	In a feedback system, the function of a summing point is to:	1	K1	CO4
	(a) Increase the output voltage (b) Compare the input and feedback signals			
	(c) Control the amplifier's power (d) Decrease the input signal			
8.	Positive feedback typically leads to:	1	K1	CO4
	(a) Wider bandwidth (b) Improved stability			
	(c) Narrower bandwidth (d) Enhanced gain			
9.	The differential gain is, _____	1	K1	CO5
	(a) very high (b) very low			
	(c) dependent on input voltage (d) about 100			
10.	What combination is a NAND gate?	1	K1	CO6
	(a) NOT AND (b) NOT OR (c) NOT NOT (d) None of these			

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

11.	What are the classifications of crystalline materials?	2	K1	CO1
12.	What is meant by acceptor energy level?	2	K1	CO1
13.	Differentiate between half-wave and full-wave rectifier.	2	K2	CO2
14.	What is zener breakdown?	2	K1	CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **14121**

15.	Distinguish between PNP and NPN transistors.	2	K2 CO3
16.	What is the working principle of JFET?	2	K1 CO3
17.	What are the conditions for positive feedback?	2	K1 CO4
18.	Define bandwidth of an amplifier.	2	K1 CO4
19.	Draw the schematic symbol of an operational amplifier indicating the various terminals.	2	K1 CO5
20.	What is voltage follower?	2	K1 CO5
21.	Difference between Half adder and Full adder.	2	K2 CO6
22.	Mention any two applications of multiplexers.	2	K1 CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a) Apply the intrinsic carrier concentration relationship to describe how the balance between electrons and holes changes when the semiconductor is doped. *11 K3 CO1*

OR

b) Apply the concept of carrier concentration in a N-type semiconductor to describe how the electrical properties of a semiconductor device change with temperature. *11 K3 CO1*

24. a) Explain the process of biasing and current flow in a PN junction diode. *11 K2 CO2*

OR

b) Explain the construction and working of a full-wave rectifier with a suitable circuit diagram and waveform. *11 K2 CO2*

25. a) Identify the characteristics of a transistor in C-B configuration and discuss how transistor parameters can be evaluated. *11 K2 CO3*

OR

b) Explain the working principles of an n-JFET to analyze its behavior during ON and OFF states in a switching circuit. *11 K2 CO3*

26. a) Construct a Hartleyoscillator circuit and explain how its components determine the frequency and amplitude of oscillation. *11 K2 CO4*

OR

b) In designing a feedback control system for a precision amplifier, how would you utilize VCVS and CCVS configurations to optimize the system's performance? Discuss. *11 K2 CO4*

27. a) Describe the construction of differentiator circuit in op-amp and explain how the output voltage represents the derivative of the input signal. *11 K2 CO5*

OR

b) Apply your knowledge of the non-inverting op-amp configuration to construct a circuit that achieves a specified voltage gain and explain how the resistor values determine the gain. *11 K2 CO5*

28. a) Develop a de-multiplexer-based circuit to route a single input signal to multiple outputs and explain its working and functions with necessary diagrams. *11 K3 CO6*

OR

b) Reduce the following Boolean expression: $A = XY + X(Y+Z) + Y(Y+Z)$. *11 K3 CO6*