Reg. No.															

Question Paper Code	13603

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fourth Semester

Electronics and Communication Engineering

20ECPW401 - ELECTRONIC CIRCUITS WITH LABORATORY

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K - Level	CO
1.	The operating point ________. (a) Changes in temperature (b) Does not change with temperature (c) Is always constant (d) Equals to infinity	1	K1	CO1
2.	Why is self bias circuit not used in IC amplifier? (a) To reduce power losses (b) To reduce area used on the chip (c) Stability factor reduces in the IC (d) Voltage gain is reduced	1	K1	CO1
3.	Which transformer is used for impedance matching in transistor coupled amplifier? (a) step-up (b) step-down (c) same turn ratio (d) different turn ratio	1	K2	CO2
4.	The total gain of a multistage amplifier is less than the product of the gains of individual stages due to ___________. (a) Power loss in the coupling device (b) Loading effect of the next stage (c) The use of many transistors (d) The use of many capacitors	1	K2	CO2
5.	What are oscillators? (a) Switching circuits (b) Converts DC to AC (c) Converts AC to DC (d) Filter circuits	1	K1	CO3
6.	Give the relation between output and input voltage of an oscillator? (a) $A_v = V_i/V_o$ (b) $V_i = V_o A_v$ (c) $V_o = A_v/V_i$ (d) $A_v = V_o/V_i$	1	K1	CO3
7.	What happens to capacitive reactance when operating frequency is increased? (a) Increases (b) Decreases (c) Remains constant (d) goes to infinite	1	K2	CO4
8.	Which one of the following is false with respect to stray capacitance? (a) Reduces with decrease in size of lead wires (b) Reduces when chip capacitors are used (c) Increases when lead wires are lengthy (d) Increases with less capacitance value	1	K1	CO4
9.	Bistable multivibrator is ________ in any state. (a) Stable (b) Unstable (c) Saturated (d) Independent	1	K1	CO5
10.	Why do we use CE amplifier as a large signal class a amplifier? (a) It has very high output impedance (b) It has very high input impedance (c) It has very high voltage gain (d) It is very much stable	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Why is biasing necessary for a transistor to function as an amplifier?	2	K1	CO1
12.	State voltage divider bias with necessary diagram.	2	K1	CO1
13.	Why multistage amplifiers are used instead of a single-stage amplifier?	2	K2	CO2
14.	List of application small signal analysis of CE Amplifier.	2	K1	CO2
15.	Define phase and gain margin.	2	K1	CO3
16.	Give the condition of oscillation for Hartley oscillator.	2	K1	CO3
17.	Apply the concept of 'Q' (quality factor) in the context of a resonant circuit.	2	K1	CO4
18.	Design a stagger-tuned amplifier for a given frequency range.	2	K2	CO4
19.	Justify the different types of Multivibrators.	2	K2	CO5

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

20.	Estimate the suitable characteristics of Monostable Multivibrator.	*2*	*K1*	*CO5*
21.	Design a system that integrates both a voltage amplifier and a power amplifier for a specific application.	*2*	*K2*	*CO6*
22.	State the important features of CLASS C power amplifiers.	*2*	*K2*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the concept of DC load line analysis in transistor biasing circuits. How does the load line help in determining the operating point (Q-point) of a transistor? Illustrate with a neat circuit diagram and graph.	*11*	*K2*	*CO1*
		OR			
	b)	Describe the role of resistors in a voltage divider bias circuit. How do they influence the base voltage and ensure thermal stability of the transistor? Illustrate with a circuit diagram.	*11*	*K2*	*CO1*
24.	a)	State the key parameters of the hybrid-π model for a Common Emitter amplifier. Write down the expressions for voltage gain, input impedance, and output impedance based on this model.	*11*	*K2*	*CO2*
		OR			
	b)	With a neat sketch explain the principle of operation of cascade amplifier and also derive an expression for its performance measures.	*11*	*K2*	*CO2*
25.	a)	Explain the effect on gain, input resistance, and output resistance of Voltage series feedback amplifier with suitable block diagram.	*11*	*K2*	*CO3*
		OR			
	b)	Evaluate the suitability of the Wien Bridge oscillator for generating low-frequency sine waves. Support your answer with a circuit diagram, derive the frequency of oscillation, and critically assess the role of component selection in maintaining stable oscillations.	*11*	*K2*	*CO3*
26.	a)	Given the circuit of a single tuned amplifier, explain its operation and apply relevant formulas to derive expressions for voltage gain, gain-bandwidth product, and resonant frequency.	*11*	*K2*	*CO4*
		OR			
	b)	Discuss briefly the need for neutralization in tuned amplifiers. Explain Hazeltine and Neutrodyne neutralization methods with relevant circuit diagrams.	*11*	*K2*	*CO4*
27.	a)	Analyze the operation of a collector-coupled Astable multivibrator with the help of a neat circuit diagram. Derive the expression for its frequency and explain how each component influences the timing and waveform characteristics.	*11*	*K2*	*CO5*
		OR			
	b)	Analyze the operation of a Schmitt Trigger circuit with the help of a neat diagram. Explain how hysteresis is introduced, and interpret the input and output waveforms to show how the circuit responds to varying input voltages.	*11*	*K2*	*CO5*
28.	a)	Design a transformer-coupled Class A power amplifier for a specific output power and load resistance. Derive the expression for efficiency and suggest modifications to improve performance.	*11*	*K2*	*CO6*
		OR			
	b)	Design a push-pull Class B amplifier using transformer coupling to minimize even-order harmonics in the output. Explain the working and derive conditions under which harmonic cancellation is effective.	*11*	*K2*	*CO6*