Reg. No.																

Question Paper Code	14680

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Third Semester

Electronic Instrumentation and Control Engineering

24IXPC304 - ANALOG ELECTRONICS AND LINEAR INTEGRATED CIRCUITS

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	According to reverse characteristics, if the reverse voltage is increased at a certain value of reverse voltage, the reverse current …… a) Increases sharply b) Increases slowly c) Decreases d) Remains constant	1	K1	CO1
2.	Configuration of BJT that is known for providing the highest input impedance a) Common Base (CB) b) Common Emitter (CE) c) Darlington pair d) Common Collector (CC)	1	K2	CO1
3.	A _____ is a kind of semiconductor diode that made by joining P-type and N-type semiconducting layer. a) PN junction diode b) schottky diode c) Light emitting diode d) Photo diode	1	K1	CO1
4.	MOSFET is a _____ a) Voltage-controlled device b) Current-controlled device c) Power-controlled device d) Voltage-controlled and current-controlled device	1	K1	CO2
5.	At pinch-off voltage in a JFET device… a) Channel width is zero b) Channel width is zero and ID becomes zero c) VGS becomes zero d) None of the mentioned	1	K2	CO2
6.	The typical value of gate current I_G for a JFET is…. a) 10 mA b) 20 mA c) 30 mA d) 25 mA	1	K1	CO2
7.	In a class B amplifier, the output current flows for.... a) less than half of the input cycle b) more than half of the input cycle c) half input cycle d) entire input cycle	1	K1	CO3
8.	The crossover occurs in push-pull circuits is due to a) Both the transistors will be partially OFF during the zero crossing b) More noise c) Supply will be off d) None of the mentioned	1	K2	CO3
9.	An amplifier differs from the oscillator because an oscillator… a) has more gain b) has less gain c) does not require DC supply d) does not require input signal	1	K1	CO3

10.	……..relates its output current with its input voltage. a) Voltage Series Feedback Amplifier b) Current Series Feedback Amplifier c) Voltage Shunt Feedback Amplifier d) Current Shunt Feedback Amplifier	*1*	*K1*	*CO4*
11.	Which type of oscillations is produced by an oscillator? a) Modulated b) Damped c) Undamped d) None of the mentioned	*1*	*K1*	*CO4*
12.	The relation between crystal frequency and thickness of the crystal can be stated as.... a) Crystal frequency is inversely proportional to thickness of the crystal b) Crystal frequency is directly proportional to thickness of the crystal c) No relation between both d) None of the mentioned	*1*	*K2*	*CO4*
13.	Clamp diodes are used in comparator a) To reduce output offset voltage b) To increase gain of op-amp c) To reduce input offset current d) To protect op-amp from damage	*1*	*K2*	*CO5*
14.	The CMRR of an ideal op amp is… a) Infinite b) Unity c) Zero d) Cannot predict	*1*	*K1*	*CO5*
15.	The function of the discharge pin in an 555 IC is a) Discharge the timing capacitor when the output is low b) Discharge the timing capacitor when the output is high c) Discharge the timing capacitor when the output is low and When output is high, it acts as open circuit d) None of the above	*1*	*K2*	*CO6*
16.	The timing capacitor to the ICL 8038 is connected at the _____ pin number. a) 10 b) 12 c) 14 d) 7	*1*	*K1*	*CO6*

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)
Answer ALL Questions

17.	Compare the advantages of the Common Emitter (CE) configuration with other transistor configurations.	*3*	*K2*	*CO1*
18.	Illustrate the transistor equivalent circuit of an SCR and explain its operation.	*3*	*K2*	*CO2*
19.	Summarize the methods used to eliminate crossover distortion in amplifiers.	*3*	*K2*	*CO3*
20.	Interpret the Barkhausen criterion and determine the conditions required for sustained oscillations in an oscillator circuit.	*3*	*K3*	*CO4*
21.	Identify the use of op-amp circuits in linear applications such as amplification, addition, and integration with suitable examples.	*3*	*K3*	*CO5*
22.	Select the applications of the 555 timer operating in astable mode with suitable examples from electronic circuits and list the same.	*3*	*K3*	*CO6*

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

23.	a)	Apply the concept of biasing to explain the behavior of a PN junction diode under forward and reverse bias conditions, including the changes in depletion region width and current flow, with suitable diagrams and characteristics.	*11*	*K3*	*CO1*

OR

	b)	Construct the circuit of an NPN Bipolar Junction Transistor (BJT) in common emitter configuration and explain its operation using suitable input and output characteristics.	*11*	*K3*	*CO1*
24.	a)	Make use of the structure of a UJT, demonstrate its operation, and interpret its VI characteristics with suitable illustrations.	*11*	*K3*	*CO2*
		OR			
	b)	Examine the input and output characteristics of a MOSFET transistor configuration using appropriate circuit diagrams and characteristic curves.	*11*	*K3*	*CO2*
25.	a)	Choose suitable biasing and transformer arrangements for a Class AB amplifier and explain how they support efficient signal amplification.	*11*	*K3*	*CO3*
		OR			
	b)	Apply circuit analysis to derive efficiency of a series-fed Class A amplifier with the construction and operation of the same.	*11*	*K3*	*CO3*
26.	a)	Apply your knowledge to draw the circuit diagrams of voltage series and voltage shunt feedback amplifiers. Describe their operating principles and analyze the circuits to derive the expression for gain with feedback.	*11*	*K3*	*CO4*
		OR			
	b)	Identify the crucial parameters that decide when a Wien bridge oscillator will produce sustained oscillations and explain their roles.	*11*	*K3*	*CO4*
27.	a)	Construct the circuit diagram of an Astable multivibrator using op-amp and analyze its operation to derive the expression for its pulse width, explaining each step in detail.	*11*	*K3*	*CO5*
		OR			
	b)	Construct circuit diagrams of the non-inverting and inverting amplifiers, analyze their operation, and derive the expressions for their voltage gain with detailed explanation.	*11*	*K3*	*CO5*
28.	a)	Build an explanation of the 555 timer's block diagram by describing the purpose of comparators, flip-flops, and the output stage.	*11*	*K3*	*CO6*
		OR			
	b)	Construct a block-level description of IC 8038 and explain how frequency and amplitude control are achieved.	*11*	*K3*	*CO6*