Reg. No.																

Question Paper Code	14641

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

Third Semester

Electronics and Instrumentation Engineering

24EIPC302 - ANALOG ELECTRONIC 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.	Which region in a p-n junction during forward bias shows a slow increase in current? a) Saturation b) Depletion c) Cut off d) Breakdown	1	K1	CO1
2.	A Zener diode has which of the following properties: 1. It is properly doped crystal diode with sharp breakdown 2. It is reverse biased 3. Its forward characteristics are just that of an ordinary diode 4. Its reverse characteristics are like an ordinary diode a) 1, 2, 3 are 4 b) 1,2 and 4 only c) 1, 2 and 3 only d) 3 and 4 only	1	K2	CO1
3.	If the cathode of an SCR is made positive with respect to the anode & no gate current is applied then _____ a) Only the middle junction is reversed biased b) Only the middle junction is forward biased c) All the junctions are forward biased d) All the junctions are reversed biased	1	K1	CO1
4.	Which terminal is grounded in a Common Source MOSFET amplifier for proper biasing? a) Drain b) Source c) Gate d) Body	1	K1	CO2
5.	Assertion: Increasing the reverse bias voltage at the gate of a JFET reduces the width of the conducting portion of the channel. Reason: Increased penetration of the depletion region reduces the channel width, decreasing the current flow. a) Both Assertion and Reason are true, and Reason is incorrect explanation. b) Both Assertion and Reason are true, and Reason is correct explanation c) Assertion is True and Reason is False. d) Assertion is False and Reason is True.	1	K2	CO2
6.	Why N-type channel more preferred than the P-type channel in MOSFET? a) It is cheaper b) It is faster c) It has better noise immunity d) It has better drive capability	1	K1	CO2
7.	To start of the oscillation and amplitude stabilization in a circuit, the loop gain must start being ……. with no amplitude and then decrease monotonously until Barkhausen's criterion is satisfied. a) <1 b) > 1 c) <=1 d) >=1	1	K1	CO3

8. The crystal frequency changes with temperature due to... *1 K2 CO3*

a) Zero temperature coefficient b) Positive temperature coefficient

c) Negative temperature coefficient d) None of the mentioned

9. The disadvantage of Wien Bridge oscillator is/are..... *1 K1 CO3*

a) It cannot fabricate a pure tune b) Distortion observed in output is high

c) It cannot be used for high resistance values d) There is no automatic gain control

10. When the frequency is increased, input impedance of differentiator is …. *1 K1 CO4*

a) Decreased b) Increased

c) Remains constant d) None of the above

11. The main difference between the peak detector and sample and hold circuit is *1 K2 CO4*

a) None of the mentioned b) Two capacitors are used in peak detector

c) Three op-amps are used in the sample and hold circuit. d) Sample and hold circuit has a FET switch to connect and disconnect the capacitor

12. Which of the following about monostable multivibrator is true? *1 K1 CO4*

i. It has one stable state in which it can remain indefinitely

ii. It has a quasi stable state for a predetermined interval

iii. It is also called one shot.

a) i b) i and ii

c) ii and iii d) i, ii and iii

13. In a triangular wave generator circuit which of the following statements is true ? *1 K1 CO5*

i. The output of a Schmitt trigger is a square wave

ii. The output of the Schmitt trigger is a triangular wave.

a) both i and ii b) ii

c) i d) neither i nor ii

14. Assertion(A): An operational amplifier can amplify very low frequency including dc signals *1 K2 CO5*

Reason(R): Op-amp uses very large coupling capacitor for cascading the various stages

a) Both A and R are true and R is a correct explanation of A b) Both A and R are true but R is not a correct explanation of A

c) A is true but R is false d) A is false but R is true

15. A monostable multivibrator be modified into a linear ramp generator by__ *1 K2 CO6*

a) Replace capacitor by constant current source b) Replace resistor by constant current source

c) Connect a constant current source to trigger output d) Connect a constant current source to trigger input

16. When the 555 timer is used as a missing pulse detector, what happens when the input pulse is missed? *1 K1 CO6*

a) All of mentioned b) Output of the mono-shot goes equal after Time T

c) Output of the mono-shot goes low after Time T d) Output of the mono-shot goes high after Time T

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

Answer ALL Questions

17. Interpret FET is called voltage-controlled device. *3 K2 CO1*

18. Illustrate cross over distortion. How can it be eliminated? *3 K2 CO2*

19.	Outline the reason why Negative feedback is preferred to other methods of modifying Amplifier characteristics.	*3*	*K2*	*CO3*
20.	Construct a sample-and-hold (S/H) circuit using an op-amp.	*3*	*K3*	*CO4*
21.	Identify the applications of a monoshot multivibrator.	*3*	*K3*	*CO5*
22.	Calculate the duty cycle of a waveform with TON=4ms and TOFF=6 ms.	*3*	*K3*	*CO6*

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

23.	a)	Apply the concept of PN junction diode operation to explain its behavior under forward and reverse bias conditions.	*11*	*K3*	*CO1*
		OR			
	b)	Demonstrate the structure of a UJT, apply its working principle to explain the operation, and illustrate its V–I characteristics.	*11*	*K3*	*CO1*
24.	a)	Identify the input and output characteristics of a transistor in Common Base (CB) configuration and determine how these characteristics can be used to evaluate the input and output resistances.	*11*	*K3*	*CO2*
		OR			
	b)	Illustrate the transfer characteristics of a JFET in common-source configuration.	*11*	*K3*	*CO2*
25.	a)	Draw and describe the Voltage series and voltage shunt feedback. Derive the expression for gain with feedback. Mention the advantages of negative feedback amplifier.	*11*	*K3*	*CO3*
		OR			
	b)	With neat circuit diagram explain the operation of an RC phase shift oscillator and derive the condition for oscillation and resonant frequency with BJT.	*11*	*K3*	*CO3*
26.	a)	Draw the inverting amplifier circuit and non-inverting amplifier circuit of an op-amp in closed loop configuration. Obtain the expression for the closed loop gain for both amplifiers.	*11*	*K3*	*CO4*
		OR			
	b)	Construct the circuit of a three-op-amp instrumentation amplifier and explain its working also discuss its application.	*11*	*K3*	*CO4*
27.	a)	Construct a triangular-wave generator using op-amp and derive the expression for its frequency of oscillation.	*11*	*K3*	*CO5*
		OR			
	b)	Construct a square-wave generator using op-amp and derive the expression for its frequency of oscillation.	*11*	*K3*	*CO5*
28.	a)	Apply the working of 555 timer as Astable multivibrator.	*11*	*K3*	*CO6*
		OR			
	b)	Develop the functional operation of the IC 8038 function generator and examine how different external components influence the generation of sine, square, and triangular waveforms. Determine its practical applications in waveform generation circuits.	*11*	*K3*	*CO6*