Reg. No.															

Question Paper Code	13525

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

Third Semester

Electrical and Instrumentation Engineering

20EIPC303 - ANALOG ELECTRONIC CIRCUITS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	In a Common Emitter (CE) configuration of a BJT, the output is taken across which terminals? (a) Base and Emitter (b) Collector and Base (c) Collector and Emitter (d) Base and Collector	1	K1	CO1
2.	What is the main function of a UJT (Unijunction Transistor)? (a) High-frequency amplification (b) Voltage regulation (c) Oscillation and triggering (d) Power switching	1	K1	CO1
3.	Which of the following FET amplifier configurations offers high input impedance and is typically used as a buffer? (a) Common Gate (CG) (b) Common Source (CS) (c) Common Drain (CD) (d) Differential	1	K1	CO2
4.	Which of the following is a major drawback of Class B amplifiers that Class AB aims to reduce? (a) Low input impedance (b) High power dissipation (c) Crossover distortion (d) Large size	1	K1	CO2
5.	What is one major advantage of using negative feedback in an amplifier? (a) Reduces input impedance (b) Increases distortion (c) Improves gain stability and reduces noise (d) Decreases bandwidth	1	K1	CO3
6.	Which of the following is a necessary condition for oscillation in a feedback circuit? (a) Feedback factor must be zero (b) The loop gain must be less than one (c) The total phase shift around the loop must be 180° (d) Loop gain must be unity and total phase shift must be 0° or 360°	1	K1	CO3
7.	Which of the following is a key characteristic of an ideal operational amplifier (op-amp)? (a) Infinite output impedance (b) Infinite bandwidth and infinite open-loop gain (c) High input current (d) Low common-mode rejection ratio	1	K1	CO4
8.	The purpose of a sample and hold (S/H) circuit using an op-amp is to: (a) Differentiate the input signal (b) Filter high-frequency noise (c) Maintain a constant output voltage during sampling intervals (d) Generate square waves	1	K1	CO4
9.	Which IC is commonly used for generating sine, square, and triangular waveforms over a wide frequency range? (a) IC741 (b) IC555 (c) IC8038 (d) LM317	1	K1	CO5
10.	In astable mode, the 555 timer generates: (a) A single pulse (b) A continuous square wave (c) A sine wave (d) A ramp signal	1	K2	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	What is the purpose of biasing in BJT amplifiers?	*2*	*K1*	*CO1*
12.	What is the function of the base region in a BJT transistor?	*2*	*K1*	*CO1*
13.	What is the significance of diffusion and transition capacitance in a PN junction diode?	*2*	*K2*	*CO1*
14.	What is meant by crossover distortion in Class B power amplifiers?	*2*	*K1*	*CO2*
15.	State the basic difference between JFET and MOSFET.	*2*	*K2*	*CO2*
16.	What is the role of source resistance in a common drain (CD) amplifier?	*2*	*K1*	*CO2*
17.	State the basic principle behind the working of a Wien Bridge Oscillator.	*2*	*K1*	*CO3*
18.	Differentiate between voltage-series and current-shunt feedback topologies.	*2*	*K2*	*CO3*
19.	List the applications of instrumentation amplifier.	*2*	*K1*	*CO4*
20.	What is the need for clipper and clamper circuits?	*2*	*K2*	*CO4*
21.	Differentiate between astable and monostable mode of operation.	*2*	*K2*	*CO5*
22.	List few applications of LM317.	*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Draw the structure of a PN junction diode and explain its V-I characteristics under forward and reverse bias conditions.	*11*	*K2*	*CO1*
		OR			
	b)	Discuss the different types of biasing techniques used in BJT amplifiers. Explain the need for stabilization and thermal runaway prevention.	*11*	*K2*	*CO1*
24.	a)	With a neat diagram explain the construction and working of JFET and MOSFET.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the operation and characteristics of a Class B push-pull amplifier. How can a crossover distortion be minimized.	*11*	*K2*	*CO2*
25.	a)	With neat circuit diagram explain the construction and working principle of a phase shift oscillator.	*11*	*K2*	*CO3*
		OR			
	b)	Explain the different types of feedback configurations with suitable diagrams. State the advantages of negative feedback in amplifiers.	*11*	*K2*	*CO3*
26.	a)	Explain the function of op-amp based clipper and clamper circuits. Use diagrams to show how input waveforms are modified by these circuits.	*11*	*K2*	*CO4*
		OR			
	b)	Explain the working of an instrumentation amplifier using op-amps. List its advantages and applications in measurement systems.	*11*	*K2*	*CO4*
27.	a)	Draw and explain the functional block diagram of a 555 timer IC. Describe how it operates in astable mode with a suitable timing diagram and waveform.	*11*	*K2*	*CO5*
		OR			
	b)	Explain the function and operation of the IC8038 function generator. Illustrate the waveform outputs and the internal block diagram to support your explanation.	*11*	*K2*	*CO5*
28.	a) i)	Explain the working principle of op-amp based monostable multivibrator.	*6*	*K2*	*CO4*
	ii)	Describe the internal block diagram and working of the LM317 adjustable voltage regulator.	*5*	*K2*	*CO5*

OR

b)	i)	Explain the operation of an op-amp based differentiator circuit.	*6*	*K2* *CO4*
	ii)	Explain the operation of the IC723 voltage regulator.	*5*	*K2* *CO5*