Reg. No.																

Question Paper Code	14700

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

Third Semester

Electronics and Instrumentation Engineering

20EIPC303 - ANALOG ELECTRONIC CIRCUITS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

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

		Marks	K – Level	CO
1.	In a Zener diode, breakdown occurs due to a) Avalanche effect only b) Forward biasing c) High reverse voltage d) Low current operation	1	K1	CO1
2.	Identify the primary function of coupling capacitors in BJT amplifiers. a) Increase gain b) Block DC and pass AC c) Reduce distortion d) Increase bandwidth	1	K1	CO1
3.	Determine the amplifier class commonly used in push-pull amplifiers. a) Class A b) Class B c) Class C d) Class D	1	K1	CO1
4.	Analyze the effect of varying gate voltage on the drain current in a JFET. a) Drain current remains constant b) Drain current changes c) Source current becomes zero d) Gate current increases largely	1	K1	CO2
5.	Compare power amplifiers and voltage amplifiers based on their output characteristics. a) Power amplifiers deliver high power to load b) Both have same operation c) Power amplifiers have low output power d) Voltage amplifiers deliver maximum current only	1	K1	CO2
6.	What is the advantage of MOSFET over JFET. a) High gate current b) Low input impedance c) Very high input impedance d) Low switching speed	1	K1	CO2
7.	If the gain of a non-inverting amplifier is 11 and the input voltage is 0.3 V, what is the output voltage? a) 0.33 V b) 3.3 V c) 33 V d) 1.1 V	1	K2	CO3
8.	An op-amp with open-loop gain A_{OL}=100,000 and used in a closed-loop configuration with feedback factor β=0.01, what is the closed-loop gain? a) 10 b) 50 c) 90.9 d) 100	1	K2	CO3
9.	Analyze the effect of negative feedback on the bandwidth of an amplifier. a) Bandwidth decreases b) Bandwidth increases c) Gain becomes infinite d) Output becomes unstable	1	K1	CO3
10.	Identify the application most suitable for instrumentation amplifiers. a) Audio amplification b) Precision measurement systems c) Power conversion d) Oscillation generation	1	K1	CO4

11.	Evaluate the role of clipper circuits in waveform shaping applications. a) Increase frequency b) Limit signal amplitude c) Amplify power d) Convert analog to digital	*1*	*K1*	*CO4*
12.	Determine the effect of increasing the feedback resistance in an inverting amplifier. a) Gain decreases b) Gain increases c) Output becomes zero d) Input impedance becomes zero	*1*	*K2*	*CO4*
13.	Identify the additional components used in the current limiting circuit of IC723. a) a transistor and a resistor b) two transistors c) a transistor and potential divider d) transistor or a resistor	*1*	*K2*	*CO5*
14.	The effect of heat dissipation in voltage regulator is used to a) Improve instability b) Reduce reliability c) Maintains safe operation d) Eliminates regulation	*1*	*K1*	*CO5*
15.	Determine the reason for using filters in regulated power supplies. a) Increase ripple voltage b) Reduce efficiency c) Increase noise d) Remove AC ripples	*1*	*K2*	*CO5*
16.	The maximum current obtained from IC723 is a) 150mA b) 1A c) 1.5A d) 4.5mA	*1*	*K2*	*CO5*

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

17.	Infer diffusion current in PN junction diode.	*3*	*K2*	*CO1*
18.	Identify the applications and limitations of UJT.	*3*	*K3*	*CO1*
19.	Interpret cross over distortion. How can it be eliminated.	*3*	*K2*	*CO2*
20.	The CMRR of an amplifier given as 20 dB infer the common mode gain, if the differential gain is 100.	*3*	*K3*	*CO2*
21.	A Wein bridge oscillator is used for operating at 20KHz frequency. Consider the value of resistor is 100Ω. Solve for the value of capacitor.	*3*	*K3*	*CO3*
22.	Infer the limitations of Ideal differentiator.	*3*	*K2*	*CO4*
23.	Identify the characteristics of op amp IC741 and draw its equivalent circuit.	*3*	*K3*	*CO4*
24.	Identify the advantages and limitations of switching regulator.	*3*	*K3*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a)	Develop the current equation of a PN junction diode and give few applications.	*12*	*K3*	*CO1*
		OR			
	b)	Illustrate the operation and V-I characteristics of Zener diode with suitable diagrams.	*12*	*K3*	*CO1*
26.	a)	Identify the conversion efficiency of class B push pull power amplifier and the relationship between its maximum output power and power dissipation.	*12*	*K3*	*CO2*
		OR			
	b)	Construct Class B push pull amplifier and derive the expression for efficiency of the same.	*12*	*K3*	*CO2*

27.	a)	Build a Colpitts oscillator with C1 is 150pf and C2 is 250pf. The inductance assumed to be variable. Determine the range of inductance values, if the frequency of oscillation is to be varied between 900 KHz and 2000 KHz.	*12*	*K3*	*CO3*
		OR			
	b)	Solve for the frequency of oscillations of a RC phase shift oscillator which has R of 12 $k\Omega$, C of 0.01 μF and RC of 3.3 $k\Omega$. Find the minimum current gain needed for this purpose.	*12*	*K3*	*CO3*
28.	a)	Construct an Instrumentation amplifier with gain 6 by deriving the expression for gain.	*12*	*K4*	*CO4*
		OR			
	b)	Build the inverting and non-inverting amplifier circuits of an op-amp in closed loop configuration. Obtain the expression for the closed loop gain in these circuits.	*12*	*K3*	*CO4*
29.	a)	Illustrate the astable mode of operation of IC 555 timer. A 555 timer is configured in astable mode with R_a = 4KΩ, R_b = 8KΩ and c = 0.1μF.Determine the frequency of output waveform.	*12*	*K3*	*CO5*
		OR			
	b)	Develop an adjustable voltage regulator circuit using LM317 for the following specification where input d.c. voltage is 13V, output voltage of 5 V to 9V and maximum load current 1A.	*12*	*K3*	*CO5*