Reg. No.																

Question Paper Code	14089

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Third Semester

Electronics and Communication Engineering

24ECPC304 - ELECTRONIC CIRCUITS

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Compare fixed bias and voltage divider bias in terms of stability. (a) Voltage divider more stable (b) Fixed bias more stable (c) Both equally stable (d) Neither stable	1	K1	CO1
2.	T he purpose of bias stabilization is to ____ (a) Compensate for β & temperature changes (b) Increase gain (c) Decrease noise (d) Improve frequency response	1	K1	CO1
3.	The voltage gain characteristics of — amplifier has nearly unity gain. (a) CE (b) CB (c) CC (d) Cascade	1	K1	CO2
4.	In a common-source FET amplifier, the output is _____ with respect to the input. (a) In phase (b) 180° out of phase (c) Attenuated (d) Same	1	K1	CO2
5.	In voltage-shunt feedback, the input and output impedances respectively are ____. (a) Low and low (b) High and high (c) Low and high (d) High and low	1	K1	CO3
6.	The main advantage of negative feedback in amplifiers is _____. (a) Improved stability (b) Higher distortion (c) Reduced bandwidth (d) Increased gain	1	K1	CO3
7.	According to the Barkhausen criterion, for sustained oscillations (a) $\|A\beta\|=1$ and phase shift = 0° or 360° (b) $\|A\beta\|<1$ (c) $\|A\beta\|>1$ (d) Phase shift = 180°	1	K1	CO4
8.	The crystal oscillator provides ____. (a) High frequency stability (b) Variable frequency (c) Low efficiency (d) Low Q-factor	1	K1	CO4
9.	Neutralization in tuned amplifiers is used to ____. (a) Avoid unwanted oscillations (b) Improve Q-factor c) Increase coupling (d) Reduce bandwidth	1	K1	CO5
10.	A Class AB amplifier conducts for _____ (a) More than 180° but less than 360° (b) Exactly 180° (c) 90° (d) 360°	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

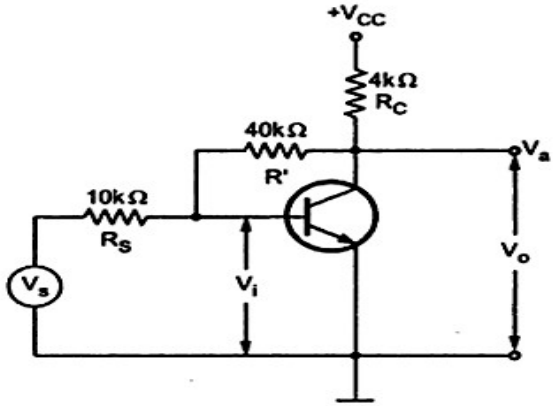
		Marks	K – Level	CO
11.	Justify why the operating point selected at the center of the active region.	2	K2	CO1
12.	Calculate I_B and I_C current for the given specification h_{fe}=80, V_{BE}=0.7V, R_C=5KΩ, Vcc=5V.	2	K2	CO1
13.	Draw the circuit for CS FET amplifier configuration using small signal model.	2	K1	CO2
14.	Find the CMRR of differential amplifier with differential gain 300 and common mode gain of 0.2.	2	K2	CO2
15.	Apply the feedback gain formula to find the overall gain when open-loop gain A=100 and feedback factor β=0.01.	2	K3	CO3
16.	Identify the feedback type when output voltage is sampled and fed in series with the input.	2	K3	CO3
17.	Apply the oscillation frequency formula for a Hartley oscillator to find frequency when L_1=2mH , L_2=20mH and C=2.98pF.	2	K3	CO4
18.	List the applications of the RC phase shift oscillator.	2	K2	CO4
19.	Why is a stagger tuned amplifier used instead of a single tuned amplifier?	2	K1	CO5

20.	Summarize the importance of neutralization in maintaining amplifier stability.		2	K2	CO5
21.	What is crossover distortion in a Class B amplifier?		2	K1	CO6
22.	Why is heat sink required in power amplifiers?		2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Construct a Fixed bias circuit using BJT and derive the stability factors S, S' and S''.	11	K3	CO1
		OR			
	b)	Calculate R_E, $V_{CE}$and stability factor(S) for the voltage divider bias circuit with, I_c=2mA, β =50, V_{CC} = 12 V, R_1=50 KΩ, R_2=5 KΩ, Rc=2 KΩ.	11	K3	CO1
24.	a)	Analyse of CE amplifier circuit using its small signal h-parameter model and calculate the voltage gain, current gain, input and output impedance.	11	K4	CO2
		OR			
	b)	Analyse the transfer characteristics of differential amplifier and derive the expression for A_d, A_{CM} and CMRR.	11	K4	CO2
25.	a)	Derive the expression for the gain of an amplifier with negative feedback and summarise the effect of feedback on gain, bandwidth, distortion, and stability.	11	K3	CO3
		OR			
	b)	For the amplifier circuit shown below, hfe=50, hre=hoe=0, hie=1.1KΩ. (i) Identify the topology. (ii) Obtain the basic amplifier circuit. (iii) Calculate the voltage gain, input resistance and output resistance.	11	K3	CO3



26.	a)	Construct and explain the operation of a wien bridge oscillator. Derive the frequency of oscillation and explain how amplitude stability is maintained.	11	K3	CO4
		OR			
	b)	Construct a Hartley oscillator circuit and explain its working with necessary equations. Also derive the frequency of oscillation and condition for oscillation.	11	K3	CO4
27.	a)	Examine the performance of capacitor-coupled single tuned amplifier using a BJT. Derive the expression for voltage gain and bandwidth and explain how tuning affects the selectivity of the amplifier.	11	K4	CO5
		OR			
	b)	Analyze how a stagger tuned amplifier is used to improve bandwidth. Explain its principle of operation and how stagger tuning overcomes the limitations of single tuned amplifiers in terms of bandwidth and flatness of response.	11	K4	CO5

28. a) Construct and describe the working of a complementary symmetry push-pull amplifier. Explain how it eliminates the need for a center-tapped transformer and discuss its advantages and limitations compared to a conventional push-pull amplifier. *11 K3 CO6*

OR

b) Identify the importance of impedance matching in power amplifiers. Summarise the methods of achieving impedance matching using transformers and coupling networks, with suitable circuit examples. *11 K3 CO6*