PVP 23

Code: 23EC3402

II B.Tech - II Semester – Regular Examinations - MAY 2025

ELECTRONIC CIRCUIT ANALYSIS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

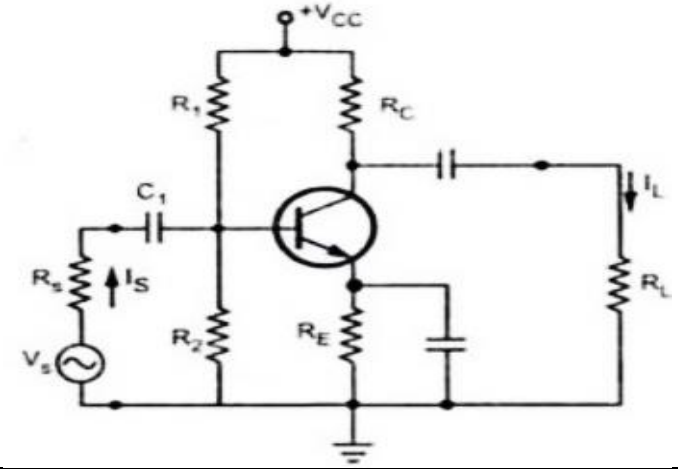
Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

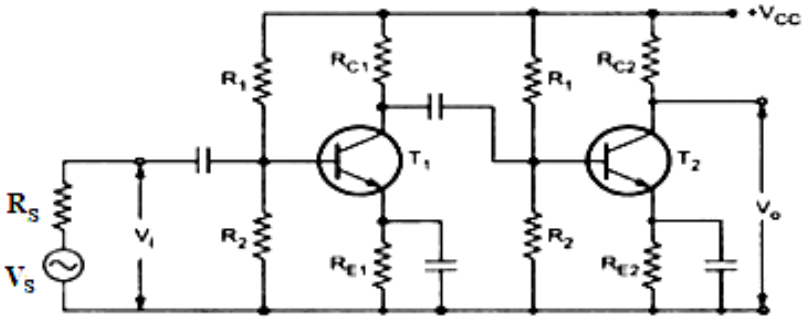
BL – Blooms Level CO – Course Outcome

PART – A

		BL	CO
1.a)	Express h_f, h_r, h_i and h_o in terms of CE Two port network.	L2	CO1
1.b)	Describe Source Resistance in CS amplifier also called as "Source degeneration" resistance.	L2	CO1
1.c)	Discuss the methods of coupling in multi stage amplifiers.	L2	CO1
1.d)	What are the classifications of multistage amplifiers? Explain the purpose of multistage amplifiers.	L2	CO1
1.e)	'Negative feedback stabilizes the gain'-justify the statement.	L2	CO1
1.f)	A feedback amplifier has an open loop gain of 600 and feedback factor $\beta = 0.01$ Express the closed loop gain with negative feedback.	L2	CO1
1.g)	Explain the conditions for Barkhausen criterion.	L2	CO1
1.h)	Describe why LC oscillators are preferred over RC oscillators at radio frequencies?	L2	CO1
1.i)	Explain the applications of power amplifiers?	L2	CO1
1.j)	Summarize the classification of power amplifiers.	L2	CO1

PART – B

			BL	CO	Max. Marks
		UNIT-I			
2	a)	Compare the CE, CB and CC transistor amplifier parameters.	L2	CO1	5 M
	b)	Consider a single stage CE amplifier with R_s = 1kΩ, R_1 = 50kΩ, R_2 = 2kΩ, R_c = 1kΩ, R_L = 1.2kΩ, h_{fe}=50, h_{ie}=1.1kΩ, h_{oe} = 25μA/V and h_{re} = 2.5 x 10^{-4}, as shown in Fig. Calculate A_i, R_i, A_v, A_{vs}, A_{is} and R_0. 	L3	CO2	5 M
		OR			
3	a)	Determine the CE short circuit current Gain parameters.	L3	CO2	5 M
	b)	Derive an expression for voltage gain, input and output impedance of a common drain amplifier.	L3	CO2	5 M
		UNIT-II			
4	a)	The following figure shows CE-CE cascade amplifier with their biasing arrangements. Calculate R_i, A_i, A_v, R_i', A_{vs} and A_{is} if circuit parameters are: R_s=1 kΩ, R_{c1} = 15kΩ, R_{E1}= 100Ω, R_{C2} = 4 kΩ, R_{E2} = 330Ω with R_1 = 200K and R_2 = 20K for first stage and R_1 = 47K and R_2 = 4.7 kΩ for second stage. Assume that h_{ie} = 1.2kΩ, h_{fe} = 50, h_{re} = 2.5 x 10^{-4} and h_{oe} = 25 x 10^{-6} A/V.	L3	CO2	5 M

		 Fig. CE-CE Cascade amplifier			
	b)	Illustrate how the input impedance is increased by Bootstrap Emitter Follower with neat diagram.	L3	CO2	5 M
OR					
5	a)	An amplifier consists of 3 identical stages in cascade, the bandwidth of overall amplifier extends from 20 Hz to 20 kHz. Calculate the bandwidth of the individual stage.	L3	CO2	5 M
	b)	With diagram, derive the expression for current gain and input resistance of Darlington amplifier.	L3	CO3	5 M
UNIT-III					
6	a)	A voltage series negative feedback amplifier has a voltage gain without feedback of A = 500, input resistance R_i = 3kΩ, output resistance R_0 = 20kΩ and feedback ratio β = 0.01. Calculate the voltage gain A_f, input resistance R_{if}, and output resistance R_{of} of the amplifier with feedback.	L3	CO2	5 M
	b)	Articulate current series and current shunt feedback configurations.	L3	CO2	5 M
OR					
7	a)	An amplifier has an open loop gain of 1000 and a feedback ratio of 0.04. If the open loop gain changes by 10% due to temperature, solve the percentage change in gain of the amplifier with feedback.	L3	CO2	5 M
	b)	Illustrate different types of feedback amplifiers? Give their equivalent circuits.	L3	CO2	5 M

UNIT-IV					
8	a)	Draw the circuit diagram and explain the working of Hartley oscillator. Also derive the expression for frequency of oscillation and condition for sustained oscillations.	L4	CO4	5 M
	b)	Explain the concept of stability of Oscillators.	L4	CO4	5 M
OR					
9	a)	In a Colpitts oscillator, $C_1 = C_2 = C$ and L = 100 μH. The frequency of oscillation is 500 kHz. Calculate C.	L3	CO4	5 M
	b)	Illustrate working principle of Wein bridge oscillator.	L3	CO4	5 M
UNIT-V					
10	a)	Illustrate with diagram, Transformer coupled Class A Power Amplifier and derive its maximum efficiency.	L3	CO3	5 M
	b)	Illustrate Complementary Symmetry Class B Power Amplifier with diagram and write about crossover distortion in class B power amplifiers.	L3	CO3	5 M
OR					
11	a)	A class B push pull amplifier supplies power to a resistive load of 12Ω. The output transformer has a turns ratio of 3:1 and efficiency of 78.5%. Calculate (i) Maximum power output, (ii) Maximum power dissipation in each transistor and (iii) Maximum base and collector current. For each transistor, assume $h_{fe} = 25$ and $V_{CC} = 20V$.	L3	CO3	5 M
	b)	Derive the general expression for the output power in the case of a class A power amplifier. Draw the circuit and explain the movement of operating point on the load line for a given input signal.	L3	CO3	5 M