CODE No.: 19BT40402 SVEC-19

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

II B.Tech II Semester (SVEC-19) Regular Examinations August – 2021

ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

[Electronics and Communication Engineering, Electronics and Instrumentation Engineering]

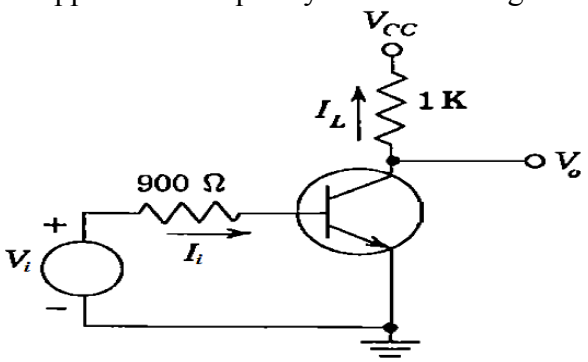
Time: 3 hours **Max. Marks: 60**

Answer One Question from each Unit
All questions carry equal marks

UNIT-I

1.	a)	Derive an expression for lower cut-off frequency of the BJT amplifier due to the effect of input coupling capacitor.	6 Marks	L4	CO1	PO1
	b)	"To achieve larger input impedances and current amplification factor Darlington pair is used". Discuss on the above statement by giving suitable expressions with your analytical skills on multistage amplifiers.	6 Marks	L3	CO1	PO2
		(OR)				
2.	a)	Develop an expression for voltage gain, input and output impedances of common source MOSFET amplifier.	6 Marks	L4	CO1	PO3
	b)	Describe the small signal model of MOSFET at low-frequency.	6 Marks	L2	CO1	PO1

UNIT-II

3.	a)	The hybrid-π parameters of the transistor used in the circuit shown are given at room temperature: $\mathbf{g_m}$ = 50mA/V, $\mathbf{r_{bb'}}$ = 100Ω, $r_{b'e}$ = 1KΩ, $\mathbf{r_{b'c}}$ = 4MΩ , $\mathbf{r_{ce}}$= 80KΩ, C_c = 3pF , C_e = 100pF. Using Miller's theorem and approximate analysis, compute the upper 3-dB frequency of the current gain $A_I = I_L/I_i$. 	6 Marks	L3	CO2	PO2
	b)	Derive the expression for voltage gain of an emitter follower circuit at high frequencies.	6 Marks	L4	CO2	PO2
		(OR)				
4.	a)	Derive the expression for Hybrid-π conductance of common emitter transistor.	6 Marks	L4	CO2	PO2
	b)	Derive the expression for CE Short Circuit Current Gain A_i as a function of frequency. Draw the frequency Response Curve.	6 Marks	L4	CO2	PO2

UNIT-III

5.	a)	Elucidate the concept of negative feedback with neat block diagram and give the outlines of each block.	6 Marks	L2	CO3	PO1
	b)	The open loop gain of an amplifier is A = 5 x 10^4. If the open loop gain decreases by 10%, the closed loop gain must not be change by more than 0.1%. Determine the required value of the feedback transfer function (β) and the closed loop gain (A_f).	6 Marks	L3	CO3	PO2

(OR)

6.	a)	Derive the expressions for input and output impedance of current-series feedback amplifier.	6 Marks	L4	CO3	PO2
	b)	A voltage-series feedback amplifier employs a basic amplifier with input and output resistances each of 2kΩ and gain A = 1000 V/V. The feedback factor β = 0.1 V/V. Find the gain A_f, the input resistance R_{if}, and the output resistance R_{of} of the closed loop amplifier.	6 Marks	L3	CO3	PO2

UNIT-IV

7.	a)	Derive the expression for frequency of oscillation of Wien bridge oscillator using BJT.	6 Marks	L3	CO3	PO2
	b)	Derive the expression for frequency of oscillations of Hartley oscillator.	6 Marks	L3	CO3	PO2

(OR)

8.	a)	State and explain Barkhausen criterion to be satisfied to get the sustained oscillations.	6 Marks	L2	CO3	PO1
	b)	Derive the expression for frequency of oscillations and gain condition for RC phase shift oscillator using BJT.	6 Marks	L4	CO3	PO2

UNIT-V

9.	a)	A power transistor operating in class A transformer coupled amplifier is to deliver a maximum of 5W to a 4Ω load (i.e. R_L = 4Ω). The quiescent point is adjusted for symmetrical clipping, and the collector supply voltage is V_{CC} = 20V. Assume ideal characteristics with V_{min} = 0. Determine: i) Transformer turns ratio. ii) Peak collector current. iii) Quiescent operating point. iv) Collector-circuit efficiency.	6 Marks	L3	CO4	PO2
	b)	Explain the origin of crossover distortion. Describe the method to minimize this distortion.	6 Marks	L2	CO4	PO1

(OR)

10.	a)	Derive an expression for bandwidth of a single stage tuned amplifier.	6 Marks	L3	CO4	PO2
	b)	Write short notes on: i) Class S Power amplifier. ii) Heat sinks.	6 Marks	L1	CO4	PO1