

Day and Date: Wednesday ,15/06/2022

Time: 9.3 to 1.15

Max. Marks- 100

Instructions:

- i. Question No. 1 is compulsory.
- ii. Figure to the right indicate full marks.
- iii. Give suitable general Instructions
- iv. Any other Course Specific Instructions.
- v. No questions should repeat from MSE/ISE

BT	CO's	Q. No.		Marks
		Q.1	Attempt the following	40
		a	i) For two port network derive four H parameters. ii) Compare RC coupled, Direct coupled and transformer coupled multistage amplifiers	4 6
		b	i) Explain BJT amplifiers classification in detail ii) Design a two stage RC coupled amplifier to meet the following specifications: Load resistance= 2 K ohm, Source resistance = 600 Ohm, frequency range = 20 Hz to 20 KHz, Voltage gain per stage > 60, supply voltage = 15 V, Calculate the overall voltage gain.	3 7
		c	i) Design CE amplifier using BC 547, $V_{CE} = 8V$, $V_{RE} = 1.5 V$, $I_C = 1 mA$ & $R_L = 1000 Ohm$ ii) Derive the R_i , R_o , A_v , A_i for amplifier using H-Parameters	5 5
		d	i) For square wave input draw and explain the output of high pass filter for i) $RC \ll T$ & ii) $RC \gg T$ ii) A CE amplifier uses $R_L = 200 Ohm$, the H-Parameters are $h_{ie} = 1.1 K Ohm$, $h_{re} = 2.5 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 22 \mu A/V$. Calculate: a) current gain, b) voltage gain & c) Input resistance	5 5
		Q.2	Attempt (any one options are allowed for sub questions)	20
		a	What is negative feedback? Explain the effect of negative feedback on various characteristics of amplifier	6
			OR	

	a	An amplifier has gain of 300. When negative feedback is applied gain is reduced to 240. Find the value of feedback factor	6
	b	Draw a neat circuit diagram of emitter follower. Derive an expression for current gain, input resistance & voltage gain	7
	c	The current series feedback amplifier has the following parameters, $R_1 = 20 \text{ K ohm}$, $R_2 = 20 \text{ K ohm}$, $h_{ie} = 2 \text{ K ohm}$, $R_L = 1 \text{ K Ohm}$, $R_E = 100 \text{ Ohm}$ and $h_{fe} = 80$ Calculate A_v , β , R_{if} , & A_{vf}	7
Q.3 Attempt (any four questions)			
	a	With the help of neat sketch explain operation of Class B push pull power amplifier	5
	b	Prove that if the total harmonic distortion is 10 % then the power delivered to the load increases by 1%	5
	c	A class B push pull power amplifier supplies power to a resistive load of 12 Ohm. The output transformer has a turns ratio of 3:1 & efficiency of 78.5 % Determine : i) Maximum power output, ii) Maximum power dissipation in each transistor	5
	d	Derive the efficiency for transformer coupled Class A power amplifier	5
	e	Compare Class A, B, AB and C with respect to angle of conduction, efficiency, position of operating point, distortion & applications	5
Q.4 Attempt (any one options are allowed for sub questions of a, b, c.....)			
	a	Explain ideal MOSFET current voltage characteristics	4
	b	Analyze the common source amplifier	4
OR			
	b	Explain DC biasing of MOSFET in detail	4
	c	An common source MOSFET amplifier is to be constructed using a n-channel e MOSFET which has a conduction parameter of 50mA/V^2 and a threshold voltage of 2.0 volts. If the supply voltage is +15 volts and the load resistor is 470 Ohms, calculate the values of the resistors required to bias the MOSFET amplifier at $1/3(V_{DD})$. Draw the circuit diagram. Values given: $V_{DD} = +15\text{v}$, $V_{TH} = +2.0\text{v}$, $k = 50\text{mA/V}^2$ and $R_D = 470\Omega$.	6
	d	Compare Common source, common gate and source follower amplifiers	6
