

**Day and Date: Wednesday ,15/06/2022**

**Time: 9.3 to 1.15**

**Max. Marks- 100**

**Instructions:**

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

BT	CO's	Q. No.		Marks
		<b>Q.1</b>	<b>Attempt the following</b>	<b>40</b>
		<b>a</b>	i) For two port network derive four H parameters. ii) Compare RC coupled, Direct coupled and transformer coupled multistage amplifiers	<b>4</b>  <b>6</b>
		<b>b</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.	<b>3</b>  <b>7</b>
		<b>c</b>	i) Design CE amplifier using BC 547, $V_{CE} = 8V$ , $V_{RE} = 1.5 V$ , $I_C = 1 \text{ mA}$ & $R_L = 1000 \text{ Ohm}$ ii) Derive the $R_i$ , $R_o$ , $A_v$ , $A_i$ for amplifier using H-Parameters	<b>5</b>  <b>5</b>
		<b>d</b>	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 $R_L = 200 \text{ Ohm}$ , the H-Parameters are $h_{ie} = 1.1 \text{ K Ohm}$ , $h_{re} = 2.5 \times 10^{-4}$ , $h_{fe} = 50$ and $h_{oe} = 22 \mu A/V$ . Calculate: a) current gain, b) voltage gain & c) Input resistance	<b>5</b>  <b>5</b>
		<b>Q.2</b>	<b>Attempt (any one options are allowed for sub questions)</b>	<b>20</b>
		<b>a</b>	What is negative feedback? Explain the effect of negative feedback on various characteristics of amplifier	<b>6</b>
			<b>OR</b>	

		<b>a</b>	An amplifier has gain of 300. When negative feedback is applied gain is reduced to 240. Find the value of feedback factor	<b>6</b>
		<b>b</b>	Draw a neat circuit diagram of emitter follower. Derive an expression for current gain, input resistance & voltage gain	<b>7</b>
		<b>c</b>	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 $A_v$ , $\beta$ , $R_{if}$ , & $A_{vf}$	<b>7</b>
		<b>Q.3</b>	<b>Attempt (any four questions)</b>	<b>20</b>
		<b>a</b>	With the help of neat sketch explain operation of Class B push pull power amplifier	<b>5</b>
		<b>b</b>	Prove that if the total harmonic distortion is 10 % then the power delivered to the load increases by 1%	<b>5</b>
		<b>c</b>	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	<b>5</b>
		<b>d</b>	Derive the efficiency for transformer coupled Class A power amplifier	<b>5</b>
		<b>e</b>	Compare Class A, B, AB and C with respect to angle of conduction, efficiency, position of operating point, distortion & applications	<b>5</b>
		<b>Q.4</b>	<b>Attempt (any one options are allowed for sub questions of a, b, c.....)</b>	<b>20</b>
		<b>a</b>	Explain ideal MOSFET current voltage characteristics	<b>4</b>
		<b>b</b>	Analyze the common source amplifier	<b>4</b>
			<b>OR</b>	
		<b>b</b>	Explain DC biasing of MOSFET in detail	<b>4</b>
		<b>c</b>	An common source MOSFET amplifier is to be constructed using a n-channel e MOSFET which has a conduction parameter of $50\text{mA/V}^2$ 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 $R_D = 470\Omega$ .	<b>6</b>
		<b>d</b>	Compare Common source, common gate and source follower amplifiers	<b>6</b>

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