

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

CLASS: B.TECH
BRANCH: ECE

SEMESTER: IV
SESSION: SP/2020

SUBJECT: EC253 ANALOG CIRCUITS

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q1	(a) Draw schematics of common-collector (CC) amplifier configuration.	[2]	1	1
Q1	(b) Compare its voltage gain (A_v), input resistance (R_i) and output resistance (R_o) with those of common-emitter (CE) configuration.	[3]	1	5
Q2	(a) Briefly explain why emitter follower is called a buffer stage?	[2]	1	2, 3, 4
Q2	(b) If $R_L = 10 \text{ k}\Omega$ and $R_S = 1 \text{ k}\Omega$, estimate A_i , R_i , A_v , R_o of the emitter follower. The h parameters for the configuration are given as $h_{ic} = 1100 \Omega$, $h_{rc} \sim 1$, $h_{fc} = -51$, $h_{oc} = 25 \mu\text{A/V}$.	[3]	1	2, 4, 5
Q3	(a) Draw circuit diagram of a BJT-based RC coupled two-stage amplifier.	[2]	2	1
Q3	(b) Draw low-frequency model of an RC-coupled two-stage BJT-based amplifier and briefly explain its each element referring to the circuit of an RC-coupled two-stage BJT-based amplifier.	[3]	2	1, 2, 3, 4
Q4	(a) Draw the high-frequency <i>hybrid-π</i> , or <i>Giacoletto</i> , model for a transistor in the CE configuration.	[2]	2	1
Q4	(b) Briefly explain each circuit component in the high-frequency <i>hybrid-π</i> , or <i>Giacoletto</i> , model for a transistor in the CE configuration.	[3]	2	2, 3, 4
Q5	(a) Classify amplifiers into categories based on the magnitudes of the input and output impedances of an amplifier relative to the source and load impedances.	[2]	3	2, 4
Q5	(b) Explain the characteristics of voltage amplifier with the help of Thevenin's equivalent circuit.	[3]	3	2, 3, 4

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