BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MIDSEM EXAMINATION)

CLASS: BTECH/IMSc
BRANCH: BT/CHEMICAL/CIVIL/MECH/PIE/FT/PHYSICS

SEMESTER: II
SESSION: SP/2024

SUBJECT: EC101 BASICS OF ELECTRONICS AND COMMUNICATION ENGINEERING

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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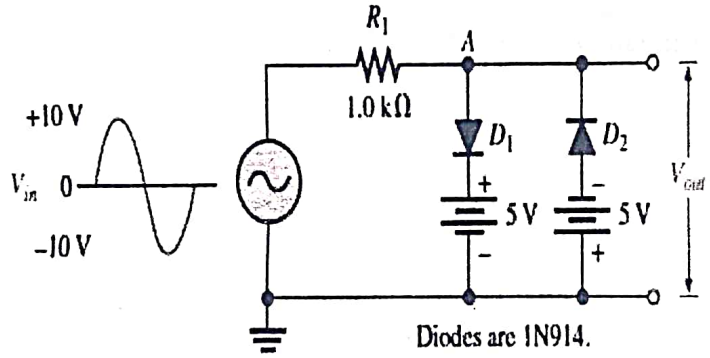
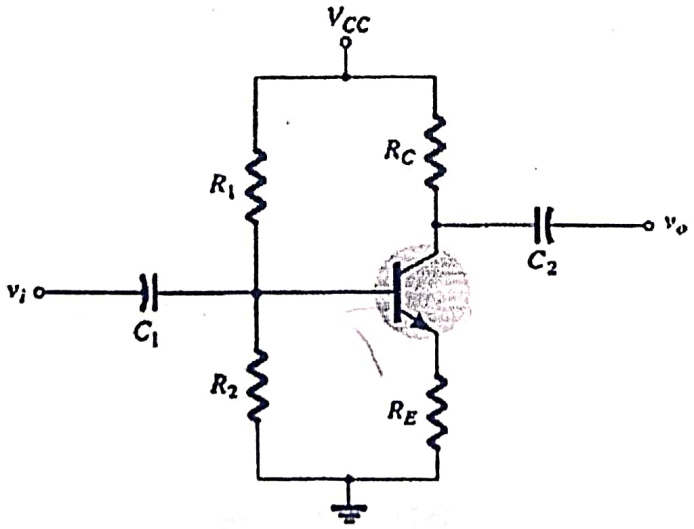
			CO	BL
Q1(a)	Given a diode current of 6 mA, $V_T = 26\,\text{mV}$, $\eta = 1$, and reverse saturation current $I_s = 1$ nA, find the applied voltage V_D.	2	1	2
Q1(b)	Explain the working of Centre-tap full wave rectifier circuit and derive its efficiency.	3	1	3
Q2(a)	Differentiate the Zener breakdown and avalanche breakdown. Draw the V-I characteristic of a Zener diode.	2	1	2
Q2(b)	Evaluate the output voltage of the following circuit. Assume D1 and D2 are Si and Ge diodes respectively.	3	1	3



Q3(a)	Establish the relation between α, β and γ.	2	2	3
Q3(b)	In the following Figure, determine the values of I_C, V_{CE} and V_E. The data given are, $R_1 = 62\,k\Omega,\ R_2 = 9.1\,k\Omega, R_c = 3.9\,k\Omega, R_E = 0.68\,k\Omega, V_{cc} = 16V,$ and $\beta = 100.$	3	2	3



PTO

Q4(a) Define pinch-off voltage for a JFET. 2 2 2

Q4(b) Explain the working of n-channel JFET. Draw the drain characteristics and transfer characteristics to support your answer. 3 2 2

Q5(a) Differentiate JFET and MOSFET. 2 2 2

Q5(b) Determine I_B, I_C and V_{CE}. Given: R_B=240k ohm, R_C=2.2k ohm, Vcc=12 V and beta=50. 3 2 3

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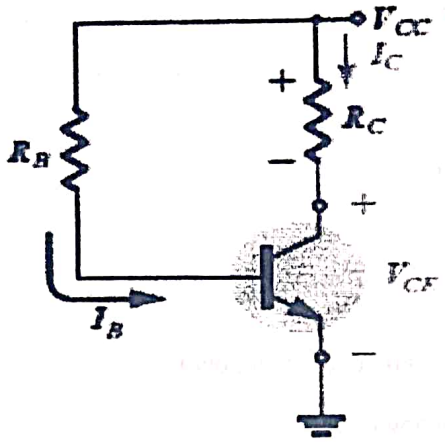

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