JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech.-III Semester (ECE/ECS/EE VLSI)

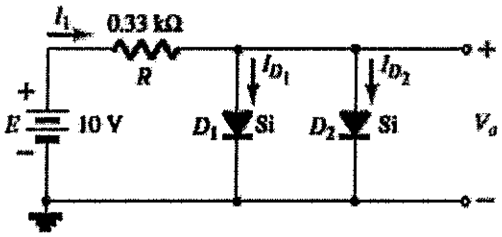
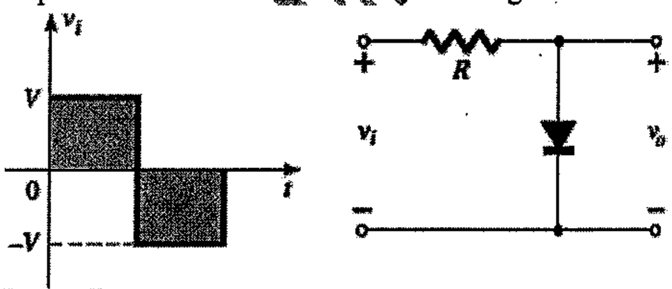
COURSE CODE (CREDITS): 25B11EC313 (04) MAX. MARKS: 25

COURSE NAME: Electronic Devices and Circuits

COURSE INSTRUCTORS: Dr. Shruti Jain MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	a) Determine V_O, I_1, I_{D1}, and I_{D2} for the parallel diode configuration of Fig. 1  Fig. 1 b) Draw output waveform for circuit shown in Fig 2.  Fig. 2	CO1	4 + 1
Q2	a) How does a transistor work as a switch? b) Differentiate between common base, common emitter, and common collector configurations. c) A transistor has β = 120 and base current = 20 μA. Calculate the collector current. d) Explain the cut-off, active, and saturation regions of transistor operation. Draw neat diagrams of input and output characteristics of CE, configurations, and mark the different regions of operation.	CO2	1 + 1 + 1 + 2
Q3	a) In a lab circuit, if the Q-point shifts into saturation and cutoff, what practical problem will you notice in the amplifier's output waveform?	CO3	1 + 2 + 2

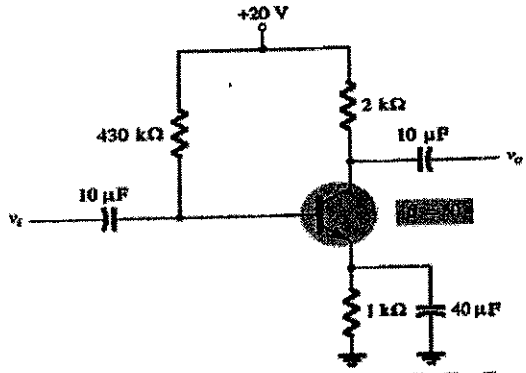
<table>
<tr><td></td><td>b) If the emitter current is 5 mA and $\alpha = 0.98$, calculate the base and collector currents
c) Explain h-model of common emitter transistor to Sita. Draw its equivalent diagram too.</td><td></td><td></td></tr>
<tr><td>Q4</td><td>a) For the emitter bias network shown in Fig 3, determine I_B, I_C, V_{CE}, V_C, V_E, V_B, V_{BC}.


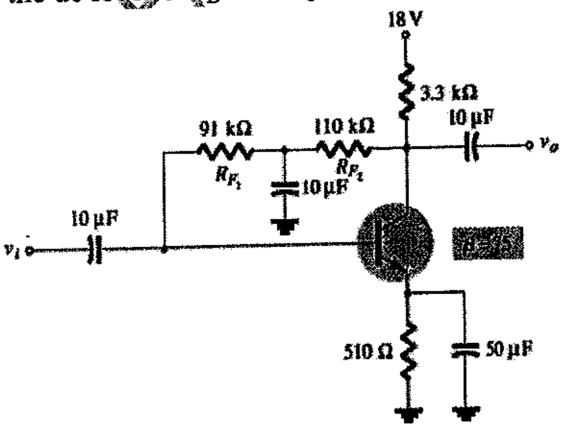
Fig. 3
b) Why is voltage divider bias preferred in real amplifier circuits even though fixed bias is simpler?
c) Ram designed a fixed-bias amplifier with $\beta = 100$, but the actual transistor has $\beta = 200$. What happens to the operating point?</td><td>CO2</td><td>3 + 1 + 1</td></tr>
<tr><td>Q5</td><td>a) Determine the dc level of V_B and V_C for the network of Fig. 4.


Fig. 4
b) If a transistor's β varies a lot between samples of the same model, which biasing scheme ensures consistent performance in real circuits?</td><td>CO2</td><td>4 + 1</td></tr>
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