JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 3 EXAMINATION 2025

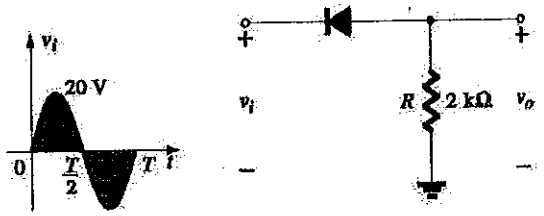
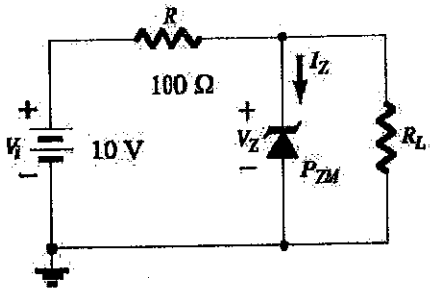
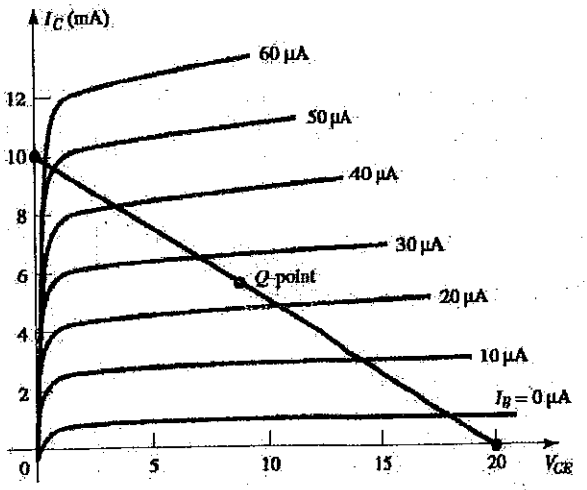
B.Tech-I Semester (CSE/CE/ECE/IT/MC)

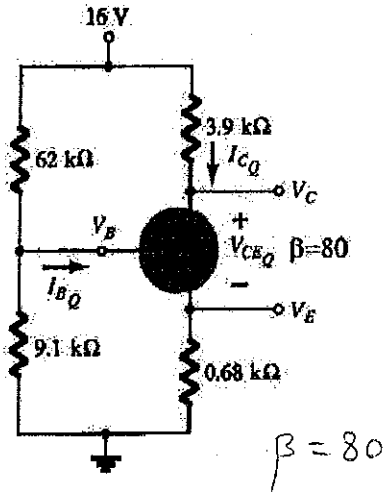
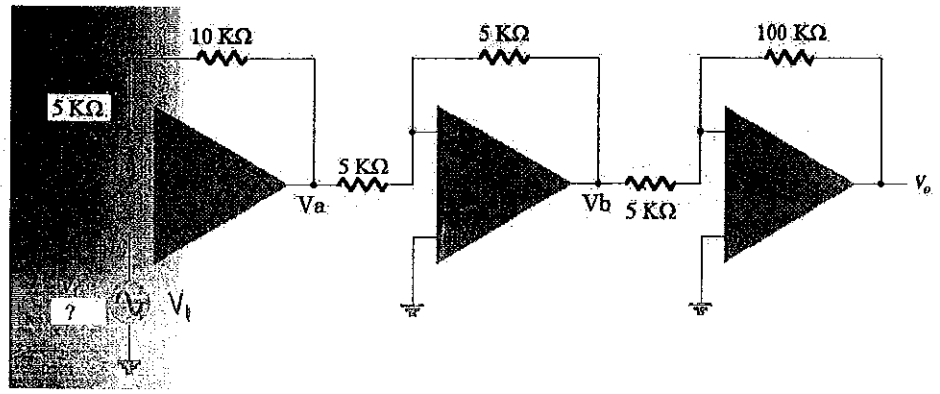
COURSE CODE(CREDITS): 25B11EC111(4) MAX. MARKS: 35

COURSE NAME: Basic Electronics

COURSE INSTRUCTORS: **RKU**, SHR, HSL, SWT, SRU, NTJ, ALK, PRG MAX. TIME: 2 Hours

Note: (a) All questions are compulsory. (b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems. (c) Scientific Calculator is allowed.

Q.No	Question	CO	Marks
Q.1	A. Draw the circuit diagrams of Half Wave Rectifier (HWR) and Center-tapped transformer Full Wave Rectifier (FWR). What are the advantages of FWR over HWR? B. Sketch the output v_o and determine the dc level of the output for the given circuit. 	CO-2	2+2
Q.2	A. What is a Zener diode and how does it differ from a normal PN junction diode? B. Find the minimum and maximum value of R_L given that $I_{Z_{max}} = 30$ mA if $V_Z = 5$ V. 	CO-2	2+2
Q.3	Given the load line and the defined Q - point, determine the required values of : V_{CC} , R_C, R_B and R_E for an emitter-bias configuration. 	CO-3	5

Q.No	Question	CO	Marks
Q.4	A. In the common base configuration, if the emitter current (I_E) of a transistor is 8 mA and base current (I_B) is 1/100 of collector current (I_C), determine the levels of collector and base current. B. In a Bipolar Junction Transistor (BJT), derive the following mathematical relationship $\beta = \alpha/(1-\alpha)$ by defining α and β.	CO-3	2+3
Q.5	For the voltage-divider bias configuration, determine: I_{B_Q}, I_{C_Q}, V_{CE_Q}, V_C, V_B and V_E. 	CO-4	5
Q.6	A. Sketch the transfer and drain characteristics of an n - channel depletion-type MOSFET with $I_{DSS} = 10$ mA and $V_P = -5$ V for a range of $V_{GS} = -V_P$ to $V_{GS} = 1$ V. B. What are the fundamental differences between BJTs and FETs? Analyze the working of properly biased n-channel JFET to provide its transfer and output characteristics.	CO-4	1+4
Q.7	Determine the output voltage of an op-amp for input voltages of $V_{i_1} = 200$ mV and $V_{i_2} = 140$ mV. The amplifier has a differential gain of $A_d = 6000$ and the values of CMRR are : (i.) 200 and (ii.) 10^5. What is the significance of CMRR?	CO-5	3
Q.8	Calculate the input voltage V_1 if the final output V_o is 10.08 V. 	CO-5	4