JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Supplementary Examination- 2026

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

COURSE CODE(CREDITS): 25B11EC313 (04) MAX. MARKS: 75

COURSE NAME: Electronic Devices and Circuits

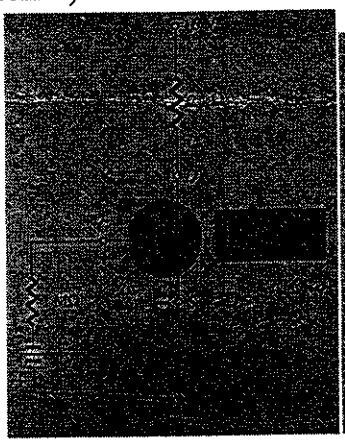
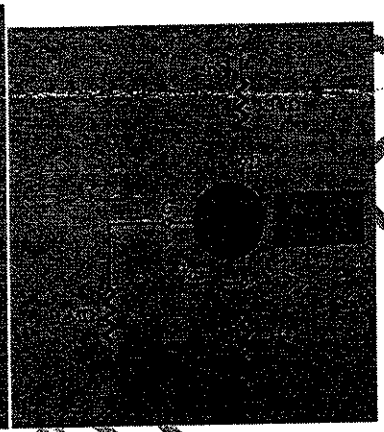
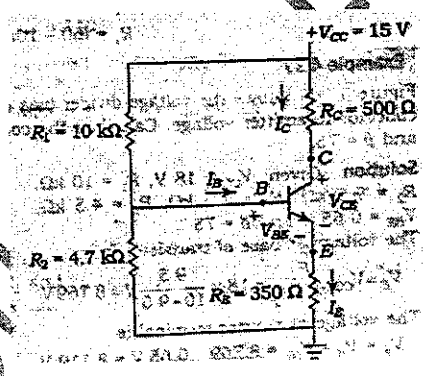
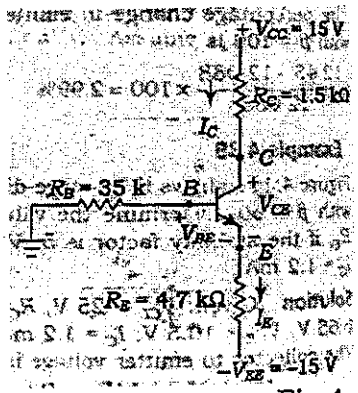
COURSE INSTRUCTORS: Dr. Shruti Jain MAX. TIME: 2 Hours

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

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

(c) Use of calculator is allowed

Q.No.	Question	CO	Marks
Q1	Explain the following diode equivalent circuits: i. Ideal diode model ii. Practical diode model iii. Piecewise linear diode model	CO1	5
Q2	Explain the operation of: i. Clipper circuits (positive and negative clippers) ii. Clamper circuits (positive and negative clampers)	CO1	10
Q3	i. Explain the construction of a Bipolar Junction Transistor (BJT) with the help of a neat diagram. ii. Describe the operation of a BJT in active region for amplification. Further, explain transistor saturation, its causes, and practical significance. iii. Discuss the input and output characteristics of a BJT in Common Base (CB) configuration, explaining the shape of the curves and important parameters. iv. Explain DC load-line analysis and show how the operating point (Q-point) is determined.	CO2	10
Q4	i. Describe the transistor equivalent models used for amplifier analysis and explain how the hybrid (*h*-parameter) model is applied to transistor circuits. ii. Draw and explain the small-signal transistor model and the *h*-parameter equivalent circuit of a common emitter transistor.	CO3	10
Q5	i. Explain the basic construction of a Junction Field Effect Transistor (JFET) with a neat diagram. ii. Explain the need for biasing in FET amplifiers and define the operating point (Q-point). Discuss why proper selection of Q-point is important for faithful amplification.	CO4	10

	iii. Explain the concept of bias stability in FET amplifiers. Discuss the factors affecting bias stability and methods used to improve stability in practical FET amplifier circuits. iv. Mention the advantages and applications of JFETs in electronic circuits. v. Explain the small-signal model of a FET and describe each parameter used in the model.		
Q6	i. Determine V_{GSQ}, I_{DQ}, V_{DS}, V_D, and V_G for Fig 1. ii. Determine V_{GSQ}, V_{DS}, V_D, and V_G for Fig 2 (assume I_D as 2.6mA)  Fig 1  Fig 2	CO5	7.5 + 7.5
Q7	Determine the collector current and collector to emitter voltage for i. Fig 3. Assume $V_{BE} = 0.65$V and $\beta = 60$. ii. Fig 4. Assume $V_{BE} = 0.7$V and $\beta = 75$.  Fig 3  Fig 4	CO6	7.5 + 7.5