JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION- 2024
B.Tech-III Semester (ECE)

COURSE CODE (CREDITS): 18B11EC313 (4) MAX. MARKS: 35

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

Q.No	Question	CO	Marks
Q1	i. The maximum current for any JFET is_____and occurs when V_{GS} = 0V. ii. The relationship between drain current and gate to source voltage of JFET is _____ as defined by Shockley's equation. iii. For potential divide biasing V_G is expressed as..... iv. What is the value of drain current when V_G = pinch off voltage? Why v. A FET has I_{DSS} = $4I_D$ and g_{m0} = 10mS then g_m = _____	CO-4	5
Q2	i. Explain Ansh the difference between a clipper and a clamper circuits using diodes and its types? ii. What is the exponential increase in current with forward voltage?	CO-1	3 + 2
Q3	i. What is the difference between the Q-point and the load line in a BJT? How do you calculate the Q-point for a common-emitter amplifier circuit? ii. What is the purpose of biasing in a BJT circuit?	CO-2	3 + 2
Q4	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)	CO-5	2.5 + 2.5
Q5	i. For the voltage divider bias configuration of Fig 3, if V_D = 12V and V_{GSQ} = -2V, determine the value of R_S ii. Find the maximum value of transconductance for the JFET considering the transfer characteristics as: V_{GS} = -1.5V, I_{DSS} = 8mA and V_P = -4V. Which FET it relates to?	CO-5	2.5 + 2.5
Q6	i. Sita is working on her minor project. She wants to design an amplifier with a gain of 100 using FET or BJT. Kindly help her in drawing the circuit diagram.	CO-6	5

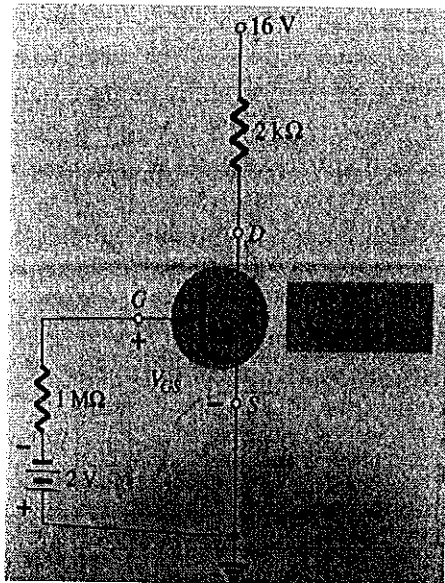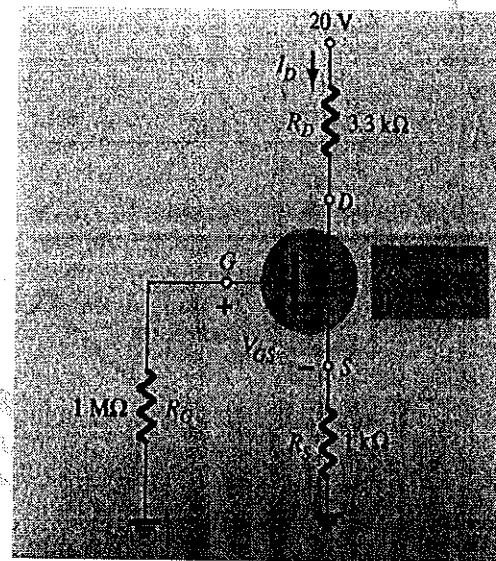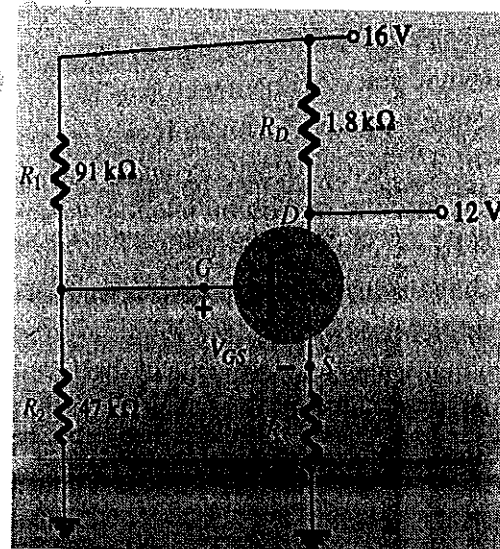|			
	ii. Explain frequency response of single stage amlpifier. How bandwidth can be evaluated?		
Q7	i. How does the frequency affect the FET's performance? What is the difference between low-frequency and high-frequency models of a FET ii. What are the key parasitic capacitances considered in the high-frequency model of a FET?	CO-6	3 + 2

Fig 1

Fig 2

Fig 3