

QP Code : 30569

(1)

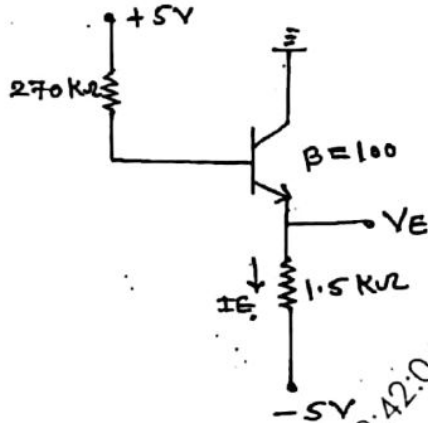
(3 Hours)

[Total Marks : 80

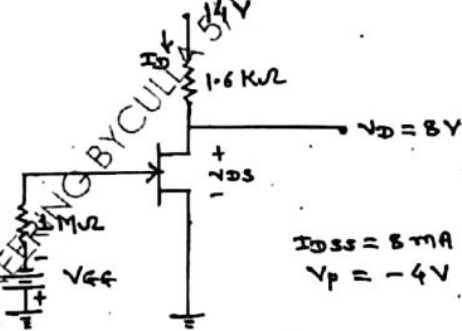
- N.B. :
- (1) Question No. 1 is compulsory.
 - (2) Attempt any three questions out of remaining five questions.
 - (3) Assume suitable data if required and mention the same in answer sheet.

1. Attempt any five questions :-

(a) Find V_E and I_E for the circuit given below.



(b) For the circuit given below find I_D , V_{DQ} , V_{DQ}



- (c) Write down current equation of diode and explain significance of each parameters.
- (d) Explain the concept of thermal runaway in BJT.

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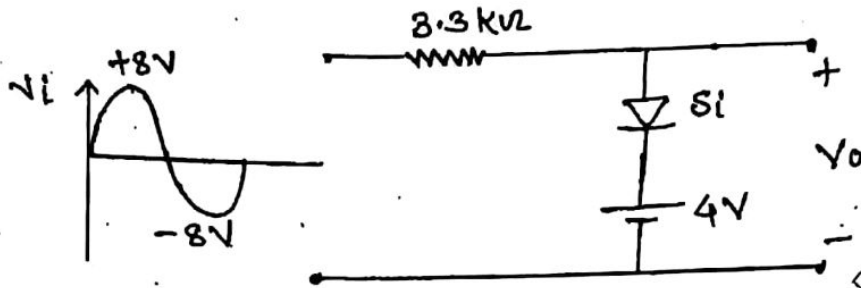
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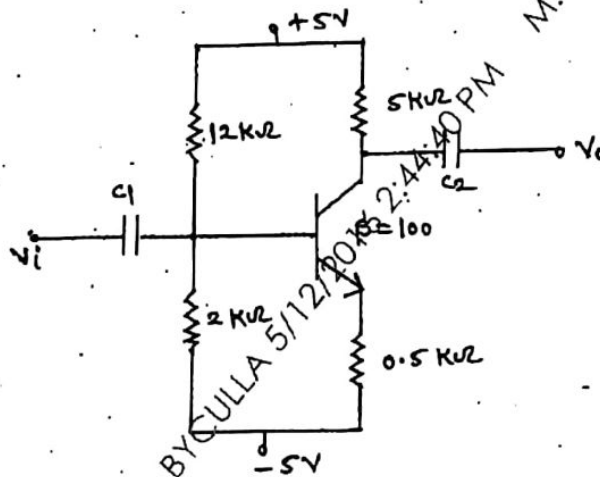
(e) Draw the output Waveform V_o for circuit shown.



(f) State and explain Barkhausen's criteria for oscillations.

2. (a) Determine Q-Print and draw d.c. load line for the amplifier shown.

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(b) Derive the expression for frequency of oscillation for a BJT RC phase shift oscillator.

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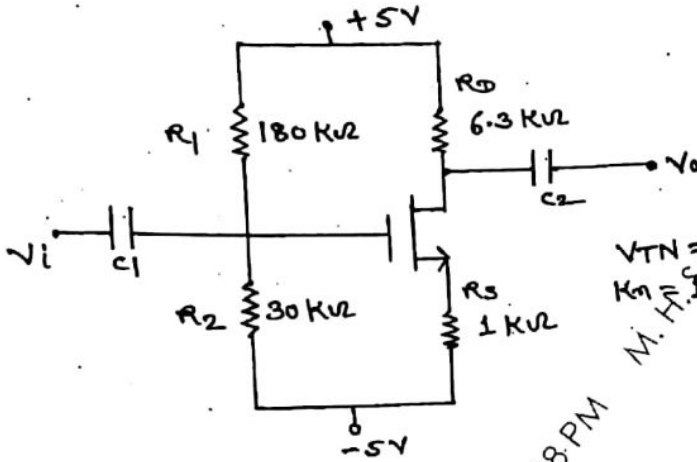
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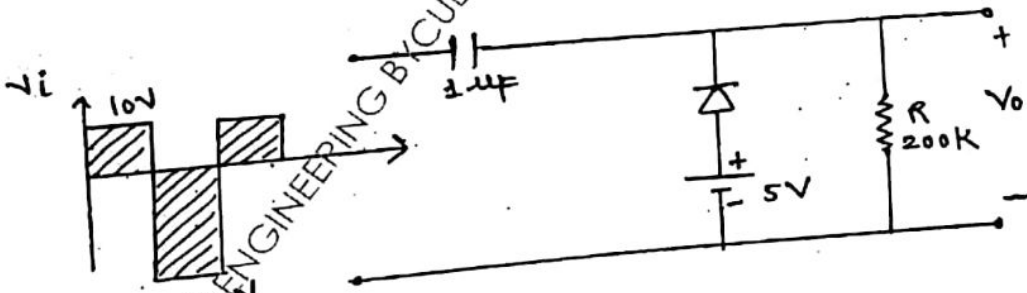
3. (a) Determine voltage gain, Input resistance and output resistance for the MOSFET amplifier shown.



$V_{TN} = 0.8V$
 $K_n = 2 \text{ mA/V}^2$

- (b) Explain the working and characteristics of n-channel Junction Field Effect Transistors (JFET) 10

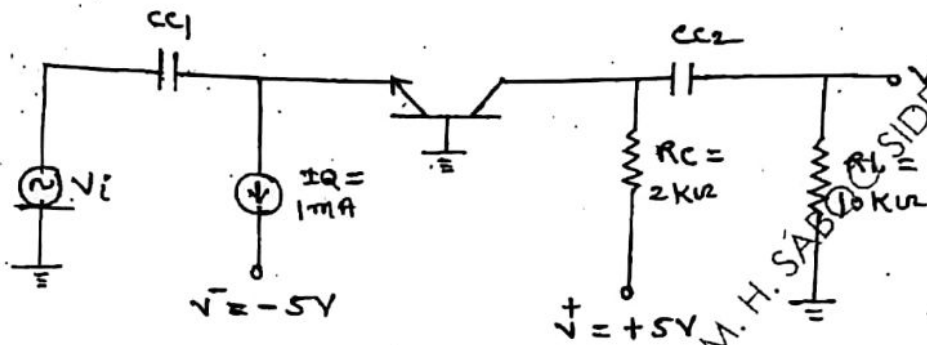
4. (a) Draw the output waveform V_o for ckt shown if (i) $V_r = 0V$ (ii) $V_r = 0.7V$ where V_r is cutin voltage of diode. 10



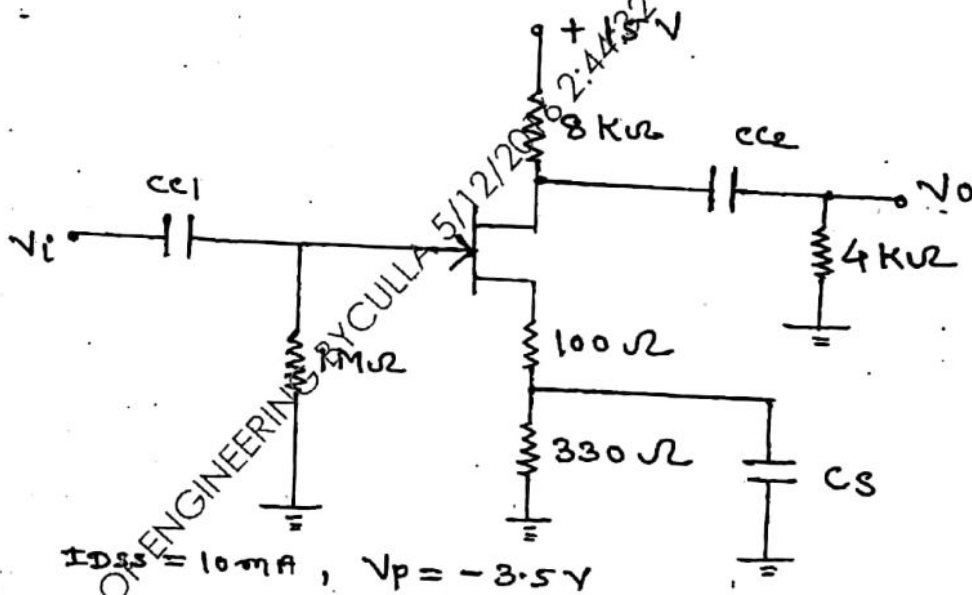
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- (b) For the common base circuit shown, the transistor has parameters $\beta = 120$ 10
 and $V_A = \infty$
 (i) Determine the quiescent V_{CEQ}
 (ii) Determine the small signal voltage gain and output resistance.



5. (a) For the Amplifier shown determine (i) Q point (ii) A_v , Z_i , Z_o 10



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(b) Derive expressions for voltage gain, input resistance and output resistance for source follower circuit using n-channel MOSFET.

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6. Write short notes on any Four :-

- (i) Construction and operation of varactor diode
- (ii) MOS capacitor
- (iii) Transistor as a switch
- (iv) Crystal oscillator
- (v) Hybrid- π model of BJT

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