12/05/16

SE-EXTC-SEM-III CBSGS- AE-I

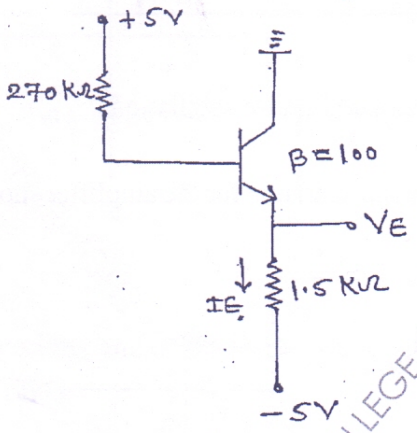
QP Code : 30569

(3 Hours) **[Total Marks : 80**

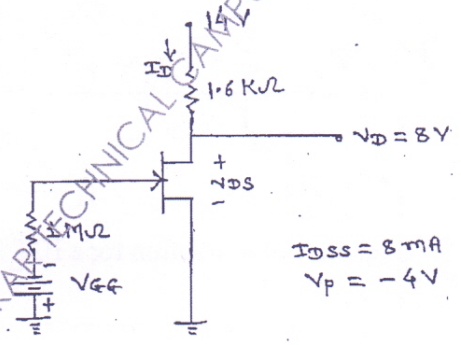
N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any three questions out of remaining five questions.
(3) Assume suitable data if required and mention the same in answer sheet.

1. Attempt **any five** questions :- 20

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



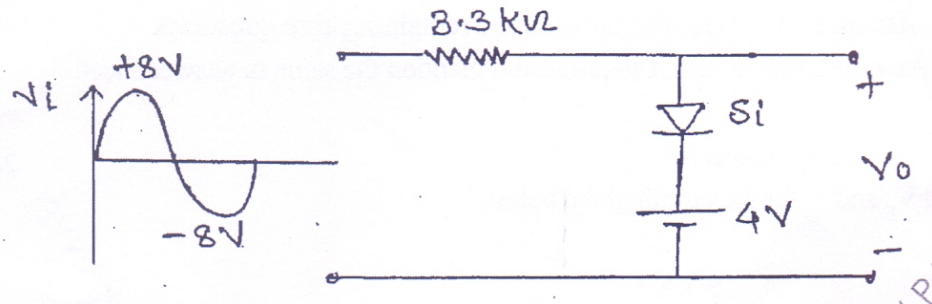
(b) For the circuit given below find I_D, V_{DS}, V_{GG}



(c) Write down current equation of diode and explain significance of each parameters.

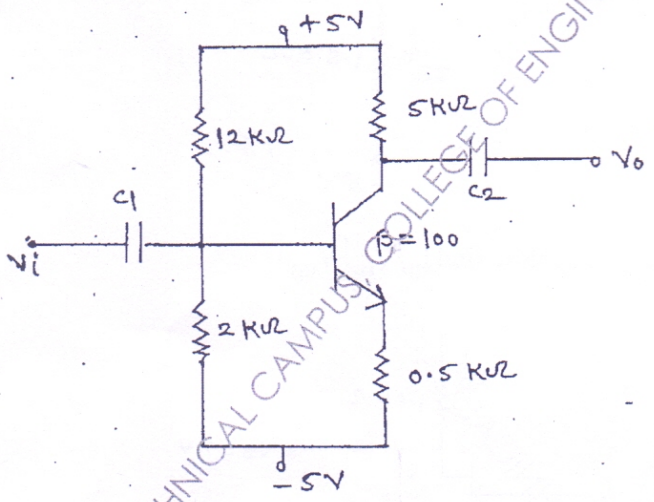
(d) Explain the concept of thermal runaway in BJT.

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



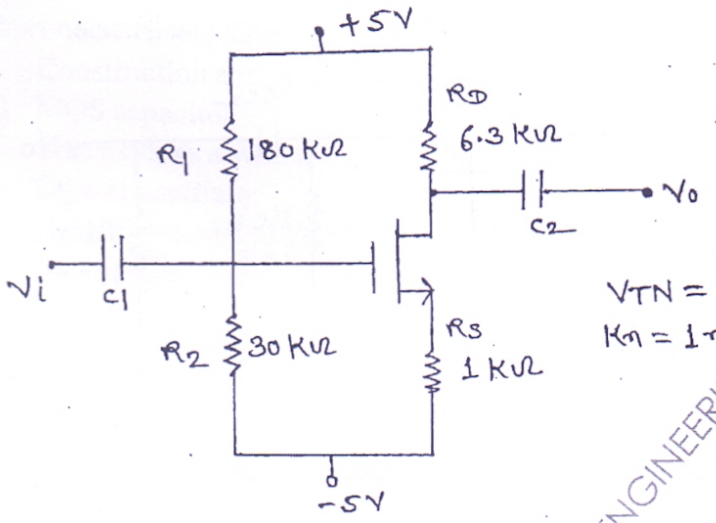
(f) State and explain Barkhausen's criteria for oscillations.

2. (a) Determine Q-Print and draw d.c. load line for the amplifier shown. 10



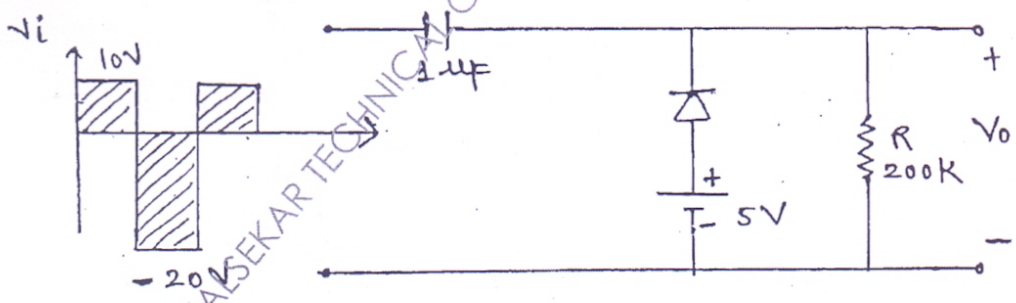
(b) Derive the expression for frequency of oscillation for a BJT RC phase shift oscillator. 10

3. (a) Determine voltage gain, Input resistance and output resistance for the MOSFET amplifier shown. **10**



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

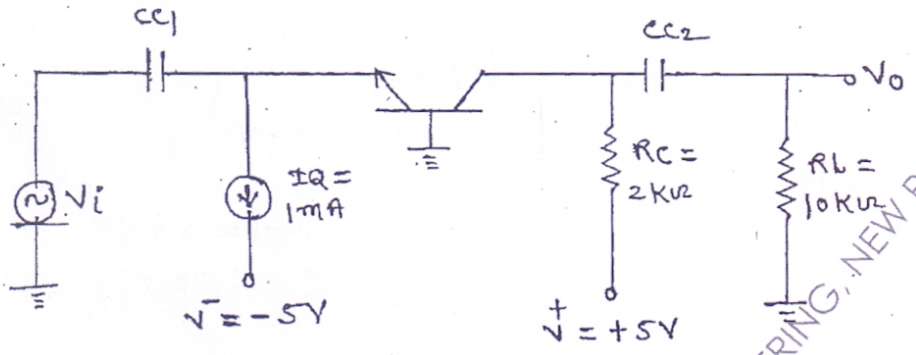
4. (a) Draw the output waveform V_0 for ckt shown if (i) Vr = 0V (ii) Vr = 0.7v where Vr is cutin voltage of diode **10**



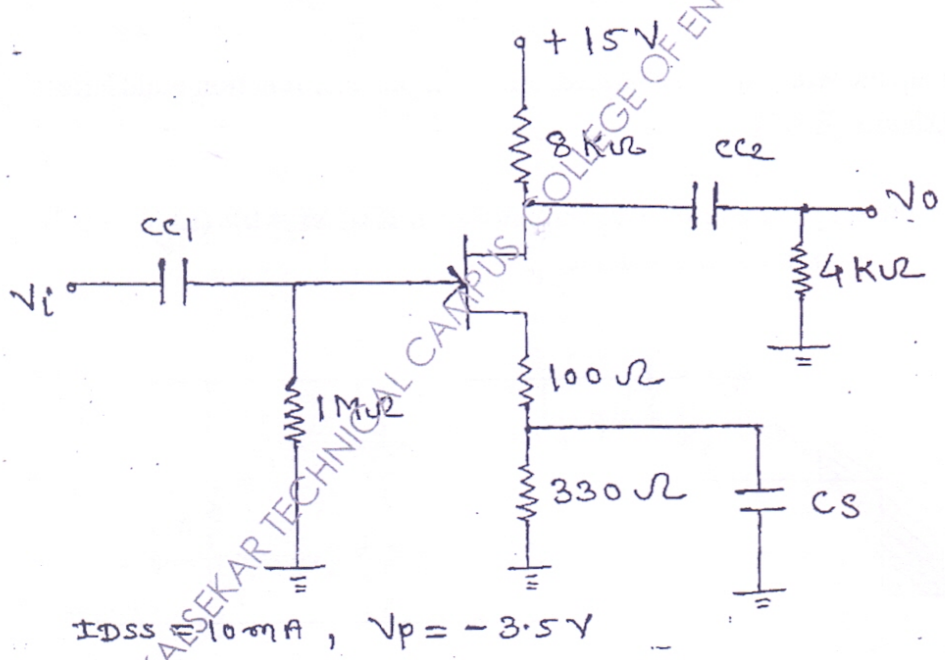
(b) For the common base circuit shown, the transistor has parameters $\beta = 120$ and $V_A = \infty$ **10**

(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) Av, Zi, Zo **10**



[TURN OVER

(b) Derive expressions for voltage gain, input resistance and output resistance for source follower circuit using n-channel MOSFET. **10**

6. Write short notes on **any Four** :- **20**
   (i) Construction and operation of varactor diode
   (ii) MOS capacitor
   (iii) Transistor as a switch
   (iv) Crystal oscillator
   (v) Hybrid-π model of BJT
