Q.P. Code : **5079**

(3 Hours)   [Total Marks : 80

N.B. : (1) Question No. **1** is **compulsory**.

(2) Attempt any **three** questions out of the remaining **five** questions.

(3) Assume suitable **data** wherever **required**.

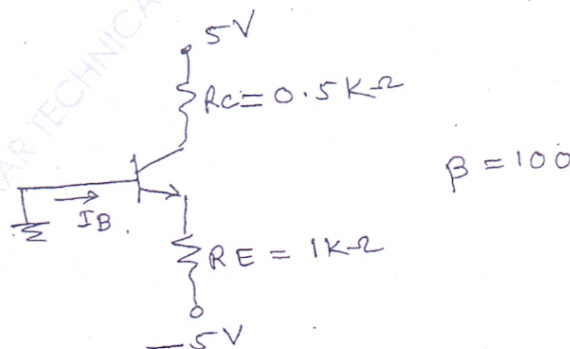1. Attempt any **four**.   20

   (a) Draw Input and Output characteristics of BJT in common emitter configuration.

   (b) Draw small signal hybrid π equivalent circuit for npn transistor.

   (c) Explain effect of temperature on JFET and derive equation for zero current drift.

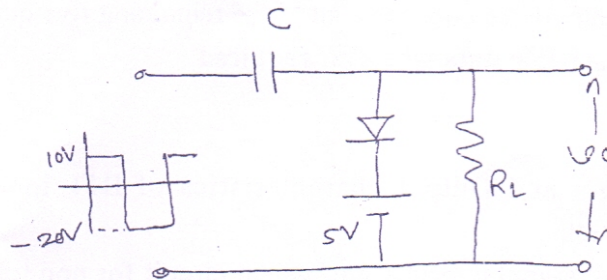   (d) Calculate I_B, I_C & V_{CE} for common emitter circuit.
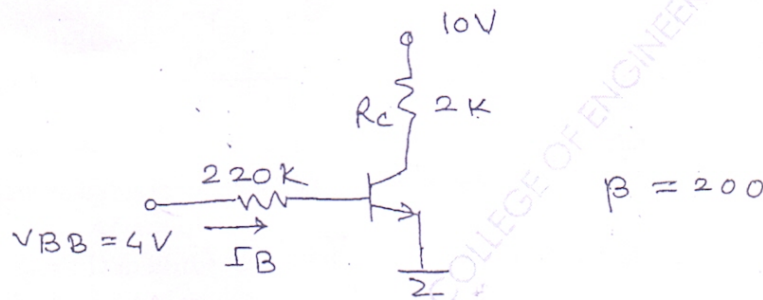
   (e) Find I_B, I_C & V_{CE} for following circuit.

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MD-Con. 7529-15.
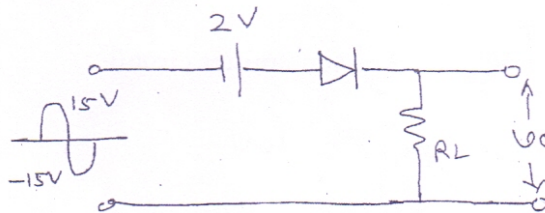
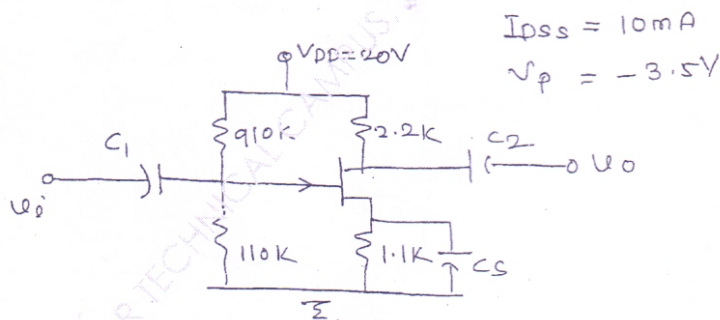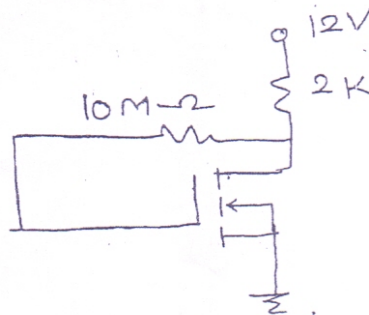2. (a) Draw output waveform for clamper and clipper circuits.   10

(i)

(ii)

(b) Explain construction & characteristics of n channel Ehancement MOSFET.   10
Draw transfer characteristics & drain characteristics.

3. (a) For JFET amplifier shown below, Calculate A_v, Z_i, Z_o 10

$I_{DSS} = 10mA$
$V_P = -3.5V$

(b) For the circuit shown below, calculate I_{DQ} & V_{DSQ}. It is given that   10
$I_{D(ON)} = 6$ mA, $V_{GS(ON)} = 8V$. Vth = 3V
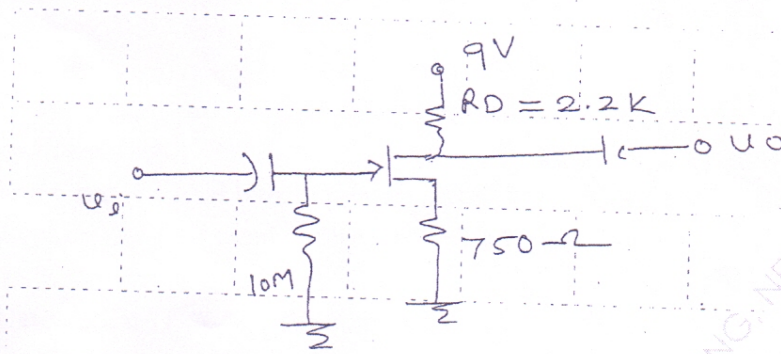

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4. (a) Explain the working of Wein Bridge Oscillator. Derive the expression for frequency of oscillation for sustained oscillations.   10

(b) Calculate voltage gain of FET amplifier.   10

$Y_{OS} = 40\mu s$
$I_{DSS} = 8$ mA
V_{GS} off = -4V

5. (a) Draw & explain energy band diagram of MOS capacitor operating in   10
    (i) Accumulation
    (ii) Depletion
    (iii) Inversion mode

(b) Draw emitter follower circuit and derive an expression for voltage gain Av.   10

6. (a) Draw circuit diagram for phase shift oscillator & derive an expression for frequency of oscillation.   10

(b) Write short notes on any **two**.   10
    (i) Photodiodes
    (ii) LC oscillators
    (iii) Transistor as a switch
    (iv) Schottky diode.

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