Prelim Paper   **Electronic Devices and Circuits I**

Time: 3 Hrs.]   [Marks : 80

N.B.:   (1)   Question No. 1 is compulsory.
            (2)   Attempt any three questions from five questions.
            (3)   Assume Suitable data if required.
            (4)   Figures to the right indicate fall marks.

1.   Attempt any FIVE questions :
     (a)   Explain various types of resistors.   **[5]**
     (b)   Why gain of BJT is higher than gain of JFET.   **[5]**
     (c)   What is zero temperature drift biasing.   **[5]**
     (d)   Consider a BJT has parameters f_T = 500MHz at I_C = 1mA, β = 100 and $C\mu$ = 0.3 pF.   **[5]**
           Calculate bandwidth of f_β and capacitance $C\pi$ of a BJT.
     (e)   Write short note on different types of filters.   **[5]**
     (f)   Explain the hybrid pi model of BJT.   **[5]**

2.   (a)   Write short note on DC load line and significance of Q-point   **[10]**
     (b)   A full wave rectifier using a center tapped transformer with two diodes gives   **[10]**
           output voltage of 250 V to a resistive load, the current being 75 ± 25 mA. If the
           ripple factor is 0.001, calculate the specification of the devices and components
           required fi the filter used are L section LC filter.

3.   (a)   Obtain expression for gain bandwidth product.   **[10]**
     (b)   Determine I_{DQ}, V_{GSQ}, V_{DSQ} if I_{DSS} = 9 mA and V_p = -3V   **[10]**
           for the circuit given in Figure.
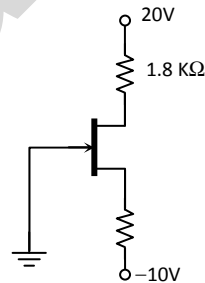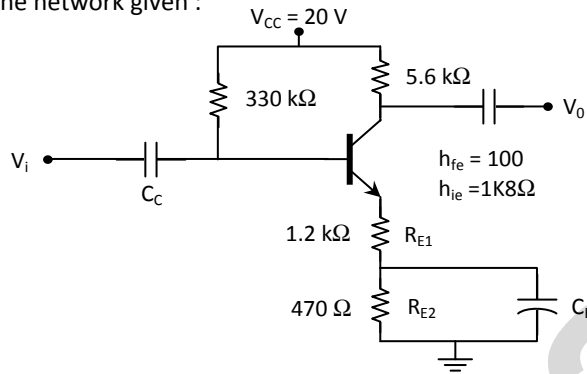

4.   (a)   Design single stage BJT CE Amplifier for the following requirements.   **[15]**
                 $A_V \geq 100$, $Z_i \geq 3K\Omega$, V_{CC} = 18 V
     (b)   For above designed circuit calculate Av, Zi, and Ro   **[5]**

5.   (a)   For the circuit using JFET as shown in Figure, if I_{DSS} = 6 mA, V_P = -6V, r_d = ∞,   **[10]**
           C_{gd} = 4 pF, C_{gs} = 6 pF, C_{ds} = 1 pF, determine : higher cutoff frequency.
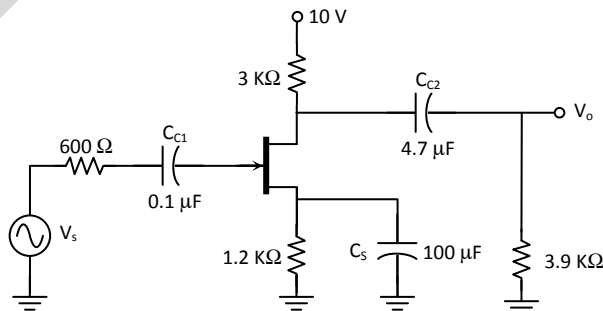
(b) Find Z_0, Z_i, A_V, A_i for the network given : **[10]**

6. Write short notes on (any FOUR) : **[20]**
   (a) Millers Theorem
   (b) Stability factors of various biasing techniques of BJT
   (c) Comparison of BJT CE ,CB and CC amplifier
   (d) Zener as Regulator
   (e) JFET as VVR.

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