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3E1651

B.Tech. III Semester (Main/Back) Examination - 2014

Information Technology

3IT1A Electronics Devices and Circuits

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from each **unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) Draw the output waveform in the diode circuit (fig-1). Also draw the graph between v_0 and v_i in this circuit

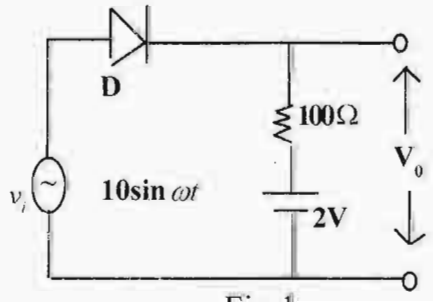

Fig.1 **(8)**

b) Draw the fermi levels in a n-type, p-type and Intrinsic semi conductor. Also show the variation in fermi level position with increase in temperature in these materials and give the reason of such variation. **(8)**

OR

1. a) A Si-sample is mixed with every 10^4 Si-atoms with one boron atoms. Find the no.of electron and hole per unit volume. Assume the no. of Si atoms per unit volume is 6×10^{22} atoms. The intrinsic carrier concentration ni = 5×10^{10} per unit volume. **(8)**

b) What is continuity equation? Find its expression for a n-type Semi conductor **(8)**

Unit - II

2. a) Calculate the operating point of the BJT shown in fig.2. Assume I_{CBO}=200kA $\beta = 40$

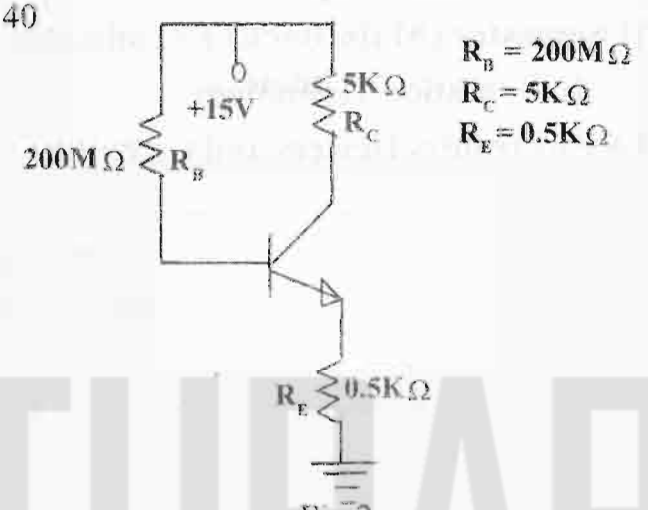

Fig.2 **(8)**

b) What is thermal run away? How it can be avoided in a BJT? Does this is also occurs in FET? **(4)**

c) Draw the Hybrid Model of a BJT in CC mode. **(4)**

OR

2. a) Draw the different current components in a BJT when its emitter junction is forward bias and collector junction is reverse bias. Find the expression of total emitter, base and collector current. **(6)**

b) Find the stability constant $\left(s = \frac{\partial I_c}{\partial I_{c_0}}\right)$ for the circuit shown in fig.2 **(6)**

c) Compare CB and CC configuration **(4)**

Unit - III

3. a) Draw the AC equivalent of a RC coupled Amplifier shown in fig.3(a)

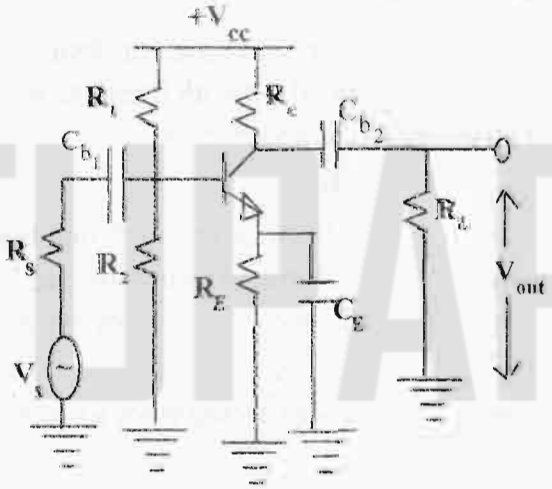

Fig. 3(a)

Find the expression for its voltage gain in terms of hybrid parameter and circuit components. **(8)**

b) Draw the different blasing schemes for FET and give their comparision **(8)**

OR

3. a) Find the low frequency common drain voltage gain of FET. Also define its Intrinsic voltage gain. Assume the FET amplifier shown in fig.3(b) **(8)**

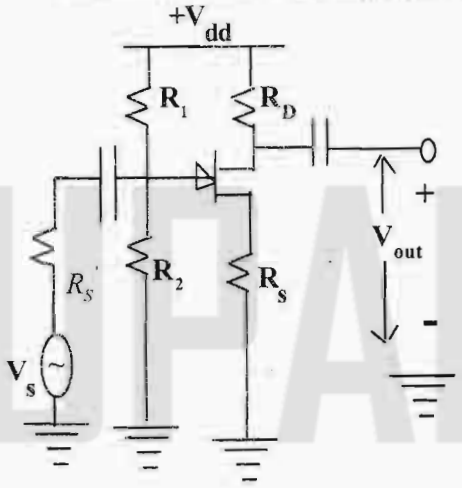

Fig. 3(b)

b) Explain the working of a MOSFET, draw its drain to source current (I_{ds}) with

i) V_{as} and

ii) V_{ds} **(4+4=8)**

Unit - IV

4. a) Find the General expression for R_{if} and R_{of} of a voltage - series feedback amplifier. **(4+4=8)**

b) If the open loop gain vary with temperature 20% from its nominal value 500. If 30% output is feedback in input side with opposite phase then find the variation in closed loop gain with temperature. **(8)**

OR

4. a) Compare positive and negative feedback with respect to gain, Bandwidth and distortion. **(4+4=8)**

b) Find the feedback topology in fig.4 and find the expression for feedback factor

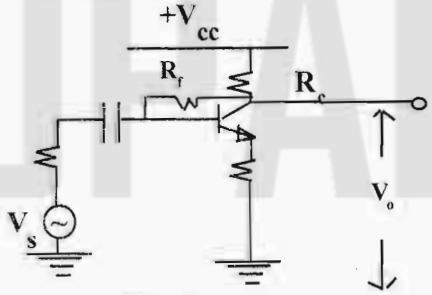

Fig.4

Unit - V

5. a) Draw the wein bridge oscillator and design it for oscillate at 30kHz. **(8)**

   b) Draw the circuit diagram of a bistable multi vibrater and draw its voltage waveform. Also find the relation between its output clock and triqper frequency. **(8)**

OR

5. a) Draw the O/P waveform of a Schmitt triqper for a I/P waveform shown in fig.5. Assume the VTP = 2.5 volt, LTP = 1.5 volt.

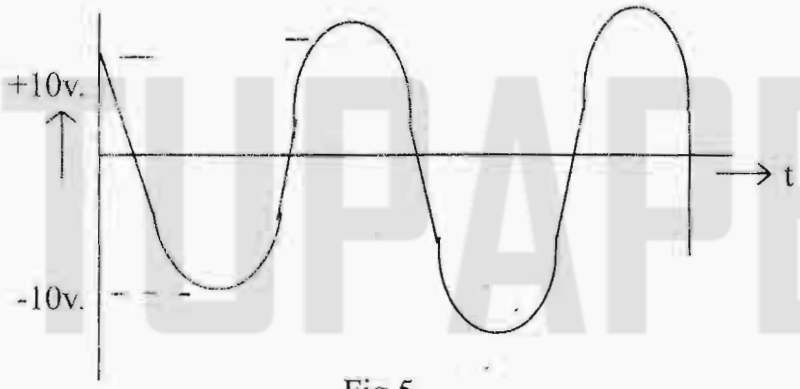

Fig.5

   b) Draw the circuit of a crystal oscillator. Also draw its impedance with frequency and on it show the frequency range over which it works as stable oscillator **(8)**