

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_o and v_i in this circuit

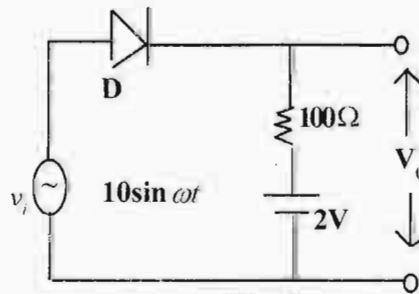


Fig. 1

(8)

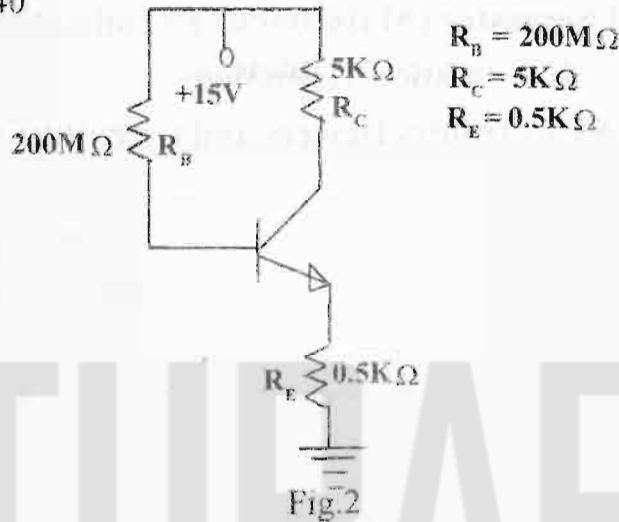
- b) Draw the fermi levels in a n-type, p-type and Intrinsic semi conductor. Also show the variation in fermi level position with increase in temperature in these materials and give the reason of such variation. (8)

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 $n_i = 5 \times 10^{10}$ 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 $I_{CBO} = 200\mu A$
 $\beta = 40$



- b) What is thermal run away? How it can be avoided in a BJT? Does this also occurs in FET? (8)
- 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 $(s = \frac{\partial I_c}{\partial I_{CBO}})$ 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)

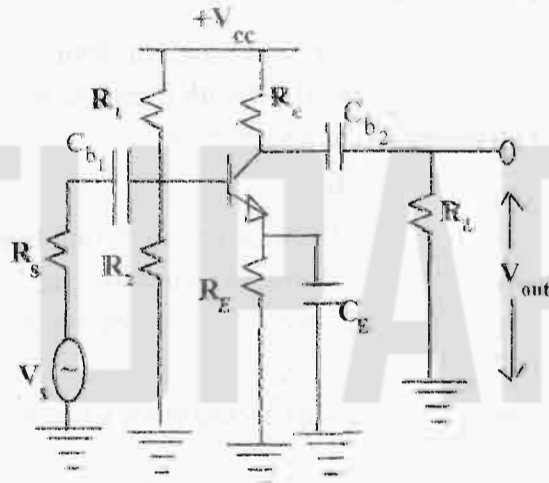


Fig. 3(a)

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

b) Draw the different biasing schemes for FET and give their comparison (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)

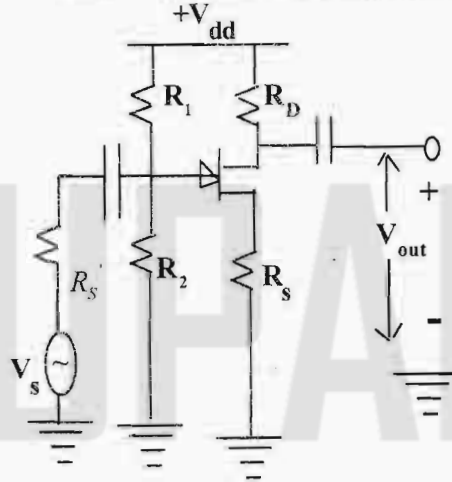


Fig. 3(b)

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

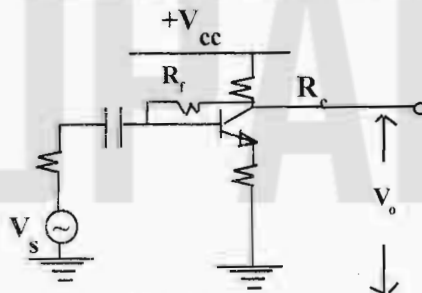


Fig.4

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 vibrator and draw its voltage waveform. Also find the relation between its output clock and tripper frequency. (8)

OR

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

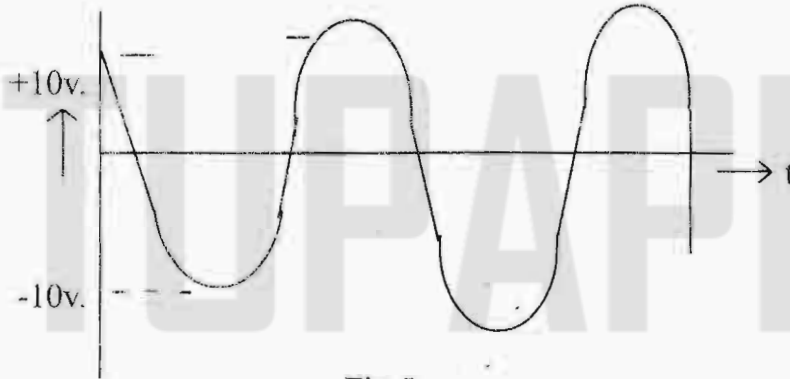


Fig.5

- 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)