

**F.E. (Semester - II) (Revised in 2007-08) Examination, May/June 2011****BASIC ELECTRONIC ENGINEERING**

Duration : 3 Hours

Total Marks : 100

- Instructions : 1) Attempt five questions, choosing at least one from each Module.  
2) Assume any additional data, if necessary.

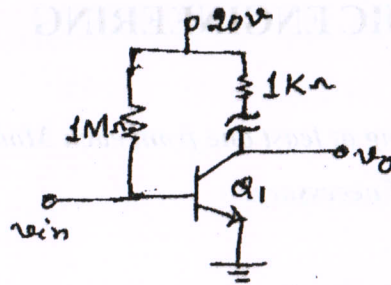
**MODULE - I**

- Q1) a) What is an ideal diode? Sketch the characteristics of an ideal diode. [2]  
 b) A silicon diode passes current of 100mA at 1V. Determine its bulk resistance. What would be its ac resistance for direct current of 0.1 mA. [4]  
 c) Explain the origin of depletion layer capacitance & diffusion capacitance and the importance of each. [6]  
 d) Explain with circuit diagram the details of drawing the load line & determining the point of operation on the diode characteristics. [8]
- Q2) a) Show how that the zener diode can be used as voltage regulator. [3]  
 b) What is the principle of voltage doubling & hence multiplication. [5]  
 c) Derive an expression for a ripple factor in a full wave rectifier with resistive load. [6]  
 d) Sketch the circuit of a positive shunt clipper. Show input & output waveform, and briefly explain. [6]

**MODULE - II**

- Q3) a) Explain the basic transistor construction. [6]  
 b) Calculate the values of collector current & emitter current for a transistor with  $\alpha_{dc} = 0.98$  and  $I_{CBO} = 5\mu A$ . The base current is measured as  $100\mu A$ . [6]  
 c) Draw the circuit diagram of an NPN junction transistor CE configuration & describe the static input & output characteristics. Also define active & saturation region of a CE transistor. [8]

Q4) a) Determine the value of  $V_{CE}$  for a given circuit : [2]



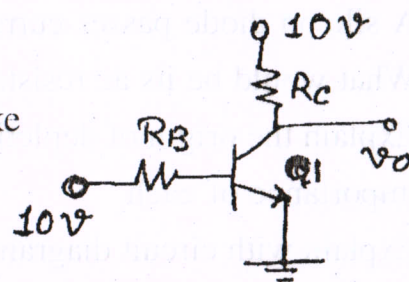
b) What is the need for biasing a transistor. [6]

c) What three factors contribute to thermal instability. [6]

d) Determine  $R_B$  &  $R_C$  for the given circuit. [6]

Data given :  $h_{FE} = 250$ ,  $I_{csat} = 10\text{mA}$

Transistor Q1 - Silicon make



### MODULE - III

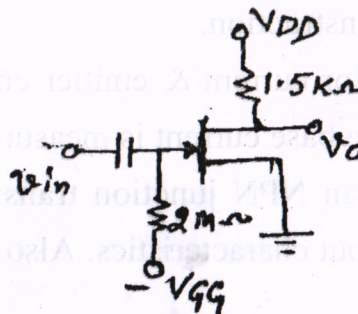
Q5) a) For an N-channel JFET,  $I_{DSS} = 8.7\text{mA}$ ,  $V_p = -3\text{V}$ ,  $V_{GS} = -1\text{V}$ . Determine  $I_D$ ,  $g_{mo}$  &  $g_m$ . [6]

b) In general, comment on the polarity of the various voltages & direction of the currents for an n-channel JFET versus a p-channel FET. [6]

c) Explain the operation of an n-channel depletion type MOSFET. Sketch the device drain & transfer characteristics & explain their shape. [8]

Q6) a) For the circuit shown, Determine  $V_{GS}$ ,  $I_D$  &  $V_{DS}$ . [6]

Given  $V_{DD} = 15\text{V}$ ,  $V_{GS} = 1.5\text{V}$ ,  $I_{DSS} = 15\text{mA}$ ,  $V_p = -4\text{V}$



b) Draw & explain the biasing circuit of an enhancement mode MOSFET. [6]



- c) In an N-channel JFET biased by voltage divider method, calculate the value of  $R_S$  to give operating point  $I_D = 4 \text{ mA}$  &  $V_{DS} = 8 \text{ V}$  [8]

Given :  $V_{DD} = 25 \text{ V}$ ,  $R_{G1} = 1.2 \text{ M}\Omega$ ,  $R_{G2} = 0.6 \text{ M}\Omega$ .

JFET parameter :  $I_{DSS} = 12 \text{ mA}$ ,  $V_p = -4 \text{ V}$ .



### MODULE - IV

- Q7) a) What is an oscillator? How it differ from an Amplifier. [5]  
b) Explain feedback concept with the aid of simple block diagram. [5]  
c) Draw a basic OP-AMP with two inputs & one output. Describe double ended operation. [5]  
d) Explain the basic biasing construction & characteristics of photo diode. [5]
- Q8) a) Explain basic diagram of CRT. [5]  
b) Describe the basic behavior of SCR using the two transistor equivalent circuit. [7]  
c) Briefly explain how diodes, resistors & capacitors are fabricated in monolithic integrated circuit. [8]

