(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 199211   **Roll No.**

B.Tech.

(SEM. II) THEORY EXAMINATION 2013-14

ELECTRONICS ENGG.

Time : 3 Hours   *Total Marks : 100*

Note :– Attempt **all** Sections.

SECTION–A

1. All parts are compulsory. Write short answers by giving proper reasons. :   **(2×10=20)**

   (a) Calculate the dynamic forward and reverse resistance of a PN junction diode when the applied voltage is 0.25 V at $T = 300°$ K given $I_o = 2$ μA.

   (b) Distinguish between avalanche and zener mechanisms.

   (c) Draw the block diagram of unregulated Power Supply.

   (d) Establish the relationship between I_{CBO} and I_{CEO}.

   (e) Draw the transfer and output characteristic of Tunnel Diode.

   (f) Enlist the difference between JFET and MOSFET.

   (g) An operational Amplifier has a differential gain of 103 and a CMRR of 100, input voltages are 120 μV and 80 μV. Determine the output voltage.

   (h) The BJT circuit has $I_C = 10$ mA and $\alpha = 0.98$. Determine the value of I_E.

   (i) In JFET $I_{DSS} = 8$mA, $V_P = -4$V biased at $V_{GS} = -1.8$V. Determine the value g_m.

   (j) What are Lissajous figure ?

SECTION–B

2. Attempt any **three** parts of the following : (10×3=30)

(a) (i) Draw and explain the working of Bridge rectifier with input and output waveforms. Calculate efficiency and ripple factor for the same.

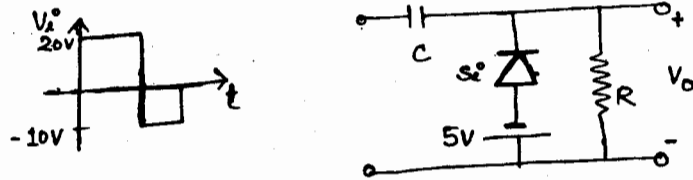   (ii) For the network shown in **Fig. 1**, determine the output voltage.

Figure 1

(b) (i) With proper circuit diagram, draw the Base curve and collector curves of n-p-n transistor in C-E configuration.

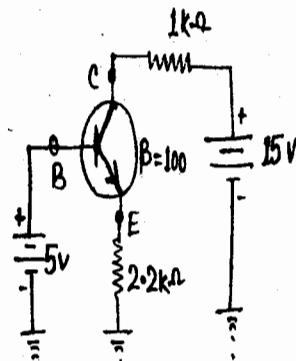   (ii) Determine I_{CQ} and V_{CEQ} for the network shown in **Fig. 2**.

Figure 2

(c) (i) With suitable ckt. diagram describe the working of n-channel JFET with drain and transfer curves.

   (ii) Draw the dc load line and determine V_G, I_{DQ}, V_{GSQ} for the network shown in **Fig. 3**.
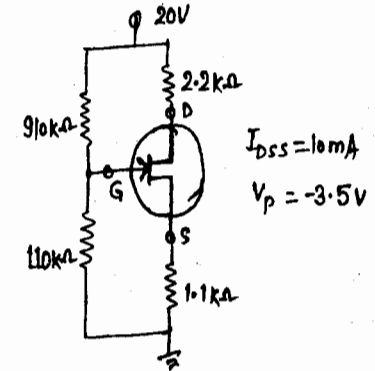

Figure 3

(d) (i) How OP-Amp acts as a differentiator ? Derive its output voltage expression.

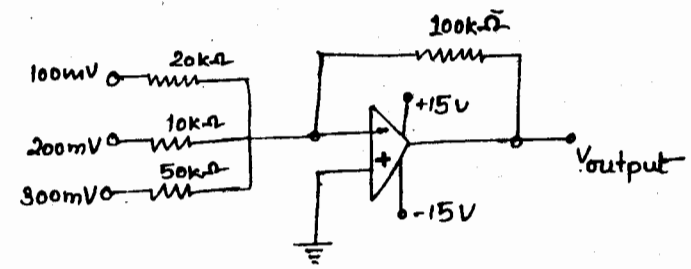   (ii) Determine the output voltage for the network shown in **Fig. 4**.

Figure 4

(e) (i) Write short note on digital multimeter with proper block diagram.

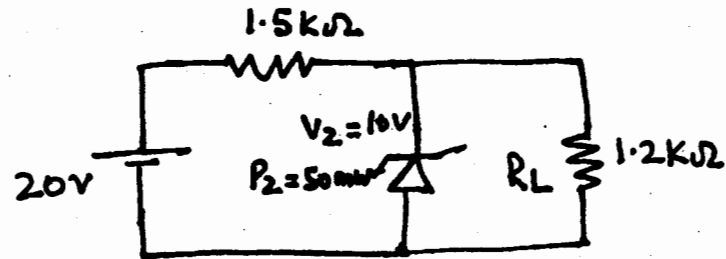(ii) For the given zener diode network shown in **Fig. 5** determine V_L, V_R, I_Z and I_R.

Figure 5

SECTION–C

Note : Attempt all questions of this section.   (10×5=50)

3. Attempt any two parts of the following :

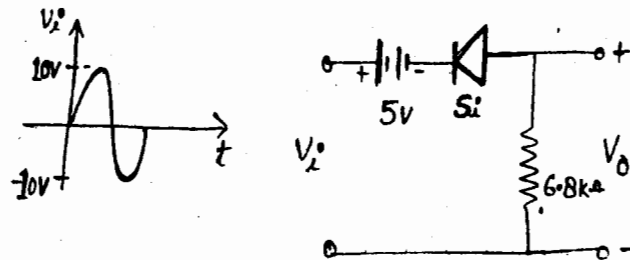(a) Determine the output voltage for given network in **Fig. 6**.

Figure 6

(b) Design a clamper to perform the function indicated in following **Fig. 7**.
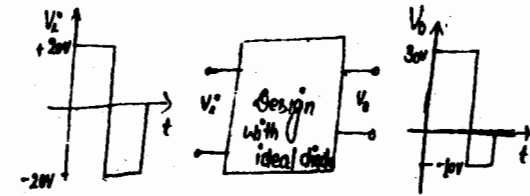

Figure 7

(c) Explain Schottky diode and varicap with their applications.

4. Attempt any **two** parts of the following :

(a) Draw and explain the a.c. equivalent circuit of voltage divider Bias amplifier using re model.

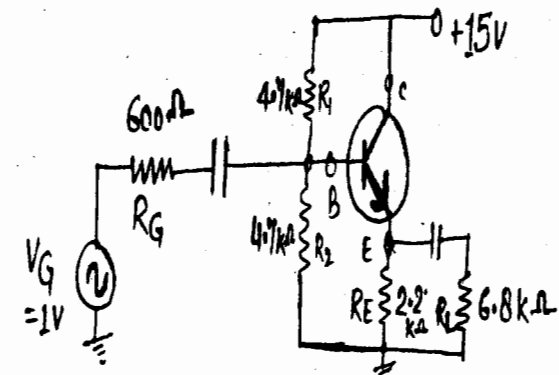(b) Determine the voltage Gain of emitter follower in **Fig. 8**. If $\beta = 150$, what is a.c. input voltage ?

Figure 8

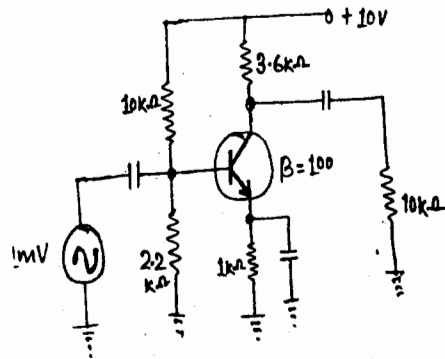(c) Calculate the voltage Gain of VDB amplifier shown in Fig. 9.

Figure 9

5. Attempt any **two** parts of the following :

(a) With proper circuit diagram draw and explain the drain and transfer characteristic curve for N-Channel JFET.

Show that $\varepsilon_m = \dfrac{-2}{V_p}\sqrt{I_{DSS}I_{DS}}$

(b) For the network shown in **Fig.10**, calculate V_G, V_{GS}, I_D, V_{DS} and V_s.
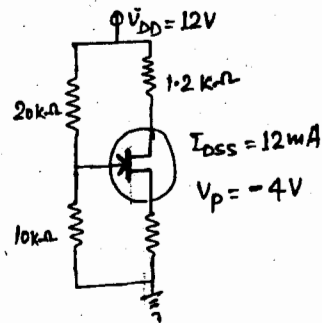

Figure 10

(c) Determine the output voltage of following network shown in Fig. 11. having $V_{GS(off)} = -2V$, $I_{DSS} = 4mA$ and $g_{mo} = 3000\ \mu s$
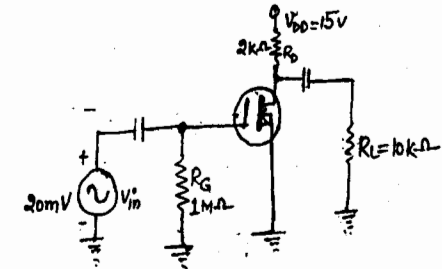

Figure 11

6. Attempt any **two** parts of the following :

(a) Define CMRR, Slew Rate and concept of virtual ground in Op-AMP.

(b) For the network shown in **Fig. 12.**, determine the output voltage.
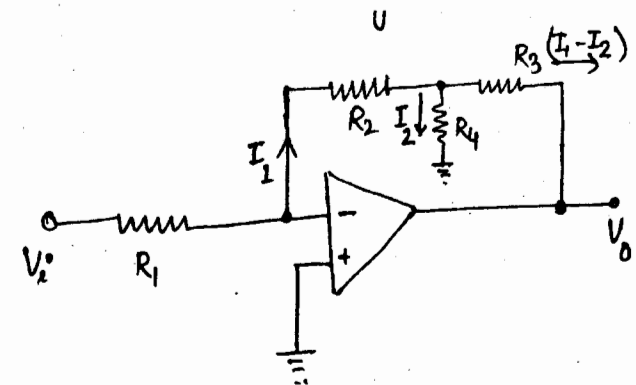

Figure 12

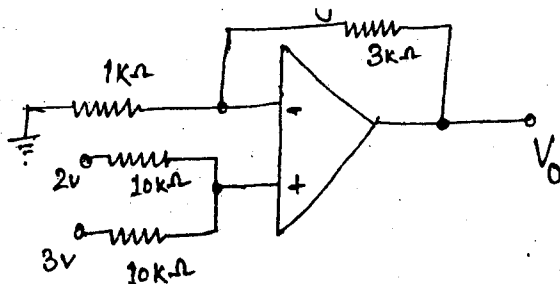(c) Determine output voltage for network in **Fig. 13**.

Figure 13

7. Attempt any **two** parts of the following :

   (a) Draw the block diagram of function generator and explain its working.

   (b) Draw the block diagram of CRO and explain the function of each block.

   (c) How phase and frequency of an input signal is measured using CRO ?