(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.

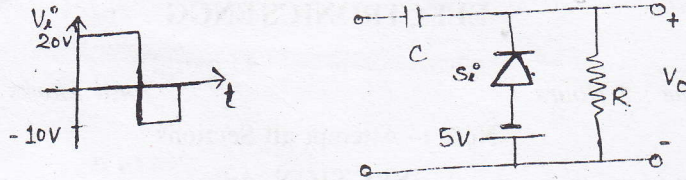(ii) For the network shown in **Fig. 1**, determine the output voltage.

Figure 1

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

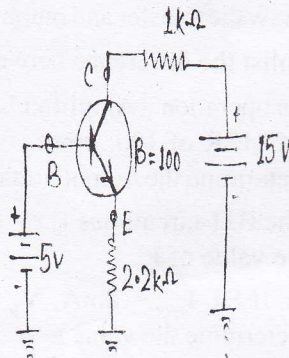(ii) Determine I_{CQ} and V_{CEQ} for the network shown in **Fig. 2**.

Figure 2

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

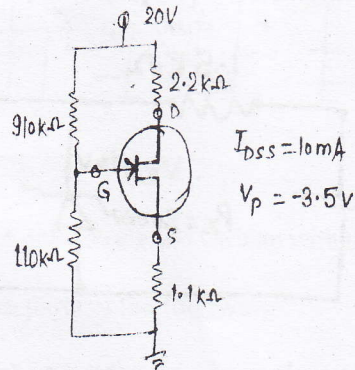(ii) Draw the dc load line and determine V_G, I_{DQ}, V_{GSQ} for the network shown in **Fig. 3**.

Figure 3

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

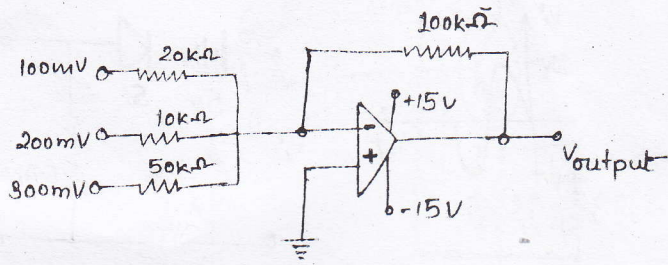(ii) Determine the output voltage for the network shown in **Fig. 4**.

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.
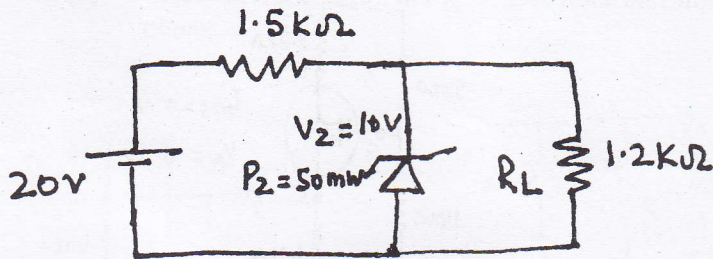

Figure 5

SECTION–C

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

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

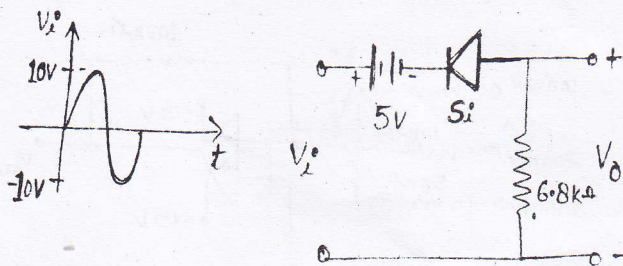(a) Determine the output voltage for given network in **Fig. 6**.

Figure 6

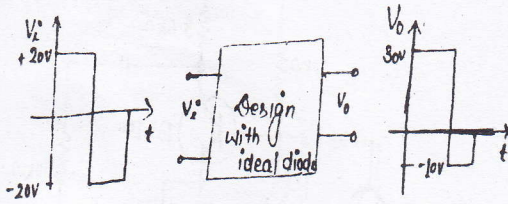(b) Design a clamper to perform the function indicated in following **Fig. 7**.

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**.

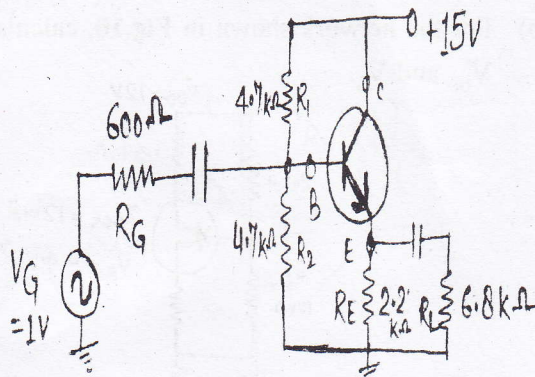If $\beta = 150$, what is a.c. input voltage ?

Figure 8

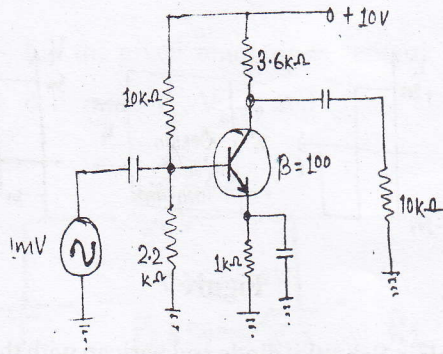(c) Calculate the voltage Gain of VDB amplifier shown in Fig. 9.

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.
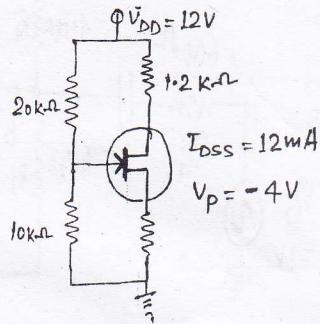

Figure 10

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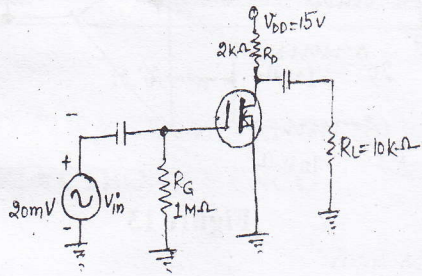

Figure 11

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

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

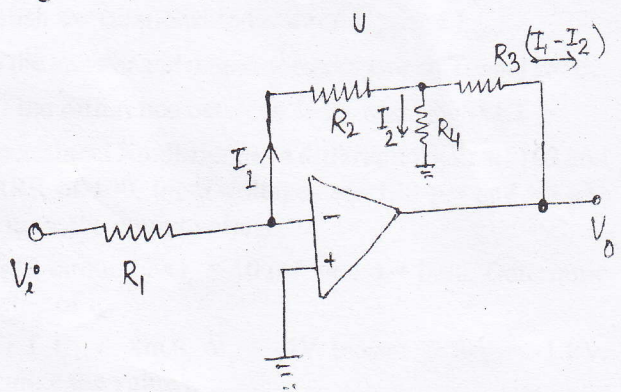(b) For the network shown in **Fig. 12.**, determine the output voltage.

Figure 12