Printed Pages: 3

Paper Code: REC-101	Roll No.									

B.Tech.

(SEM I) ODD SEMESTER EXAMINATION2016-17

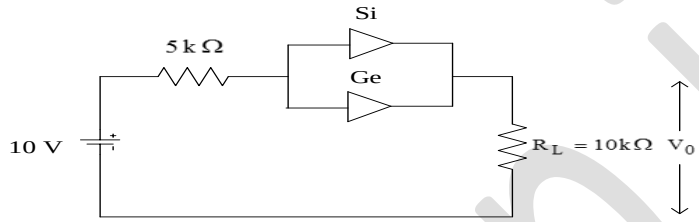
BASIC ELECTRONICS ENGG.

[Time: 3 hrs.] **[Max. Marks:70]**

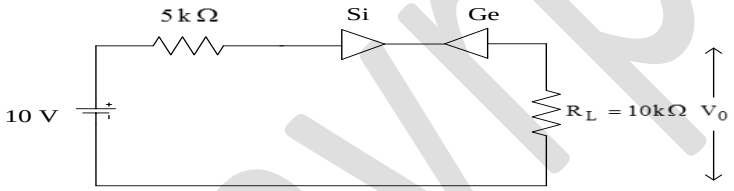
Note- ***Attempt All Questions. All Questions carry equal marks*:-**

Q1 Attempt any *four* parts of the following:- **[3.5x4=14]**

(a) Determine the V_0 and I in the load resistance of 10KΩ in both circuit given in Figures. 1a, and 1b.



(a)



(b)

Figure 1.

(b) Differentiate between Transition capacitance and Diffusion capacitance of a p-n junction diode.

(c) A 6V zener diode is used in the circuit as shown in Figure. 2. The load current is to vary from 20mA to 100mA. and the input voltage is constant at 15V . The minimum zener diode current of 15mA. Determine the value of series resistance R_s to maintain a voltage of 6V across the load resistance R_L.

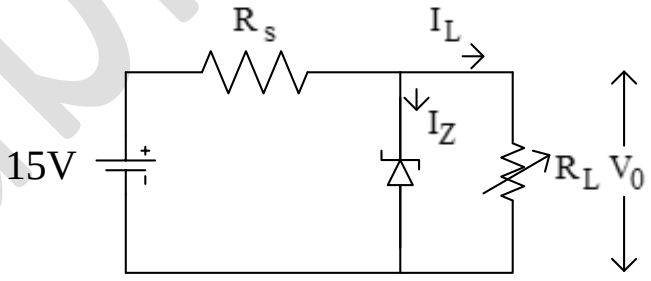


Figure. 2.

(d) In a centre-tapped full wave rectifier two diode with $R_f = 10\Omega$, $R_r = \infty$, $V_y = 0$, $R_L = 100\Omega$ are used. Find peak, dc, and rms load currents.

(e) Draw the CE npn transistor configuration and its characteristics show cut-off, saturation, and active region. Also prove that : $I_c = (1+\beta)I_{CO} + \beta I_B$.

(f) Define and explain the parameter trans-conductance gm, drain resistance r_d and amplification μ of a JFET. In JFET I_{DSS}=8mA, V_P=-4V biased at V_{GS}= -1.8V. Determine the value g_m.

Q2. Attempt any two parts of the following:- **[7x2=14]**

(a) Sketch Vo for both circuit network as shown in of Figure 3. All diode are ideal.

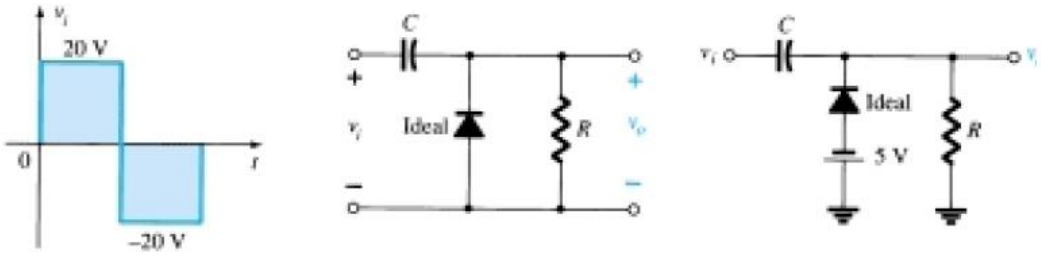


Figure. 3.

(b) Design a common emitter (CE) Voltage divider circuit and determine the bias voltage $\mathbf{V_{CE}}$ and current $\mathbf{I_C}$. Biasing resistance R_1=39kΩ , R_2=3.9kΩ, R_C=10kΩ R_E=1.5kΩ, β=100, V_{CC}=22V, input coupling capacitor 10μF output coupling capacitor 10 μF and Emitter bypass capacitor 50μF.

(c) (i) Explain the principle of operation of JFET with neat diagram. Also sketch its transfer and output characteristics.

(ii)For voltage divider configuration as shown in Figure 4, if V_D =12V and V_{GSQ} = -2V, determine the value of source resistance **(RS).**

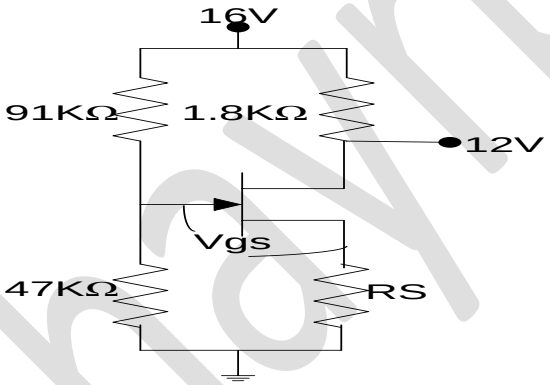


Figure. 4.

Q3. Attempt any four parts of the following:- **[3.5x4=14]**

(a) For the given circuit in Figure 5 determine the Q point. Given V_{BE} = 0.6V, and β = 55.

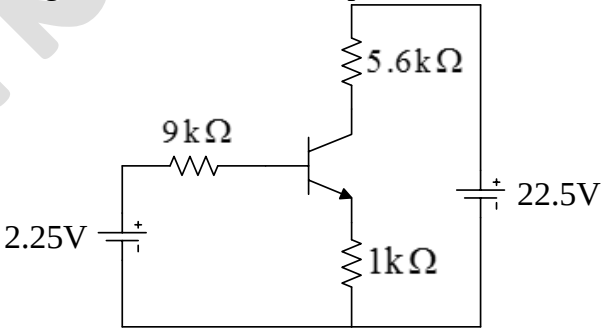


Figure. 5.

(b) Explain the principle of operation of any type of MOSFET with diagram and draw the transfer characteristics.

(c) Enlist the ideal characteristic of Op-amp and Explain the following terms Slew rate & CMMR.

(d) An operational Amplifier has a differential gain of 10^3 and a CMRR of 100, input voltages are 120µV and 80µV. Determine the output voltage.

(e) Find out the voltage of the following circuit as shown in Figure 6.

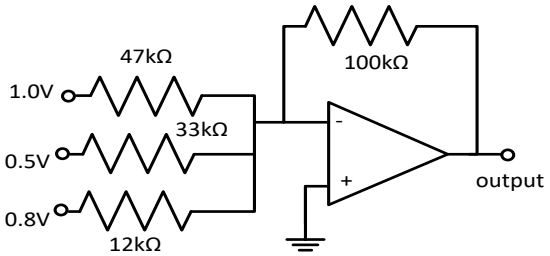


Figure 6

(f) Determine the output voltage V_{out} assume that V_1=2V and V_2 = 4V as shown in Figure 7.

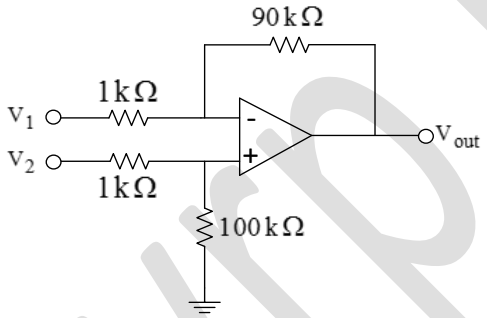


Figure. 7.

Q4. Attempt any *two* parts of following:- [7x2=14]

(a) Using a suitable diagram explain the basic principle of a multimeter and enlist the applications of multimeter.

(b) Draw the block diagram of a CRO and explain its working. Draw the Lissajous pattern on CRO when the ratio of the frequency of the vertical input to that of the horizontal input is 1:2.

(c) Using a suitable diagram explain the basic principle of a RAMP type digital voltmeter.

Q5. Attempt any four parts of the following:- [3.5x4= 14]

(a) Explain the element of the communication system with block diagram.

(b) An AM transmitter with an unmodulated carrier power of 150W is modulated simultaneously by four modulating signals with modulation index 0.3, 0.4, 0.5 and 0.6 Determine (i) Total modulation index (ii) Total transmitted power (iii) Each sideband power.

(c) The antenna current of an AM transmitter is 8 amperes when only the carrier is sent, but it increases to 8.93 amperes when the carrier is modulated by a single sine wave. Find the percentage modulation.

(d) Derive the expression for AM wave and draw the spectrum of the AM signal.

(e) Draw the circuit diagram of full wave voltage doubler circuit and explain the working operation.

(f) Draw and explain the V-I characteristics and application of the Tunnel diode.