Paper Code: EC-101	Roll No.										

B.TECH
(SEM I) ODD SEMESTER EXAMINATION 2016-17
BASIC ELECTRONICS ENGINEERING

[Time = 3 Hr] **[Max. Marks: 100]**

Note: 1. Attempt all the question all the questions are compulsory
2. Assume the data if required in any questions.

Q.1. Attempt any four of the following questions: **(4x5=20)**

a) Differentiate among conductor, insulator and semiconductor using energy band concept. Also describe the difference between ***n*-type** and ***p*-type** semiconductor materials.
b) Differentiate between Transition capacitance and diffusion capacitance of a p-n junction diode.
c) What is the **zener** breakdown mechanism also write the comparison of **zener** diode and p-n junction diode
d) Draw the CE npn transistor configuration and its characteristics show cut-off, saturation, and active region. Also prove that : $I_C = (1+\beta)I_{CO} + \beta I_B$
e) Define and explain the parameter trans-conductance gm, drain resistance rd and amplification μ of a JFET. In JFET I_{DSS}=8mA, V_P = -4V biased at V_{GS} = -1.8V. Determine the value gm
f) Determine the voltage **Vo** for the network of Figure1

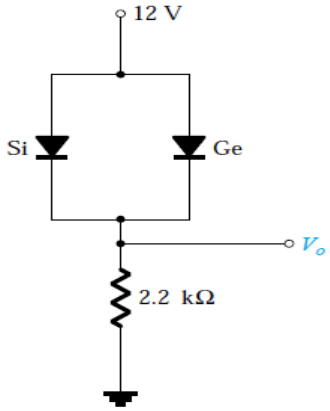

Figure1

Q.2. Attempt any two of the following questions: **(2x10=20)**

a) Determine **Vo** for each network of Figure 2.

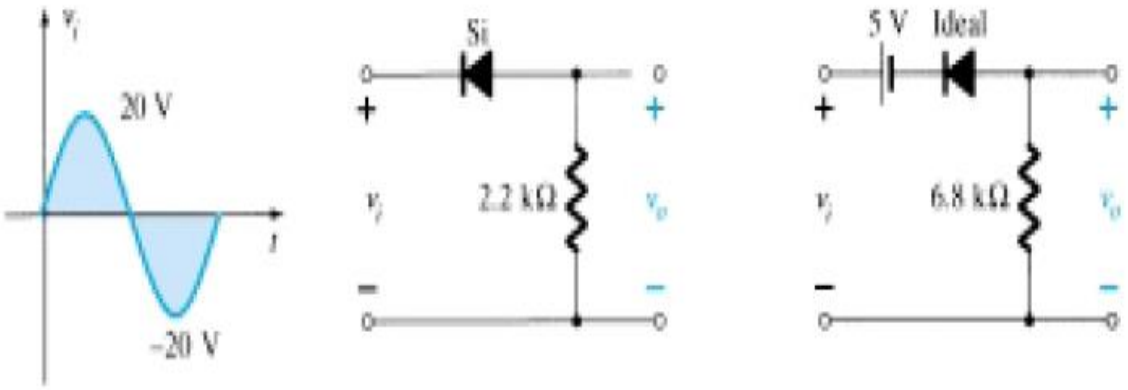

Figure 2

b) Sketch **Vo** for each network of Fig 3.

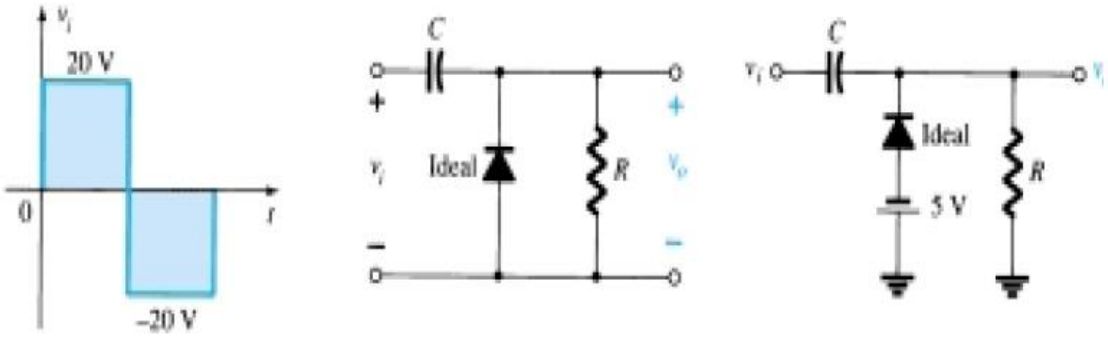

Figure3

c) Determine the minimum value of **R_L** to ensure that the **Zener** diode is in **the "on" state** in Figure 4.

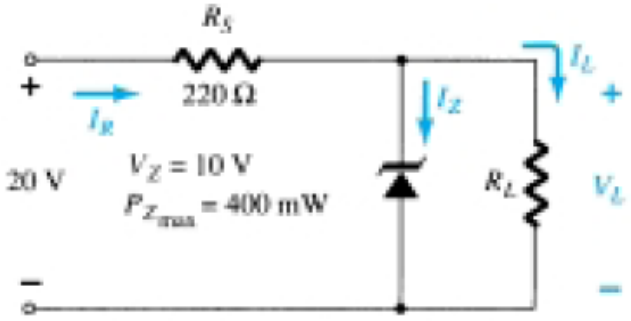

Figure 4.

f) Explain the working of **a voltage double**r with neat diagram

Q.3. Attempt any two of the following questions: (2x10=20)

(a) Explain ant type of MOSFET with diagram and draw the transfer and output characteristics.

(b) (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 5, if V_D =12V and V_{GSQ} = -2V, determine the value of source resistance **(RS).**

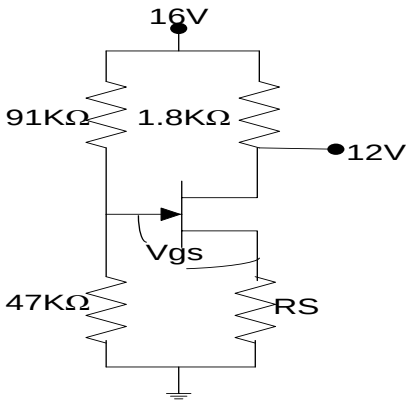

Figure 5

(c) For the emitter bias network of Figure 6, determine:
(a) I_B. (b) I_C. (c) V_{CE}. (d) V_C. (e) V_E. (f) V_B. (g) V_{BC}.

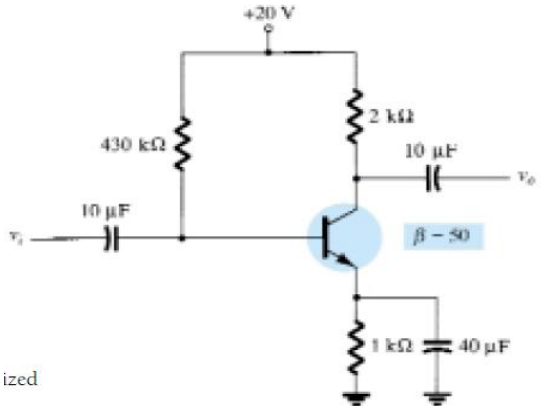

Figure 6

Q.4. Attempt any two of the following questions. (2x10=20)

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

(b) Find out the voltage of the following circuit as shown in Figure 7.

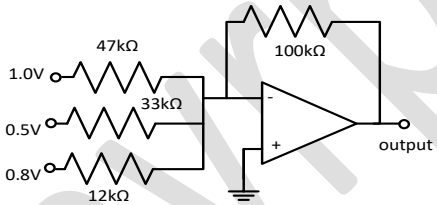

Figure 7

(c) Determine the output voltage V_{out} assume that V_1=2V and V_2 = 4V as shown in Figure 8.

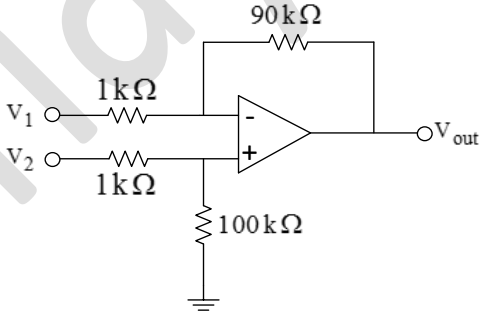

Figure 8

Q.5. Attempt any two of the following questions: (2x10=20)

(a) What are the basic constructional differences between a Varactor diode and a Tunnel diode? Explain briefly the operation and characteristics of a tunnel diode.

(b) Define light emitting materials. What determines the emission of colour of LED? Describe the working of solar cell. What are the applications of these devices?

(c) (i) Explain the operation and characteristic of silicon controlled rectifier. Also describe the application of the SCR.

(ii) Explain the working of **a full wave voltage double**r with neat diagram