

**B.TECH.**

**THEORY EXAMINATION (SEM-II) 2016-17**

**ELECTRONICS ENGINEERING**

**Time : 3 Hours**

**Max. Marks : 100**

**Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.**

**SECTION – A**

**1. Explain the following:**

**10 x 2 = 20**

- Differentiate between N-type and P-type semiconductor.
- Give all the Equivalent / Approximation circuits of a Diode.
- Find the barrier potential of a silicon diode at junction temperature of 75°C and 10°C. Assume a barrier potential of 0.7 V at an ambient temperature of 25°C.
- What is a Varactor Diode, give its application also.
- What is Schottky Diode, give its application also.
- Differentiate between Multi meter and CRO.
- Determine  $\beta_{dc}$  and  $I_{CBO}$ , if  $I_E = 5$  mA,  $I_C = 4.95$  mA,  $I_{CEO} = 200\mu A$ .
- Differentiate between Depletion and Enhancement type MOSFET.
- The Op-Amp has a Slew Rate of 10 V/ $\mu$ sec. What is the power bandwidth for a peak output voltage of 5 V.
- Define Modulation Index.

**SECTION – B**

**2. Attempt any five of the following questions:**

**5 x 10 = 50**

- Draw & explain the V-I characteristic of a P-N junction diode. Also describe the effect of temperature on the V-I characteristic of a P-N junction diode.
  - For a Zener Voltage regulator, determine the range of  $R_L$  and  $I_L$  that will result in  $V_O$  being maintained at 10V. Given  $V_{in} = 50V$ ,  $R = 1K \Omega$ ,  $I_{ZM} = 32mA$ .
- Differentiate between Clipper and Clamper circuit.
  - Explain the function of the circuit shown in Fig. 2b(ii). and draw the output waveform.
- Describe the construction of a NPN transistor. Define  $\alpha$  and  $\beta$  with respect to BJT and derive the relationship between them.
  - Refer the information appearing in Fig. 2c(ii). Determine  $I_C$ ,  $V_E$ ,  $V_C$ ,  $I_B$ ,  $\beta$  &  $V_{CE}$ .

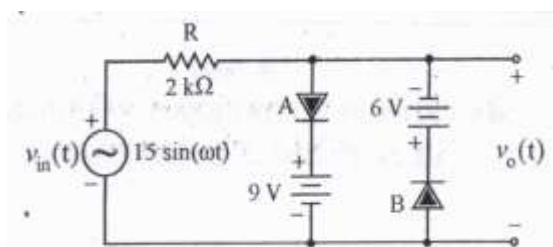


Fig. 2b(ii)

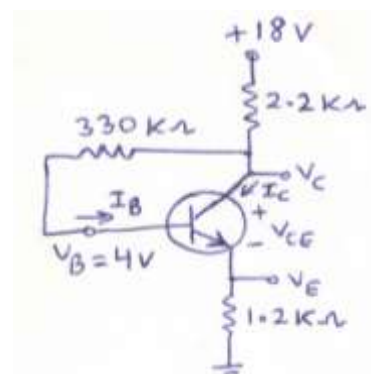


Fig. 2c(ii)

- Explain the construction, working and characteristics of MOSFET.
- Draw the circuit of a subtractor circuit using op-amp and explain its working by obtaining output expression.

- (h) Draw the circuit of Integrator using op-amp and obtain expression for output.
- (f) Describe the working of Digital Voltmeter and Digital Multi Meter giving their block diagram.
- (g) Describe the working of CRO giving its block diagram
- (h) Describe communication system with the help of its block diagram.

### SECTION – C

Attempt any two of the following questions:

2 x 15 = 30

3. (a) List up the characteristics of an Op- amp. Also give its symbol and equivalent circuit. For a particular Op-Amp the input offset current is 10 nA while input bias current is 40 nA. Calculate the values of two input bias currents.
- (b) In a full wave rectifier the load resistance is  $2\text{ K } \Omega$ ,  $r_f = 400\text{ } \Omega$ . Voltage applied to each diode is  $240\sin\omega t$ . Find
- |   |                                       |
|---|---------------------------------------|
| (i) Peak value of current i.e. $I_m$      | (ii) DC value of current i.e $I_{dc}$ |
| (iii) RMS value of current i.e. $I_{rms}$ | (iv) Efficiency                       |
| (v) Ripple Factor.                        |                                       |
4. (a) Define the following:
- |                |                        |
|----------------|------------------------|
| (i) Slew Rate  | (ii) Electron Volt     |
| (iii) Mobility | (iv) Ripple Factor     |
| (v) CMRR       | (vi) Pinch Off Voltage |
| (vi) T.U.F.    |                        |
- (b) What is modulation? Give the need of modulation. Differentiate AM & FM.
5. (a) Describe the working of voltage multiplier circuit.
- (b) Describe Amplitude Modulation by obtaining its expression. A 560 watt carrier is modulated to a depth of 75%. Calculate the total power in the modulated wave.