

**B.TECH.**

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

**BASIC ELECTRONICS**

**Time : 3 Hours**

**Max. Marks : 70**

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

**SECTION – A**

**1. Explain any seven of the following:**

**7 x 2 = 14**

- Classify the materials with help of energy band.
- Explain the principle of operation of LED.
- Derive the relationship between  $\alpha$  and  $\beta$ .
- Why are FET called unipolar device?
- Write down the constructional difference between Depletion type and Enhancement type MOSFET.
- Derive the circuit of integrator using an ideal Op-Amp.
- State the advantages of digital instruments over analog instruments.
- Briefly discuss the need of modulation in communication engineering.

**SECTION – B**

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

**5 x 7 = 35**

- Explain the V-I characteristic of p-n junction diode. How it is differ from Zener diode?
- Draw the circuit and discuss the working of full wave bridge rectifier with suitable input -output waveforms. What is PIV of bridge rectifier?
- Draw and explain the construction and working of p-channel depletion type MOSFET. Also draw the characteristics of p-channel depletion type MOSFET.
- Calculate the output voltage for the circuit of Figure 1 with inputs of  $V_1 = 40$  mV rms and  $V_2 = 20$  mV rms.

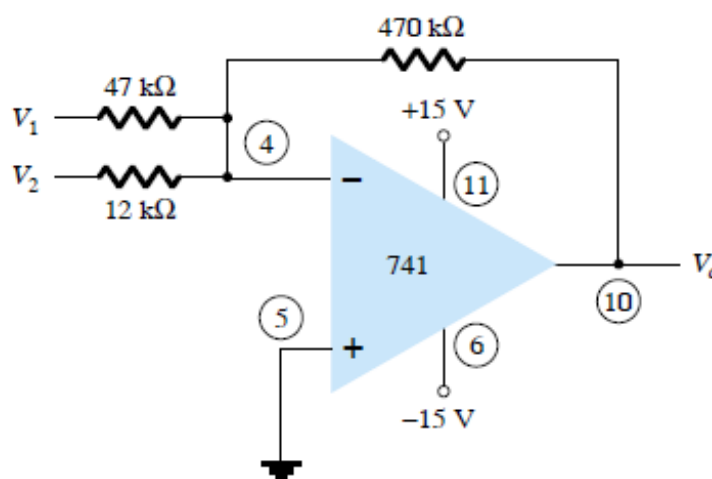


Figure 1

- Given that  $I_{CQ} = 2$  mA and  $V_{CEQ} = 10$  V, determine  $R_1$  and  $R_C$  for the network of Figure 2.

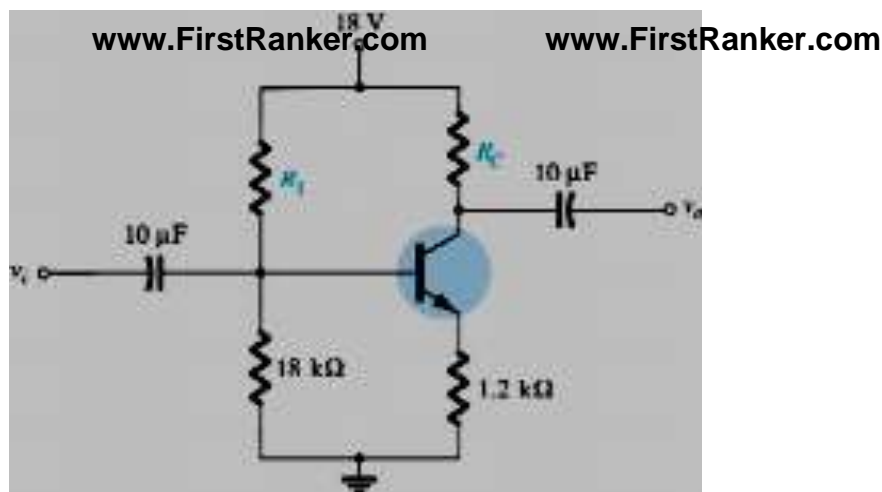


Figure 2

- (f) Draw and explain the block diagram of Ramp type digital voltmeter. Also draw related voltage to time conversion waveforms.
- (g) Derive the expression for AM modulated waveform. Also derive the expression for modulation index.
- (h) Describe the operation of CRT with neat block diagram. How unknown frequency is measured using CRO?

### SECTION – C

Attempt any two of the following questions:

2 x 10.5 = 21

3. (a) Explain principle of operation and construction of Tunnel diode. Draw its V-I characteristic.
- (b) Design a clamper to perform the function indicated in Figure 3.

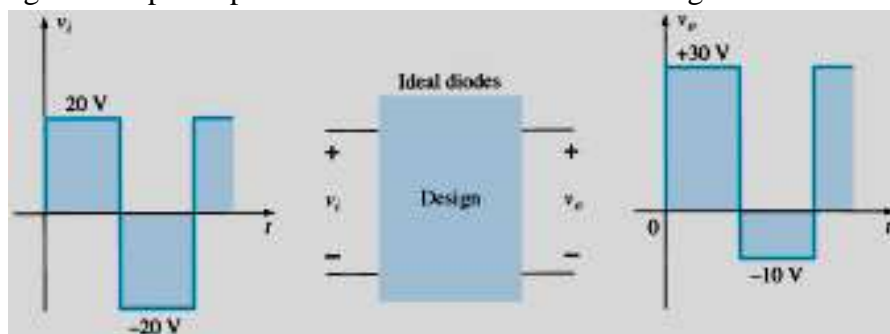


Figure 3

4. (a) Draw and explain the N-channel JFET and draw its transfer characteristics.
- (b) Draw and explain the differential amplifier. Define CMRR and slew rate in Op-Amp.
5. (a) Draw the CE n-p-n BJT characteristics. Also explain the self bias configuration in DC bias configuration.
- (b) Discuss the need of modulation in the communication engineering. Which types of modulations are used in television?