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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**

(a) Classify the materials with help of energy band.

(b) Explain the principle of operation of LED.

(c) Derive the relationship between α and β.

(d) Why are FET called unipolar device?

(e) Write down the constructional difference between Depletion type and Enhancement type MOSFET.

(f) Derive the circuit of integrator using an ideal Op-Amp.

(g) State the advantages of digital instruments over analog instruments.

(h) Briefly discuss the need of modulation in communication engineering.

SECTION – B

2. Attempt any five of the following questions: **5 x 7 = 35**

(a) Explain the V-I characteristic of p-n junction diode. How it is differ from Zener diode?

(b) Draw the circuit and discuss the working of full wave bridge rectifier with suitable input -output waveforms. What is PIV of bridge rectifier?

(c) Draw and explain the construction and working of p-channel depletion type MOSFET. Also draw the characteristics of p-channel depletion type MOSFET.

(d) Calculate the output voltage for the circuit of Figure 1with inputs of V_1= 40 mV rms and V_2=20 mV rms.

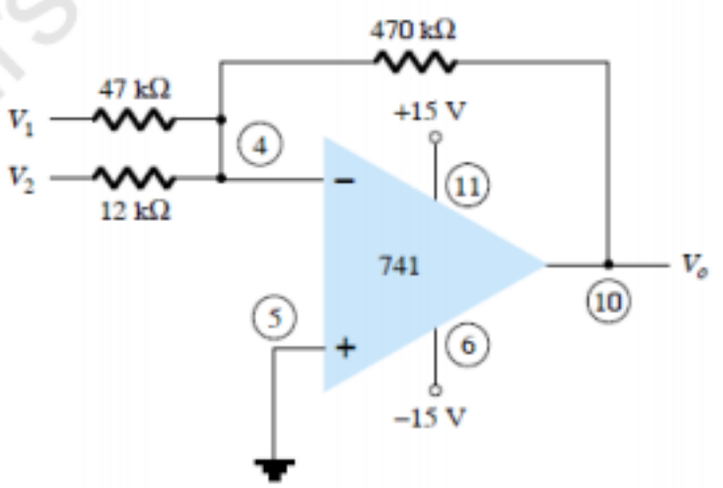

Figure 1

(e) Given that I_{CQ} = 2 mA and V_{CEQ} =10 V, determine R_1 and R_C for the network of Figure2.

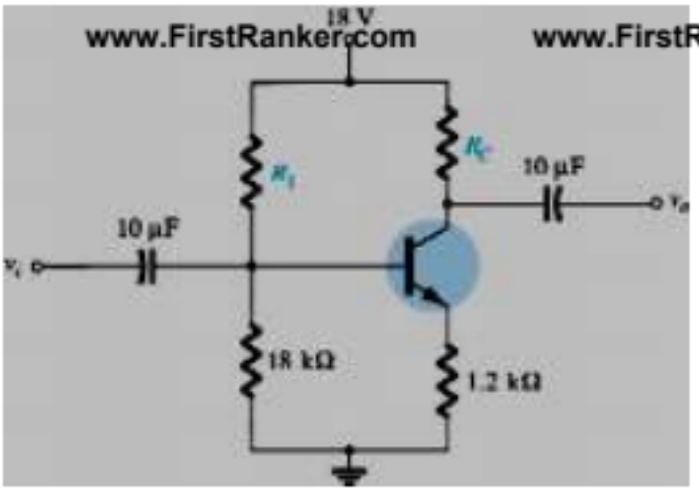

Figure 2

(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.

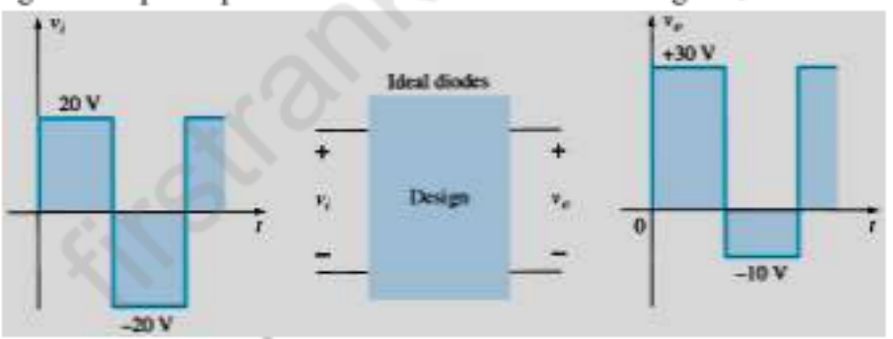

Figure 3

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?