Printed Pages: 7 **REC-101**

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2012295 Roll No. | | | | | | | | | | |

B.TECH.

Regular Theory Examination (Odd Sem - I), 2016-17

BASIC ELECTRONICS

Paper-I

Time : 3 Hours *Max. Marks : 100*

Section - A

1 Attempt all parts. All parts carry equal marks. Write answer of each part in short. (10×2=20)

a) Distinguish between avalanche and zener breakdown.

b) Calculate the dynamic forward resistance of pn junction diode when applied voltage is 0.80 V at temperature of 43 degree Celsius and reverse saturation current is 8 microampere?

c) Explain the principle of operation of LED.

d) Derive the relationship between α and β.

e) The thickness of base is typically smaller than emitter and collector. Why?

f) Explain FET as voltage variable resistor.

g) An operation amplifier has differential gain of 10^2 and CMRR of 80 dB, input voltage are 100 microampere and 60 microampere. Determine output voltage.

h) Write the characteristics of an ideal Op-Amp.

i) State the advantages of digital instruments over analog instruments.

j) Give advantages of FM over AM?

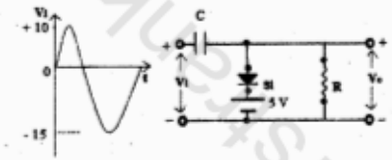
Section - B

Attempt any five questions from this section **(5×10=50)**

2. a) Explain the V-I characteristic of p-n junction diode. Draw well labelled characteristic.

b) Draw the circuit and discuss the working of full wave bridge rectifier with suitable input-output waveform.

3. a) For the given clamper circuit shown in figure below determine the output voltage and also draw the waveform of output signal.



b) Explain the V-I characteristic of tunnel diode.

4. a) Draw the circuit diagram of BJT in CE configuration. Draw output characteristic curves and indicate the different regions of operation.

b) An n-p-n transistor with $\beta = 98$ is operated in the CB configuration, if the emitter current is 2 mA and reverse saturation current is 12 μA. What are the base and collector current?

5. a) Why is transistor biasing required? Describe collector to base biasing in CE n-p-n transistor circuit.

b) Explain various current components in npn transistor with help of suitable diagram.

6. a) Draw the circuit and explain the drain characteristic for N-channel JFET.

b) Describe the construction and basic connection of Depletion - MOSFET.

7. a) Draw the circuit diagram of an integrator using Op-Amp and explain its working.

b) Design and draw an inverting amplifier using Op-Amp with a gain of –5 and $R_i = 10$ KΩ.

8. a) Explain how unknown signal frequency is measured using CRO.

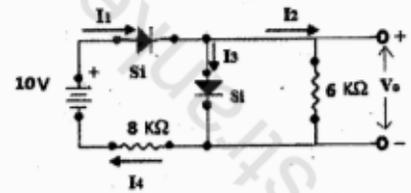
b) Explain the basic principle of a digital multimeter.

9. Define Amplitude modulation. Derive the expression for AM modulated waveform. Define modulation index of AM.

Section - C

Attempt any two questions from this section **(2×15=30)**

10. a) For the circuit shown in figure below determine I_1, I_2, I_3, I_4, V_0.

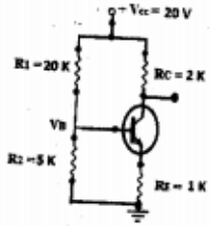


b) Draw and discuss voltage tripler circuit.

c) Explain principle of operation of LCD.

11. a) Discuss AC equivalent model of voltage divider biased amplifier in CE configuration.

b) For the circuit shown below determine V_B, I_C, V_C. Given that $\beta = 80$, $V_{BE} = 0.7$ V.



c) Explain the formation of depletion region in JFET.

12. a) Draw and derive relationship for Op-Amp as closed loop non-inverting amplifier circuit.

b) A 500 W carrier is modulated to a depth of 60%. Calculate the total power in amplitude modulated wave.

c) If a FM wave is represented by the equation :

$V = 8\sin(6 \times 10^8 + 3\sin 2000t)$

Calculate :

i) Carrier frequency

ii) Modulating frequency

iii) Modulation index.

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