Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33402 | Roll No. [| | | | | | | | |]

B. Tech. Examination 2021-22

(Even Semester)

BASIC ELECTRONICS ENGINEERING

Time : Three Hours]   **[Maximum Marks : 60**

Note :– Attempt all questions.

SECTION – A

1. Attempt all parts of the following : $8 \times 1 = 8$

   (a) Distinguish between Avalanche and Zener breakdown mechanisms.

   (b) What do you mean by Doping? Describe its need.

   (c) Define threshold voltage for an E-MOSFET. Also define I_{DSS} for an JFET.

   (d) Explain FET as voltage variable resistor.

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(e)   Convert $(6089.25)_{10} \rightarrow (?)_8$.

(f)   Explain need for modulation.

(g)   Enlist the characteristics of an ideal op-amp.

(h)   Explain Barkhausen criterion for oscillation.

SECTION – B

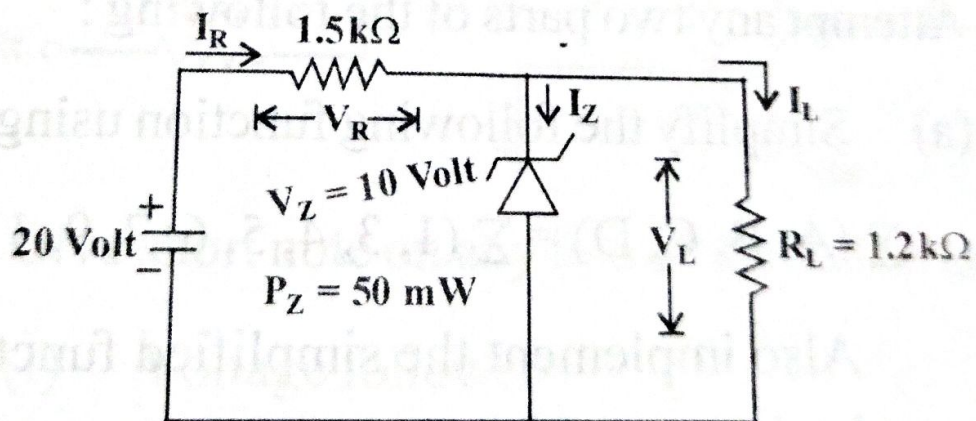2.   Attempt any two parts of the following : $2 \times 6 = 12$

    (a)   What do you mean by rectification? With help of neat circuit diagrams, explain working of a full wave bridge rectifier and calculate ripple factor.

    (b)   Give a sketch of the basic structure of n-channel enhancement type MOSFET. Explain its operation and characteristics. Discuss pinch off voltage.

    (c)   What are the basic elements of communication system? Explain communication system with the help of block-diagram.

    (d)   Define CMRR and slew rate. Draw the circuit diagram of differentiator using op-amp and derive the expression for voltage gain.

SECTION – C

Note :– Attempt all questions from this section. 10×4
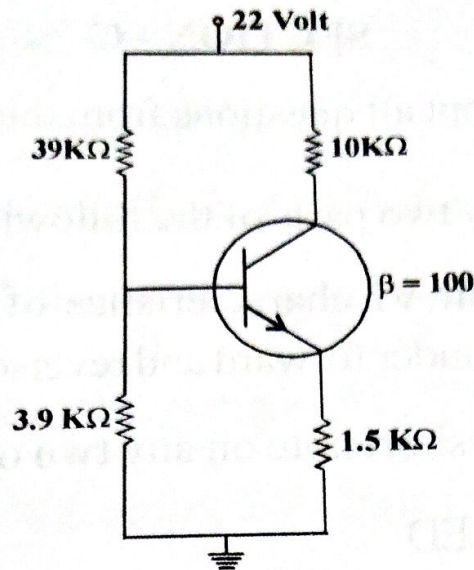
3. Attempt any two parts of the following :

   (a) Explain VI characteristics of a P-N junction diode under forward and reverse bias conditions.

   (b) Give a short note on any **two** of the following :

       (i) LED

       (ii) LCD

       (iii) Solar Cell

   (c) Determine V_L, V_R, I_Z and I_R for given network :

4. Attempt any two parts of the following :

   (a) Explain voltage divider bias configuration for BJT. Find I_C and V_{CE} for given circuit if $\beta = 100$:

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22 Volt

39KΩ   10KΩ

β = 100

3.9 KΩ   1.5 KΩ

(b) Draw and explain input and output characteristics of a BJT in CE configuration.

(c) Explain working principle of NPN bipolar junction transistor.

5. Attempt any two parts of the following :

(a) Simplify the following function using K map :

$$\Sigma (A, B, C, D) = \Sigma (1, 3, 4, 5, 6, 7, 9, 11, 13, 15)$$

Also implement the simplified function using basic gates only.

(b) By showing all the calculations, do as directed :

(i) $(110110.011)_2 = (\ ?\ )_{16}$

(ii) $(231.36)_{10} = (\ ?\ )_2$

6.

(c)   What do you mean by amplitude modulation? Explain with help of proper wave forms.

6.   Attempt any two parts of the following :

(a)   Explain op-amp as a summer with necessary calculations and diagram. Why open loop op-amp configuration are not used in linear applications.

(b)   Find output voltage of the following op-amp circuit :
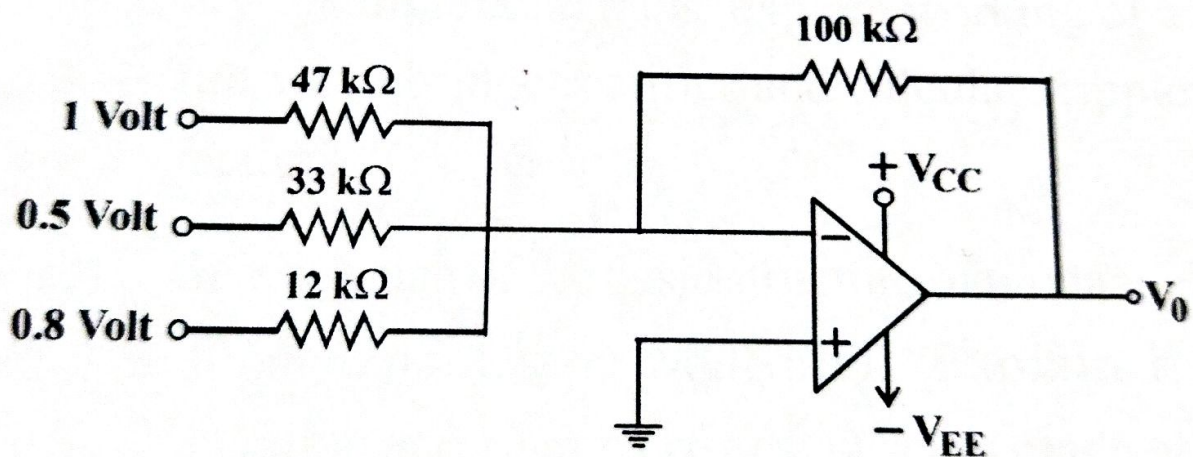
(c)   Give short note on any two of the following :

(i)   Voltage follower

(ii)   Inverting amplifier

(iii)   Op-amp as an integrator

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