S.No. : 519

BEC 3201

No. of Printed Pages : 05

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

PAPER ID : 33402 Roll No.

B. Tech. Examination 2022-23

(Even Semester)

BASIC ELECTRONICS ENGINEERING

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

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

   (a) Which type of impurity is added to make n-type semiconductor?

   (b) Draw the VI characteristics of an ideal diode.

   (c) Write down the biasing condition of a BJT for active mode.

   (d) What is the function of SiO_2 layer in MOSFET?

   (e) Draw the circuit diagram of voltage follower.

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(f) For an OP-amp if $Ad = 5 \times 10^5$ and $AC = 50$. Find CMRR.

(g) Write down the truth table for two input NOR gate.

(h) What is the value of $X + X'$?

SECTION – B

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

(a) A bridge rectifier circuit with $R_L = 200\ K\Omega$ is is given an input of 230V, 50 Hz from power mains through a transformer having turn ratio 4 : 1. Calculate I_{dc}, I_{rms}, ripple, factor, P_{dc}, P_{ac} and rectification efficiency. Neglect the diode and secondary winding resistance.

(b) Sketch and explain the input and output characteristics of transistor in CE configuration. Why CE configuration is most widely used for amplification?

(c) Perform the following conversion :

(i) $(10.265)_{10} = (?)_2$

(ii) $(475.25)_8 = (?)_{10}$

(iii) $(B2C.D6)_{16} = (?)_2$

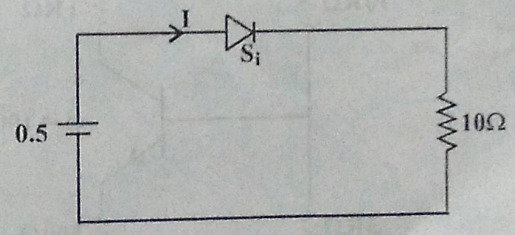
(iv) $(736.25)_8 = (?)_{16}$

(d) Draw the circuit of a difference amplifier using OP-AMP. Also derive the expression for output voltage.

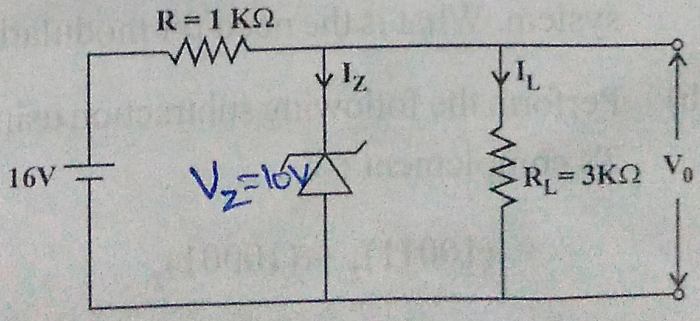
SECTION – C

Note :– Attempt all questions. Attempt any two parts from each question. 5×8=40

3. (a) Explain worknig of PN junction diode in forward biased condition. Calculate the current I for the network given below :



(b) Explain Zener breakdown mechanism in a reversed biased diode. For the network given below find V_0 and I_Z :

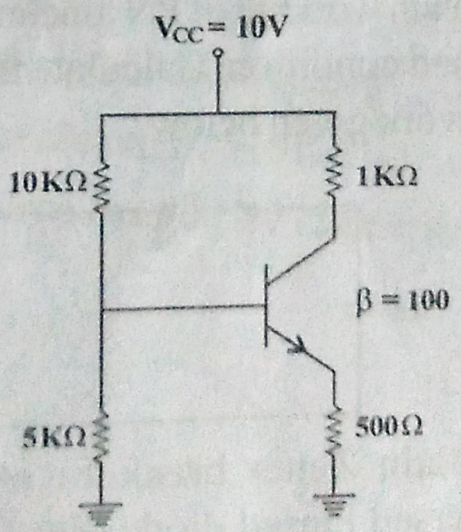


(c) Explain the working of LED with neat diagram. What are the advantages of LED?

4. (a) Explain the input and output characteristics of a BJT in CE configuration.

(b) Explain the construction and drain characteristics of N-channel E-MOSFET.

(c) For the following voltage divider circuit find the I and V_{CE}. Assume germanium transistor :



5. (a) Explain the block diagram of communication system. What is the need for modulation?

(b) Perform the following subtraction using 1's and 2's complement :

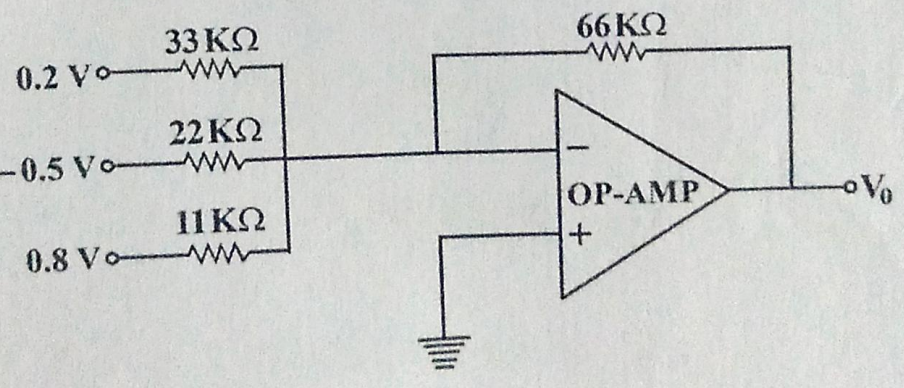
$$(10011)_2 - (10001)_2$$

(c) What are the universal gates? Reduce the following function using K-map and implement the reduced function with basic gate :

$$F(A\ B\ C\ D) = \Sigma\,(0, 2, 4, 5, 6, 7, 8, 10, 13, 15)$$

6. (a) What do you understand by CMRR? Enlist the characteristics of ideal OP-AMP.

(b) Derive the output expression for the inverting summing op-amp. Find the output voltage for the following network :



(c) Which type of feedback is used for the oscillation? Explain the principle of oscillator and describe the Barkhausen criterion.

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