

S.No. : 392

BEC 2201

No. of Printed Pages : 05

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

PAPER ID : 23402

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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) Which type of impurity is added to make n-type semi conductor?
 - (b) Draw VI characteristics of ideal diode.
 - (c) What is biasing condition of emitter base and collector base junction in active region of a BJT.
 - (d) For $\alpha = 0.98$.. Find the value of β .

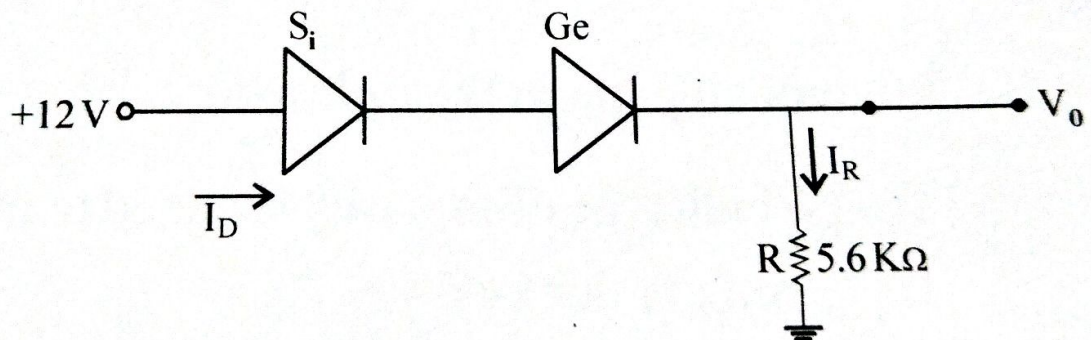
[P. T. O.]

- (e) State Demorgan's theorem.
- (f) Convert $(636)_8$ to binary number.
- (g) What is the value of CMRR if $A_d = 4000$ and $A_c = 40$?
- (h) Draw the circuit diagram of voltage follower.

SECTION – B

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

- (a) Explain working of PN junction diode in forward biased condition. Determine V_0 and I_D for the series circuit of following figure :



- (b)
 - (i) Explain the construction and working of npn transistor.
 - (ii) Derive the relationship between α and β . Calculate I_C and I_E for a transistor that has $\alpha_{dc} = 0.95$ and $I_B = 50\text{ }\mu\text{A}$.

- (c) (i) Find the complement of the following expression :

$$F = (A + B' + C)(A' + C')$$

- (ii) Perform the following conversion :

- (1) $(2AE)_{16}$ into binary
 - (2) $(135)_8$ to hexadecimal
 - (3) $(214)_{10}$ to octal
 - (4) $(0.8125)_{10}$ to binary
- (d) Draw the circuit of a difference amplifier using OP-amp. Also derive the expression for output voltage.

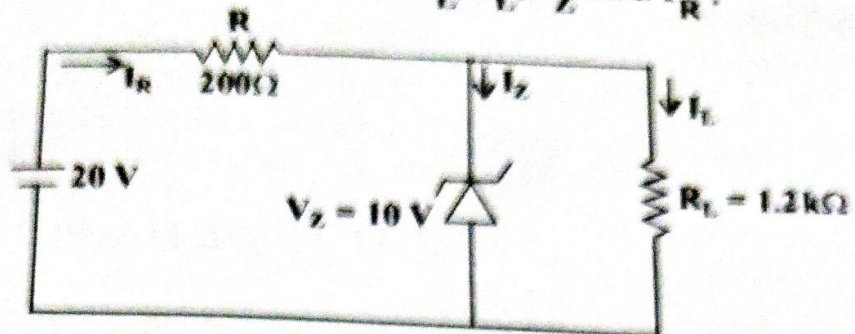
SECTION – C

Note :- Attempt all questions. Attempt any two parts from each questions.

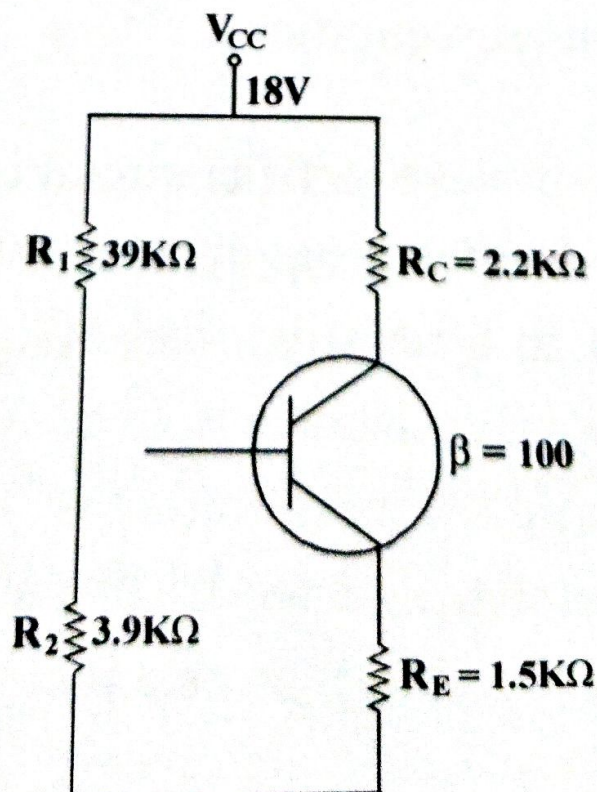
$$5 \times 8 = 40$$

3. (a) A half wave rectifier circuit is supplied from a 230 V, 50 Hz supply with a step down ratio of 3 : 1 to a resistive load of 10 K Ω . The diode forward resistance is 75 Ω . While transformer secondary resistance is 10 Ω . Calculate maximum, average, RMS value of current, D. C. output voltage and efficiency of rectification.

- (b) Explain Zener breakdown mechanism. For the following circuit find V_L , I_L , I_Z and I_R :



- (c) Explain the construction and working principle of LED. What are the advantages of LED?
4. (a) Sketch and explain the input and output characteristics of transistor 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_{CQ} and V_{CEQ} . Assume silicon 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 :

$$(100111)_2 - (100011)_2$$

- (c) Minimise the given Boolean function using K-map and implement the minimized function using basic gates :

$$F(A B C D) = \Sigma (1, 3, 5, 7, 9, 10, 12, 13, 15)$$

6. (a) What do you understand by CMRR? Enlist the characteristics of ideal OP-amp.
- (b) Explain the working of oscillator with the help of block diagram. What is Barkhausen criterion?
- (c) Derive the output expression for the inverting summing OP-amp.

