

S.No. 628

No. of Printing Pages : 5

NEC4101

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

Paper ID : 43401

Roll  
No.

**B.Tech. Examination -2023-24**

**(Odd Semster)**

**BASIC ELECTRONICS ENGINEERING**

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

**Note :- Attempt all questions.**

**SECTION-A**

1. Attempt each part in this section. Each part carry equal marks.  $8 \times 1 = 8$

- What is extrinsic semiconductor ?
- Draw VI characteristics of an ideal diode.
- For  $\alpha = 0.98$  find the value of  $\beta$ .
- Why FET is called unipolar device ?

**[ P. T. O. ]**

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3-24)

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d) Explain transistor &  $\beta$ .

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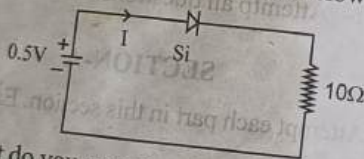
c)

- (e) What is the biasing condition of BJT in saturation mode.
- (f) For a given op-amp,  $CMRR=10^4$  and  $Ad=10^6$ , find its common mode gain.
- (g) Draw the circuit of voltage follower.
- (h) State demorgan's theorem.

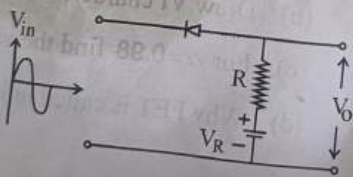
### SECTION-B

2. Attempt any two parts in this section. Each part carry equal marks.  $2 \times 6 = 12$

- (a) Explain working of PN junction diode in forward biased condition. Calculate the current  $I$  for the network given below—



- (b) What do you mean by clipper circuits? Find the output waveform of the following clipper circuit.

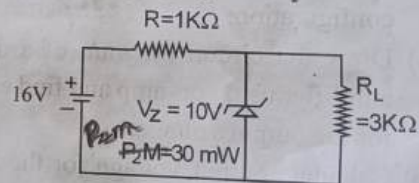


- (c) Explain the construction and working of p-n-p transistor.
- (d) Draw the circuit diagram of non-inverting amplifier. Derive the expression of voltage gain for inverting amplifier.

### SECTION-C

3. Attempt any two parts from each questions. Each part carry equal marks.  $5 \times 8 = 40$

- (a) What is avalanche breakdown. For the zener diode network of the following figures determine  $V_L$ ,  $V_R$ ,  $I_z$  and  $P_z$ .



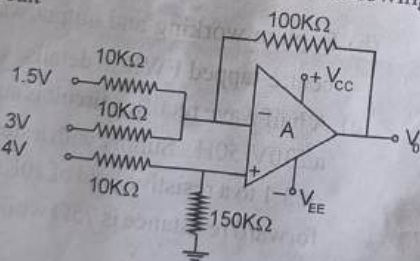
- (b) Explain working and output waveform of centre-tapped FWR in details.
- (c) A half wave rectifier circuit is supplied from a 230V, 50Hz. Supply with a step down ratio of 3:1 to a resistive load of 10KΩ. The diode forward resistance is 75Ω while transformer

[ P. T. O. ]



secondary resistance is  $10\Omega$ . Calculate maximum, average, rms value of current, d.c. output voltage, efficiency of rectification and ripple factor.

4. (a) Explain the construction and working of n-channel JFET.
- (b) Derive the relationship between  $\alpha$  and  $\beta$ . Calculate  $\alpha$  and  $\beta$  for the given transistor for which  $I_c = 5\text{mA}$ ,  $I_B = 50\mu\text{A}$  and  $I_{CBO} = 1\mu\text{A}$ .
- (c) Sketch and explain the input and output characteristics of CB npn transistor configuration.
5. (a) Draw the circuit diagram of a difference amplifier using op-amp and find expression for the output voltage.
- (b) Calculate output voltage for the following circuit



(c) Perform the following conversion—

- (i)  $(A85)_{16}$  into decimal
  - (ii)  $(25.815)_{10}$  into binary
  - (iii)  $(475.25)_8$  into decimal
  - (iv)  $(10110110.11)_2$  into octal
6. (a) Define and explain the depletion region of a p-n junction diode.
  - (b) Explain the drain and transfer characteristics of n-channel JFET.
  - (c) Realise the following logic gates using NAND and NOR gate.
    - (i) AND gate
    - (ii) OR gate
    - (iii) EX-OR gate