

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

Paper ID : 43401

**Roll
No.**

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B.Tech. Examination -2023-24

(Odd Semester)

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. $8 \times 1 = 8$

- (a) What is extrinsic semiconductor ?
- (b) Draw VI characteristics of an ideal diode.
- (c) For $\alpha=0.98$ find the value of β .
- (d) Why FET is called unipolar device ?

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(e) What is the biasing condition of BJT in saturation mode.

(f) For a given op-amp, $CMRR = 10^4$ and $Ad = 10^5$, find its common mode gain.

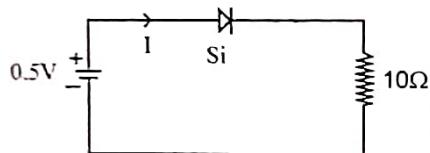
(g) Draw the circuit of voltage follower.

(h) State demorgan's theorem.

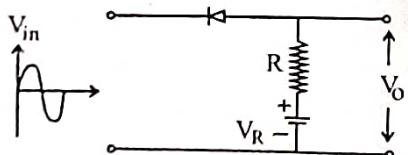
SECTION-B

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.

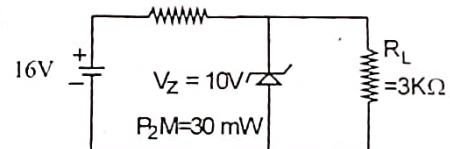
(d) Draw the circuit diagram of non-inverting amplifier. Derive the expression of voltage gain for inverting amplifier.

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 .

$$R = 1\text{ k}\Omega$$



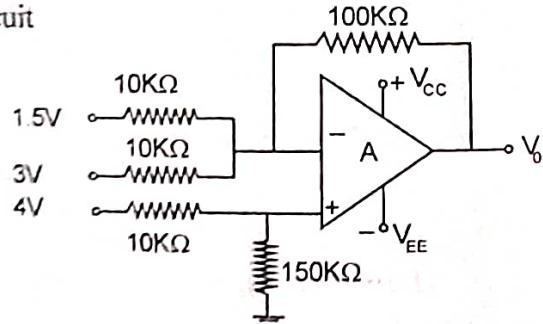
(b) Explain working and output waveform of centre-tapped FWR in details.

(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

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secondary resistance is 10Ω . 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 α and β . Calculate α and β 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