

S.No. : 674

NEC 4201

No. of Printed Pages : 05

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

PAPER ID : 43402

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B. Tech. Examination 2023-24

(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) What is doping?
- (b) Draw the energy band diagram of insulator.
- (c) What is effect of doping on depletion width in pn junction diode?
- (d) What is value of β , if $\alpha = 0.95$?
- (e) Write down the Shockley's equation for JFET.

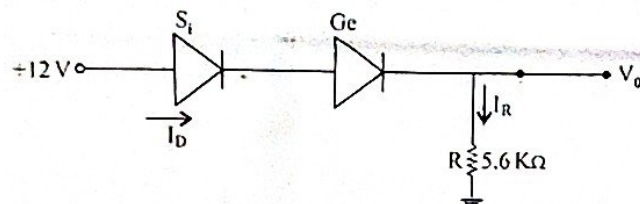
[P. T. O.]

- (f) Draw the circuit diagram of voltage follower.
- (g) Write down the truth table of NAND gate.
- (h) What is 2's complement of $(1001101)_2$.

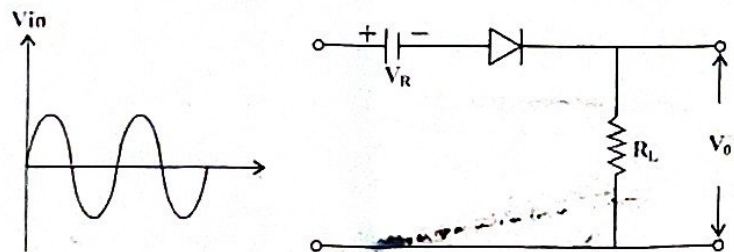
SECTION - B

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

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



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

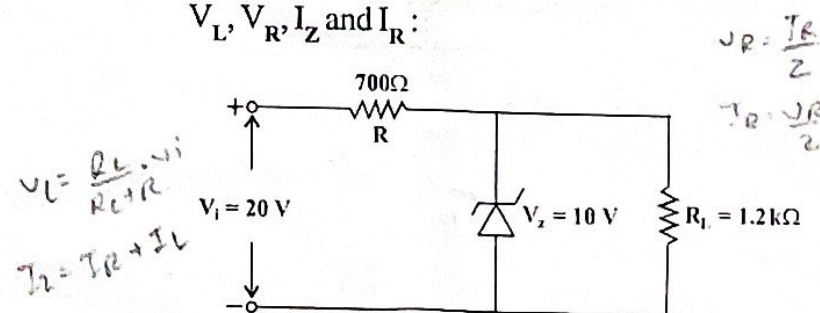


- (c) Sketch and explain the input and output characteristics of transistor in CE configuration.
- (d) Perform the following conversion :
 - (i) $(53.60)_{10}$ into binary.
 - (ii) $(10110)_2$ into decimal.
 - (iii) $(3C5.B)_{16}$ into octal.
 - (iv) $(325)_8$ into hexadecimal.

SECTION - C

Note :- Attempt all questions. Attempt any two parts from each questions. $8 \times 5 = 40$

- 3. (a) Explain Zener breakdown mechanism in reverse biased diode. For the network shown determine V_L , V_R , I_Z and I_R :



- (b) Explain the working and output waveform of full wave bridge rectifier.

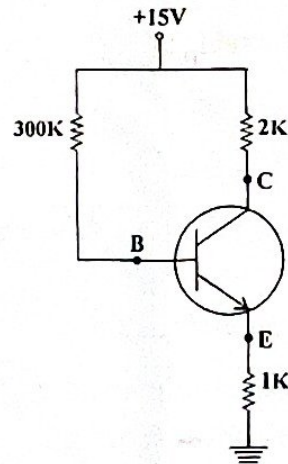
[P.T.O.]

- (c) In a centre tapped full wave rectifier, the rms half secondary voltage is 9V. Assuming ideal diodes and load resistance $R_L = 1K\Omega$, find :

- (i) I_{dc}
- (ii) I_{rms}
- (iii) Ripple factor
- (iv) Efficiency

4. (a) Explain the construction and working of npn transistor.

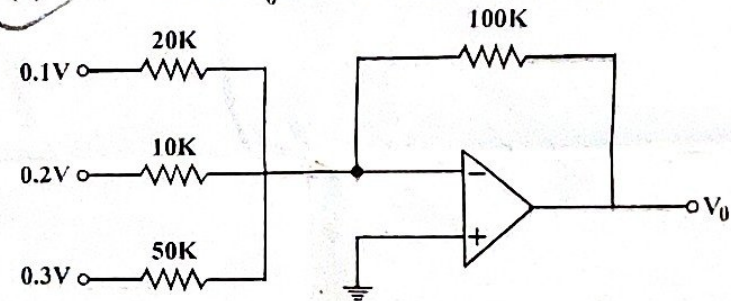
- (b) For the following circuit, calculate I_B , I_C , V_{CE} , V_C , V_E , V_B and V_{BC} . Assume $\beta = 100$ and $V_{BE} = 0.7V$.



- (c) Explain the construction and working of n-channel JFET.

5. (a) Define CMRR of an op-amp. Determine the output voltage of an op-amp for the input voltages of $300\mu V$ and $240\mu V$. The differential gain of the amplifier is 5000 and the value of the CMRR is 10^5 .

- (b) Determine V_0 for the following circuit :



- (c) Express the Boolean function $F = A + B' C$ in SOP form.

6. (a) Explain the formation of depletion layer in PN-junction diode.

- (b) Draw the drain and transfer characteristics of p-channel JFET.

- (c) Perform $(11101)_2 - (11001)_2$ using 1's and 2's complement.