

LAB 109
15/05

SE (Elect) sem III (old)

Basic Electronics

VR-3048

Con. 2756-09.

(OLD COURSE)

(3 Hours)

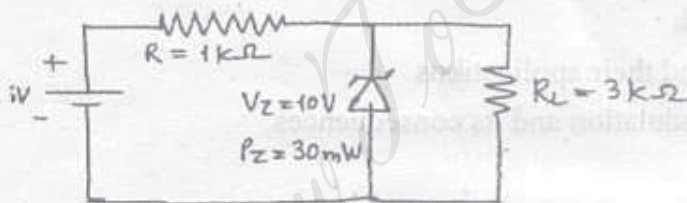
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[Total Marks : 100

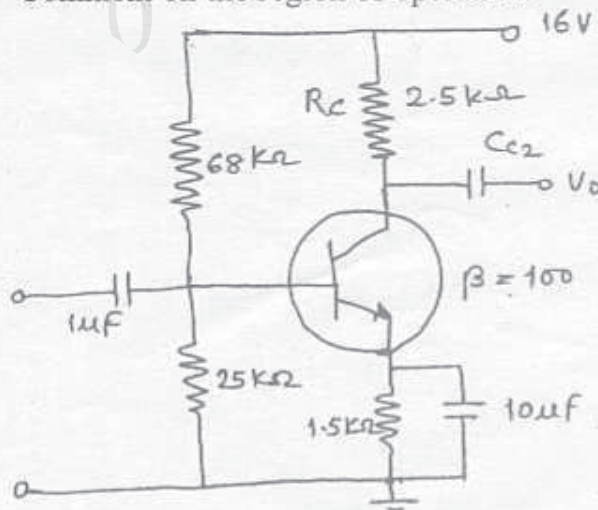
- N.B. : (1) Question No. 1 is compulsory. Solve any four questions out of remaining six questions.
 (2) Assume suitable data wherever required.
 (3) Figures to the right indicate full marks.

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1. (a) Define the terms of FET :— 6
 - (i) Pinch-off voltage
 - (ii) Trans-conductance
 - (iii) Drain resistance.
- (b) Differentiate between BJT and FET. 4
- (c) Differentiate between Series Voltage Regulator and Shunt Voltage Regulator. 6
- (d) Explain the construction of a Solar cell. 4
2. (a) Draw circuit diagram of full wave rectifier with CLC filter. 10
 Explain its working with neat sketches. Derive relation for ripple factor.
- (b) Define polarization and explain the different types of polarizations in dielectrics. 10
3. (a) For the zener diode circuit shown below, determine V_L , V_R and P_Z . 5



- (b) Compare Fixed bias with collector to base bias in case of BJT. 5
- (c) In the circuit shown in figure, determine the co-ordinates of operating point of the transistor. Draw the DC load line on output characteristics and show the location of Q point. Comment on the region of operation. 10



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- 4. (a) Give the methods used for biasing the JFET with operating points. 8
- (b) Explain the procedure for designing a single stage CS amplifier for audio frequency range using zero temperature drift. 12

- 5. Design a single stage R-C coupled CE amplifier using the transistor BC147A to meet the following:— 20

$|A_v| \geq 180, V_0 = 3V, S_{ICO} \leq 10, f_L = 20 \text{ Hz}, V_{CC} = 18 \text{ V}.$

Given : Data for BC 147A :—

$I_{C_{max}} = 0.1 \text{ Amp}, P_{d_{max}} = 0.25 \text{ W}, h_{FE}(\text{TYP}) = 180,$

$h_{fe}(\text{typ}) = 220, h_{ie} = 2.7 \text{ k}\Omega.$

Calculate R_i, R_o and A_v of the designed circuit.

- 6. (a) Draw a circuit diagram of the full dual clipper circuit to have clipping levels of $\pm 5V$. Explain its operation with the help of appropriate waveforms and transfer characteristics. 10

- (b) Explain the Hall effect and derive the expression for Hall coefficient. 10

- 7. Write notes on following :— 20

- (a) Types of capacitors
- (b) BJT as a switch
- (c) Thermistors and their applications
- (d) Base width modulation and its consequences.

