

Roll No. ....

Total Pages : 3

BT-1/D-12

8006

**ELEMENTS OF ELECTRONICS  
ENGINEERING**

**Paper-EL-101E**

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt five questions in all, selecting at least one question from each Unit. Question No. 9 is compulsory.

**UNIT-I**

1. (a) Explain, why temperature coefficient of resistance of a intrinsic semiconductor is negative ? 3
- (b) Explain the formation of depletion region in an open circuit p-n junction diode. What is the effect of forward and reverse bias on depletion region ? 7
- (c) What do you understand by a clamping circuit ? Explain, how p-n junction diode may be used as positive clamper. 5
2. (a) Design a voltage regulator that will maintain an output voltage of 20V across a load of  $1K\Omega$  with an input that may vary between 30V and 50 volts. 8
- (b) Draw the circuit of centre tapped full wave rectifier and explain its operation with the help of waveforms. 7

**UNIT-II**

3. (a) Draw the block diagram of voltage series feedback in amplifier. How negative feedback modify the gain of Amplifier ? 5

- (b) Discuss the input and output characteristics of CE NPN transistor in detail. 10
- 4. (a) What do you understand by biasing ? Explain the working of fixed biasing and voltage divider biasing circuit with help of accurate analysis. 10
- (b) Draw the expression for frequency of oscillation of Wein bridge oscillator. 5

### UNIT-III

- 5. (a) Derive the relation between CMRR and  $V_{out}$  of op-amp. How CMRR may be maximized ? 7½
- (b) What are the characteristics of Ideal op-amp ? Derive the expression for the gain of non-inverting Amplifier. 7½
- 6. (a) Differentiate between sensors and transducers. Give some examples of various sensors and transducers. 5
- (b) Explain the working of op-amp as integrator with output waveforms. 7
- (c) Define (i) CMRR (ii) Slew rate (iii) Input bias current. 3

### UNIT-IV

- 7. (a) Explain construction, working and characteristics of Depletion-Enhancement MOSFET. 8
- (b) Explain the working principle of CRO. Discuss its applications for measuring frequency and phase shift of waveforms. 7
- 8. (a) Explain turn on and turn off characteristics of SCR. How SCR may be used as controlled rectifier ? 7½

- (b) Define various JFET parameters. Also prove that

$$g_m = \frac{-2I_{DSS}}{V_p} \left[ 1 - \frac{V_{GS}}{V_p} \right] \quad 7\frac{1}{2}$$

(Compulsory Question)

9. (a) Why there is constant current in JFET after pinch off?  
(b) Derive the relation between  $\alpha$  and  $\beta$ .  
(c) Why Si type transistors are more often used than Ge type transistors?  
(d) Define PIV in rectifier circuit.  
(e) Why FET is unipolar device?  
(f) Discuss need of biasing.  
(g) What is PSRR in op-amp?  
(h) How does LED emit light?  
(i) Why transistor action cannot be achieved by connecting two diodes back to back?  
(j) Define Miller's theorem. 1½×10=15