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 1KΩ 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

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   (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 Vout 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. http://www.kuonline.in   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

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(b) Define various JFET parameters. Also prove that

$$gm = \frac{-2I_{DSS}}{V_p} \left[1 - \frac{V_{GS}}{V_p} \right].$$ 7½

(Compulsory Question)

9. (a) Why there is constant current in JFET after pinch off ?

(b) Derive the relation between α and β.

(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