Total No. of printed pages = 6

RETEST EXAMINATION – 2019

Semester : 3rd (Old)

Subject Code : Et-304

ELEMENTS OF ELECTRONICS ENGINEERING

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* questions of PART–A are compulsory.
2. Answer any *five* questions from PART–B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) A pure semiconductor is known as _____.

   (b) A semiconductor has _____ temperature coefficient of resistance.

   (c) A semiconductor has generally _____ valence electrons.

[Turn over

(d) An oscillator employs _____ feedback.

(e) ICs are generally made of _____.

(f) The SiO_2 layer in an IC acts as _____.

(g) The value of negative feedback fraction is always _____.

(h) Amplifiers use _____ feedback.

(i) A transistor has a β_{DC} of 250 and a base current, I_B, of 20 μA. The collector current I_C, equals _____.

(j) To operate properly, a transistor's base-emitter junction must be forward biased with reverse bias applied to _____ junction.

2 Write true or false : 1×10=10

(a) A reverse biased diode will act as an open switch.

(b) P-terminal of P-N junction diode is known as cathode.

(c) Electrons in p-type material of a semi-conductor are called as majority carriers.

(d) A donor to a semiconductor material is pentavalent.

(e) The current gain of a PNP transistor is near zero.

(f) The emission of electrons from a heated source is thermionic emission.

(g) Ratio of small change in plate current to small change in plate voltage with constant plate voltage is known as transconductance.

(h) Function of focussing anode is to increase the brightness.

(i) Oscillator function is to convert DC to AC.

(j) Full form of CRO is Cathode Ray Oscillator.

3. Choose the correct answer : 1×5=5

(a) When a pure semiconductor is heated, its resistance

(i) Goes up

(ii) Goes down

(iii) Remains the same

(iv) Initially goes up and then goes down

(b) In the depletion region of a P-N junction, there is a shortage of

(i) Acceptor ions

(ii) Holes and Electrons

(iii) Donor ions

(iv) Electrons only

(c) A zener diode is used as

(i) an amplifier

(ii) a rectifier

(iii) a voltage regulator

(iv) a multivibrator

(d) The ripple factor of a half-wave rectifier is

(i) 1.21 (ii) 1.12

(iii) 0.48 (iv) 0.84

(e) The maximum efficiency of a half-wave rectifier is

(i) 81.2 % (ii) 82.1 %

(iii) 40.3 % (iv) 40.6 %

PART – B

Marks – 45

4. (a) Define semiconductor with examples. 1

(b) Explain P-type semiconductor with crystal diagram. 2

(c) Draw the block diagram of DC power supply. Describe the operation of each component. 6

5. (a) Define doping. 1

(b) Draw the V-I characteristics of P-N junction diode indicating knee voltage, reverse break-down voltage. 2

(c) Explain the operation of bridge rectifier using circuit diagram and waveforms. 6

6. (a) Draw the symbol for PNP transistor. 1

(b) Explain the operation of NPN transistor. 4

(c) Draw the input and output characteristics of common base (CB) transistor. Explain it. 4

7. (a) What is the function of rectifier ? 1

(b) What are the essential conditions of maintaining oscillations ? 2

(c) Explain the operation of vacuum triode ? 6

8. (a) What is multimeter ? Draw the circuits for the following : 1+4=5

(i) Multimeter as voltmeter

(ii) Multimeter as ohmmeter.

(b) Compare negative feedback with positive feedback. 4

9. (a) Discuss about working of Hartley oscillator with suitable diagram. 5

(b) Explain about different types of biasing circuit of transistor. 4

10. Draw the block diagram of multistage amplifier. What are the variety types of coupling devices available in multistage amplifier and name them. With a diagram explain class B push pull amplifier. 2+2+5=9

11. Establish a relationship between α, β and γ. Write some applications of transistor amplifier ? 5+4=9

12. Write short notes on the following topics : $4\frac{1}{2}\times2=9$

(i) Electronic Emission

(ii) RC coupled amplifier.