Roll No. 2231123220007 Exam Code : D-23
Hasi

Subject Code—60418

B.Sc. EXAMINATION

(Main/Reappear) (Batch 2019 Onwards)

(Third Semester)

PHYSICS

CPL-303, Course-VI

Semiconductor Devices

Time : 3 *Hours* *Maximum Marks* : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

1. (a) What is Drift current ? 2

(b) What is Diffusion current ? 2

(c) Draw Circuit diagram of Common Base Configuration. 2

(d) What are different modes of transistor operation ? 2

(e) What is Oscillators ? Classified Oscillator depending upon nature of generated wave form with example. 3

(f) Give one application of Positive feedback. 1

(g) Define Input offset current and Input offset voltage in OP_AMP. 2

(h) Define OP-AMP, Write it operation symbol. 2

Unit I

2. Describes the expressions for the following for a half wave Rectifier : 16

(a) Average value of output current.

(b) R.M.S. value of output current.

(c) Ripple factor

(d) Voltage Regulation.

3. Describe the expression for a full Wave Rectifier : 16

(a) Average value of output current.

(b) R.M.S. value of output current.

(c) Ripple factor

(d) Voltage Regulation.

Unit II

4. (a) Derive expressions for current gain, voltage gain and power gain of a transistor amplifier operating in C.E. mode. 8

(b) Define load line and quiescent operating point of transistor amplifier. Explain graphically the operation of a Transistor as an amplifier. 6

(c) Why Transistor amplifier in C.E. mode is most commonly used ? 2

5. (a) Sketch and explain the input and output characteristics of common emitter configuration in detail. **8**

(b) Explain and draw the voltage divider biasing circuit. Why Voltage divider biasing circuit is mostly used ? **8**

Unit III

6. Discuss and draw circuit various methods of biasing using single battery. **16**

7. What is Amplifier ? Discuss its classification on basis of use, operation, frequency range of operation and inter-stage coupling. **16**

Unit IV

8. (a) In a non-inverting amplifier; $R_i = 6\ k\Omega$ $R_f = 15\ k\Omega$, Find the value of voltage gain ? **3**

(b) Explain the following OP-AMP application with circuit diagram :

(i) Voltage Comparator 3

(ii) Differentiator 5

(iii) Integrator. 5

9. (a) Explain the IC-741 OP-Amp. 4

(b) Explain the concept of virtual ground in OP-AMP. 4

(c) Why OP-amp called operational amplifier ? 2

(d) Explain the open loop gain in inverting and non inverting mode of operation. 6