Roll No. .....

(05/25)

5178

B.Sc. EXAMINATION

(For Batch 2011 to 2023 Only)

(Second Semester)

PHYSICS

Paper-II (PH-202)

Semiconductor Devices

Time : Three Hours *Maximum Marks : 40*

Note : Q. No. **1** is compulsory. Attempt four more questions selecting one questions from each Unit. All questions carry equal marks. Use of non-programmable calculator is allowed.

(Compulsory Question)

1. (a) How does LED differ from ordinary Bulb ? Give two points of difference.

(b) Out of three configurations of a transistor which one is better in context to applications in electronic equipments ?

(c) Why is negative feedback preferred over positive feedback ? Give two differences.

(d) What are Harmonic Oscillations and feedback oscillators ? $2\times4=8$

Unit I

2. (a) Define Hall Effect and derive the expression for mobility in terms of Hall coefficient. Also give the applications of Hall Effect. 6

(b) At 300 K an ideal solar cell has short circuit current of 3A and open circuit voltage of 0.6 V. Calculate and sketch its power output as a function of operating voltage and find its fill factor from power output. 2

3. (a) What are filter circuits ? Explain the working of series induction and shunt capacitor filters. 5

(b) Explain the working of a Zener diode as a voltage regulator. 3

Unit II

4. (a) What is a Load Line ? How is it obtained ? Explain it with proper circuit diagram. 5

(b) What are the factors which cause the shifting of operating point in a transistor ? 3

5. (a) Explain the term Biasing. Why is it always necessary to Bias a transistor ? What are the requirements of Proper Biasing ? 5

(b) Draw Voltage Divider Biasing Circuit and explain its working. 3

Unit III

6. (a) Why do we couple one Amplifer stage with another ? Derive a relation for overall voltage gain of a multistage amplifer and give the assumptions used. 4

(b) Discuss feedback in amplifier. How does the use of a negative feedback in amplifier improves its gain stability ? 4

7. (a) Explain the working of a C-E transistor amplifier with a circuit diagram and discuss the various gains. 6

(b) The gain of an amplifer is 100 and reduced to one fourth when feedback is used. Find the feedback factor. 2

Unit IV

8. (a) Discuss the construction and working of a Tunned collector common emitter oscillation. 6

(b) The tunned collector oscillator in a radio receiver has a coil of inductance 20 μH with a capacitor of the frequency of oscillator. 2

9. (a) What are sinusoidal and non-sinusoidal oscillators ? Discuss their classifications. How is an oscillator different from an amplifier ? 6

(b) What are damped and undamped oscillations. Show with diagram and write the criteria for undamped oscillations ? 2