

**Exam. Code : 103205****Subject Code : 1406****B.A./B.Sc. Semester—V****PHYSICS (Electronics)****Paper—B**

Time Allowed—3 Hours]

[Maximum Marks—35

**Note** :— Section A is compulsory. Attempt **ONE** question each from Sections B, C, D and E.

**SECTION—A**

1. (a) Why is bleeder resistance used in a filter circuit ?
- (b) Why should we prefer LEDs over conventional incandescent lamps ?
- (c) What is meant by gate-source cutoff voltage ?
- (d) Name the circuit where positive feedback is used.
- (e) What is the need of transistor biasing ?
- (f) What h parameters are preferred ?
- (g) Why we use two transistors in a Wien bridge oscillator ? 7×1=7

**SECTION—B**

2. What is rectification ? Draw and explain the circuit of a full wave rectifier. Find expressions for :
- Average value of output current
  - R.M.S. value of output current
  - Efficiency of rectifier
  - Ripple factor. 7
3. Give detailed note on solar cell. Discuss its various applications. 7

**SECTION—C**

4. Draw a sketch showing the structure of an NPN-junction transistor. Label the emitter, base and collector regions. Also label the emitter-base and collector-base junctions. What is the sign (positive or negative)  $I_E$ ,  $I_B$ ,  $I_C$ ,  $V_{EB}$  and  $V_{CE}$  ? 7
5. Compare and contrast the relative performance ratings of CB, CE and CC modes of operation of a BJT in respect of input and output resistances and voltage and current gains. 7

**SECTION—D**

6. Draw the circuit of a common emitter amplifier and its h-equivalent. Find expressions for its current gain, power gain and input impedance. 7

7. State the merits and demerits of negative feedback in amplifiers. Explain any two of these in detail. 7

**SECTION—E**

8. Under what conditions an amplifier can be converted into an oscillator ? Draw and explain the RC-oscillator. Find expression for its frequency. 7
9. Draw the circuit diagram of a LC oscillator using transistor. Derive an expression for its frequency of oscillations. 7