Exam. Code : 103205
Subject Code : 1363

B.A./B.Sc. 5th Semester

PHYSICS

Paper–B (Electonics)

Time Allowed—3 Hours] [Maximum Marks—35

Note :—Section A is compulsory. Attempt **ONE** question from Sections B, C, D and E. All questions carries equal marks.

SECTION—A

1. (a) Why a semiconductor behaves like an insulator at 0K ?

   (b) Explain the formation of depletion region in a *p-n* junction.

   (c) Why is silicon not suitable for the design of LED ?

   (d) What are the differences between the emitter and collector regions of a transistor ?

   (e) Obtain the relation between transistor α and β.

   (f) BJT is a current controlled device but JFET is a voltage controlled device. Comment.

   (g) Draw the block diagram of a feedback amplifier. State the function of each block.

SECTION—B

2. Explain the working of *L* section filter with full wave rectifier (FWR). Show that the ripple factor is independent of load resistance.

3. Discuss and draw the *I-V* characteristics of a *p-n* junction and also obtain expression for its static and dynamic resistance from the diode equation.

SECTION—C

4. Draw circuit diagram of a *p-n-p* transistor in *CE* mode for drawing output characteristic curves. Explain how the two constants of the transistor can be obtained from these curves.

5. Draw the characteristics of an n-channel JFET. What is pinch off voltage ?

SECTION—D

6. Explain the working principle of a feedback amplifier. Find the expression for the voltage gain with feedback.

7. Discuss *h* parameters for a transistor. Using two hybrid parameter equations draw the equivalent circuit for transistor in a *CE* mode.

SECTION—E

8. With a suitable circuit diagram, explain the operation of a phase shift oscillator. Find the expressions for frequency of oscillation and condition of oscillation.

9. Draw the circuit diagram of a Hartley oscillator and explain its action. Obtain the frequency and condition of oscillation of this oscillator.