61217

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

PHYSICS (Electronics)

Paper–B

Time Allowed—3 Hours]   [Maximum Marks—35

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

SECTION–A

1. (a) What is the difference between an ideal voltage
         source and practical voltage source ?

    (b) What is the charge on a p-type or n-type
         semiconductor ?

    (c) Describe the filtering action of a capacitor.

    (d) Why the base of a transistor is made very thin as
         compared to that of emitter and collector ?

    (e) Calculate the gain of a negative feedback amplifier
         with an internal gain, $A = 100$ and feedback factor,

         $\beta = \dfrac{1}{10}$.

    (f) Why at least three RC sections are used in Phase
         shift oscillator ?

    (g) What is the power dissipation in the Zener diode ?
                                                    $7 \times 1 = 7$

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SECTION–B

2. Discuss the difference between the centre tapped and bridge type Full Wave Rectifier (FWR). Show that the Peak Inverse Voltage (PIV) becomes half in a bridge rectifier in comparison to a centre tapped rectifier.   7

3. Discuss and draw the I-V characteristics of a p-n diode and show that total current through it is given by the expression $I = \left[\exp\left(\dfrac{eV}{kT}\right) - 1 \right]$, where symbols have their usual meanings.   7

SECTION–C

4. Define stability factor. Draw a fixed bias circuit diagram and derive an expression for its stability factor. Also give advantages of this technique.   7

5. Explain the terms saturation voltage and saturation current in connection with a common source drain characteristics. How do they vary when gate reverse bias increases ?   7

SECTION–D

6. Draw the low frequency h-parameters equivalent circuit of a CE transistor amplifier. Derive expressions for input resistance, output resistance, current gain, voltage gain and power gain.   7

7. Show that negative feedback (a) reduces the phase distortion of an amplifier and (b) improves the gain stability and reduces the noise level of an amplifier. 7

SECTION–E

8. Describe the operation of a tuned collector oscillator from the circuit diagram. Derive the condition from the sustained oscillations. 7

9. Draw the circuit diagram of a phase shift oscillator and explain its working. 7