3 (Sem–4/CBCS) PHY HC 3

2021

PHYSICS

(Honours)

Paper : PHY–HC–4036

(Analog Systems and Applications)

Full Marks : 60

GROUP–A

(Marks : 30)

1. (a) Write down the value of Ripple factor of a Bridge Rectifier. 1

(b) What is the full form of LCD ? 1

(c) Write the expression for α (Current gain) in CB mode. 1

(d) In Class B amplifier, where is the Q point located ? 1

(e) Define voltage gain in decibel for an RC coupled Amplifier. 1

2. (a) What is the difference between diffusion and drift process in a *pn* junction ? 2

(b) What is a Fermi level ? Where is it located in the case of pure semiconductor energy band diagram ? 2

(c) What is a Zener diode ? Write an application of a Zener diode. 2

(d) What are the disadvantages of a Half-wave Rectifier ? 2

(e) Why is Self-bias method preferred ? 2

3. (a) What is a load line ? How is a load line plotted ? What is the significance of points of intersection of a load line with the curves of output characteristics of a BJT ? 5

Or

Calculate I_E and I_C of a CB circuit for which $\alpha = 0.96$ and $I_B = 50\,\mu A$.

(b) Draw a circuit diagram to explain the working of a class A amplifier. 5

Or

Draw a fixed bias circuit diagram and derive an expression for its stability factor.

(c) Explain the frequency response curve of an R-C coupled Amplifier. 5

GROUP–B

(Marks : 30)

4. (a) Obtain Diode equation expressing I-V characteristics of a *pn* junction diode. 10

Or

Explain with the help of a circuit diagram the working of a L-section filter with full-wave Rectifier. Show that the Ripple factor is independent of load resistance.

(b) Determine Current gain, Input resistance, Voltage gain, Output resistance and Power gain of a CE transistor Amplifier in terms of h-parameter. **10**

(c) Write short notes on : *(any two)* **10**

    (i) LED

    (ii) Π – Section Filter

    (iii) Class C Amplifier

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