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**3 (Sem-4/CBCS) PHY HC 3**

**2021**

**PHYSICS**

(Honours)

Paper : PHY-HC-4036

***(Analog Systems and Applications)***

*Full Marks : 60*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

**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

*Contd.*

- (c) Write the expression for  $\alpha$  (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)  $\Pi$  - Section Filter

(iii) Class C Amplifier