(3 Hours) **[Total Marks: 80]**

1) Question 1 is compulsory
2) Solve any three from the remaining five questions
3) Assume suitable data if necessary.
4) Figures to the right indicate full marks

Q.1. Answer any **four questions** from the following: [20]

a What are pre emphasis and De emphasis circuits?

b What is vestigial sideband transmission? Where is it used?

c Discuss the need for modulation in wireless communication system.

d Why is PCM more resistant to noise?

e Explain the significance of noise figure.

Q.2.a Why the local oscillator frequency is always kept higher than the incoming signal frequency in a super heterodyne receiver? [05]

b. For an AM DSBFC wave with a carrier power of 5 W and a modulation coefficient of 1, determine the upper and lower sideband powers and the total modulated power. [05]

c. What is the importance of proper choice of RC time constant in an AM detector circuit? Explain with neat diagrams the distortions caused by improper time constant. [10]

Q.3.a With the help of a neat circuit diagram, explain the working of Foster Seeley discriminator. What is its disadvantage? [10]

b. Discuss the shortcomings of TRF receiver. [05]

c. Why is AGC needed in super heterodyne receivers? [05]

Q.4.a Justify the statement: "Multiplexing helps in proper use of communication resources" [10]

b. Discuss in detail any two sampling techniques. [10]

Q.5.a. Explain the term companding as applied to Pulse Code Modulation. Why is Delta modulation an extreme case of PCM? [10]

b. For a sinusoidal modulating signal, draw PPM, and PWM pulses. [05]

c. Discuss a simple method of noise suppression in an FM wave. [05]

Q.6 Write short notes on **any four**: [20]

a) Choice of intermediate frequency in a super heterodyne receiver
b) Sky wave propagation
c) Delta modulation
d) Varactor diode detector
e) Image frequency