

(3 Hours)

[Total Marks: 80]

- N.B. (1). Question No.1 is compulsory.
 (2). Out of remaining attempt any three.
 (3). Assume & mention suitable data wherever required.
 (4). Figures to right indicates full marks.

Q.1. Solve any four

[20]

- Explain need of modulation. Justify it with example.
- Define the following terms.
 - Noise figure
 - Noise temperature
 - Noise bandwidth
 - Noise voltage
 - Modulation.
- Compare AM and FM.
- Explain in short pre-emphasis and De-emphasis.
- What is PSK signal. Draw the PSK signal for the following binary signal 111010011.
- Explain the principle of reflection and refraction.

Q.2 a) Define signal to noise ratio. Explain the effect of cascade connection on a signal to noise ratio. Derive Friss formula for two stage cascade amplifier. [10]**b)** State and prove the following properties of Fourier transform with example

- Convolution in time domain
- Time scaling

[10]

Q.3. a) The AM Transmitter develops an unmodulated power o/p of 400 Watts across a 50Ω resistive load. The carrier is modulated by a sinusoidal signal with a modulation index of 0.8. Assuming $f_m = 5\text{KHz}$ and $f_c = 1\text{MHz}$.(i) Obtain the value of carrier amplitude V_c and hence write the expression for AM signal.

(ii) Find the total sideband power.

(iii) Draw the AM wave for the given modulation index. [10]

b) With the help of neat circuit diagram explain the working of Ratio detector. [10]**Q.4 a)** What are the limitations of TRF receiver? Explain how these limitations are avoided using super-heterodyne receiver. [10]**b)** Compare ground wave, sky wave, space wave and tropospheric scatter propagation. [10]**Q.5 a)** State Sampling theorem, write down the steps to prove sampling theorem, draw waveform for low pass band limited signal [10]**b)** Draw the block diagram of PAM generator and detector. Explain the working giving waveforms at the output of each block. [10]**Q6. a)** Explain slope overload error and hunting error in Delta modulation. Derive the condition to avoid slope overload distortion. [10]**b)** Explain the generation and detection of ASK signal. [10]