

1T01233 - S.E.(Information Technology Engineering)(SEM-III)(Choice Base Credit Grading System ) (R- 19) (C Scheme) / 51424 - Principle of Communication  
QP CODE: 10025333 DATE: 01/06/2023

(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 [10]  
i) Convolution in time domain ii) Time scaling

**Q.3.** a) The AM Transmitter develops an unmodulated power o/p of 400 Watts across a  $50\Omega$  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]