Time: 3 Hours **Max. Marks: 80**

N.B.
1. **Question No.1 is Compulsory**
2. **From Remaining 5 Questions You are Required to Solve any 3 Questions.**
3. **Assume the data if Necessary**

1 Define/state the following - (10*2) **20**

i) Modulation ii) baseband signal iii) noise factor iv) modulation index in AM

v) Image frequency vi) quantization process vii) multiplexing viii) sampling theorm ix) balanced modulator x) pre-emphasis in FM

2 Attempt the Following **20**

a) Explain/derive in detail Friss formula (noise actor of amplifier in cascade) Noise.

b) Compare PAM, PWM and PPM.

3 Attempt the Following **20**

a) What are drawbacks of TRF receiver & how it is overcome in Super heterodyne receiver.

b) Explain in detail Pulse code Modulation generation and degeneration.

4. Attempt the Following **20**

a) Draw and explain in detail FM demodulator: Foster Seeley discriminator.

b) In an AM radio receiver the loaded Q of the antenna circuit at the input to the mixer is 100. If the intermediate frequency is 455 KHz, calculate the image frequency and its rejection at 1 MHz.

5 Attempt the Following **20**

a) Derive the mathematical expression of AM in detail.

b) Write short Note on
1. Delta modulation
2. Need of modulation

6 Attempt the Following (any four) **20**

a) Draw and explain Electromagnetic Spectrum and application

b) Write short note on space wave propagation

c) Discuss time and frequency shifting, unit step, delta and gate function of Fourier Transform.

d) Compare Digital Band Pass Modulation Techniques ASK and FSK & PSK

e) Explain Amplitude Modulation Technique DSBFC.

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