3 · 1st half-10-DD (G)

Con. 3595-10.　　　　　　(REVISED COURSE)　　　　　　AN-3442

(3 Hours)　　　　　　　　　　[Total Marks : 100

N.B. (1) Question No. **1** is **compulsory**.
　　　(2) Attempt any **four** questions from the remaining **six** questions.
　　　(3) Answer to questions should be **grouped** and written **together**.

1. (a) An AM signal appears across a 50 Ω load has the following equation :— 　10
　　　$V(t) = 12 (1 + \sin 12 \cdot 566 \times 10^3 t) \sin 18 \cdot 85 \times 10^6 t$ Volts.
　　　(i) Sketch the envelope of this signal in time domain.
　　　(ii) Calculate the modulation index, side band frequencies, total power and bandwidth.
　(b) Explain Ratio detector with circuit diagram and explain why Ratio detector preferred 　10
　　　over Foster-Seeley detector for FM demodulation.

2. (a) Explain the transmitter and receiver for the Adaptive delta modulation system. 　10
　(b) Explain : (i) Shannon Hartley capacity theorem. 　5
　　　　　　　(ii) Shannon limit. 　5

3. (a) Explain : (i) Intersymbol Interference and equalization. 　8
　　　　　　　(ii) White Gaussian noise. 　2
　(b) What is line coding ? Draw the waveforms if the sequence is transmitted using — 　10
　　　(i) Unipolar Rz　　　　　　(iv) Split Phase Manchester
　　　(ii) Polar Rz　　　　　　　(v) M ary where M = 4
　　　(iii) AMI
　　　Assume the binary sequence 1 1 0 1 0 0 1 1

4. (a) Write a short note on :—
　　　(i) Viterbi Algorithm 　5
　　　(ii) Cyclic Code. 　5
　(b) The generator matrix of (6, 3) systematic block code is given by — 　10

$$G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$$

　　　(i) Find the code Vectors.
　　　(ii) Find the parity check matrix.
　　　(iii) Find the error syndrome.

5. (a) Explain the QAM Transmitter and Receiver. 　10
　(b) Explain Differentialy Encoded PSK and also show that in DEPSK error occur in pair. 　10

6. (a) State and prove the sampling theorem for Low pass filters. 　10
　(b) Explain TDM and FDM. 　10

7. Write short notes on any **three** of the following :— 　20
　　　(a) Pre-emphasis and De-emphasis　　　(c) Thermal Noise
　　　(b) Ring Modulator　　　　　　　　　(d) Companding.