

- N.B. :** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** questions of remaining **six** questions.  
 (3) **Figures** to the **right** indicate **full** marks for the question.  
 (4) Assume **suitable** data if **required**.

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|--------|---|----|
| 1. (a) | Explain Noise Factor of Amplifier in Cascade.   | 5  |
| (b)    | Compare F.M. and A.M. system.   | 5  |
| (c)    | Explain Shannon's Theorem for channel capacity.   | 5  |
| (d)    | Explain Matched Filter.   | 5  |
| 2. (a) | (i) Explain frequency spectrum of A.M. wave.  | 5  |
|        | (ii) Distortions in the envelope detector.  | 5  |
| (b)    | (i) Effect of Noise in F.M. system.   | 5  |
|        | (ii) Explain characteristics of Radio Receiver.   | 5  |
| 3. (a) | Explain pulse width modulation and demodulation.  | 10 |
| (b)    | What is need of multiplexing, explain FDM in detail.  | 10 |
| 4. (a) | Explain delta-modulation and adaptive delta-modulation.   | 10 |
| (b)    | Band limited 4 kHz signal are sampled at the Nyquist rate and quantized into 4 levels $Q_1, Q_2, Q_3$ and $Q_4$ with probability. $P_1 = P_2 = 1/18$ and $P_3 = P_4 = 3/8$ .<br>Find rate of information. | 10 |
| 5. (a) | What is effect of Gaussian Noise on Digital Communication.  | 10 |
| (b)    | Explain inter symbol interference and how it reduce.  | 10 |
| 6. (a) | Explain Binary phase shifting key (BPSK) system.  | 10 |
| (b)    | Explain QPSK transmitter and receiver system.   | 10 |
| 7.     | Write short notes on :-   | 20 |
| (a)    | Cyclic Codes  |    |
| (b)    | Noise Triangle  |    |
| (c)    | QAM   |    |
| (d)    | Thermal Noise.  |    |