

Con. 5755-13.**LJ-10568**

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question number 1 is **compulsory**.
 (2) Solve any **four** questions out of remaining **six** questions.
 (3) **Figures** to the **right** indicate **Full** marks.
 (4) Make suitable assumptions where necessary.

1. Attempt any **four** of the following :— **20**
- (a) Explain block diagram of basic communication system.
 - (b) Explain time division multiplexing.
 - (c) Explain the terms noise figure, noise factor and noise temperature.
 - (d) List advantages and disadvantages of digital transmission.
 - (e) Explain the terms code word, code rate, code efficiency and hamming distance.
2. a) The output of an Am transmitter is given by $500 (1 + 0.4 \sin 3140 t) \sin 6.28 \times 10^6 t$. **10**
 This voltage is fed to a load of 600Ω resistance. Then calculate.
- (i) Carrier frequency and modulating frequency.
 - (ii) Carrier power and total power.
 - (iii) Power carried by each side band.
 - (iv) Frequency spectrum.
 - (v) Amplitude modulated waveform.
- b) Explain in detail super heterodyne AM Receiver with waveforms at each block. **10**
3. a) Compare between **10**
- (i) Narrow band FM and Wide band FM.
 - (ii) AM and FM.
- b) Explain delta modulator with block diagram and waveforms. Also differentiate **10**
 between delta modulator and adaptive delta modulator.
4. a) Explain the following terms. **10**
- (i) Information.
 - (ii) Information Rate.
 - (iii) Entropy.
 - (iv) Shannon theorem for channel capacity.
 - (v) Shannon Hartley theorem for channel capacity.
- One of the five possible messages Q_1 to Q_5 having possibilities
- $$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}$$
- respectively transmitted. Calculate the average information.
- b) Explain Intersymbol interference. **10**

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5. a) Explain M-ary PSK with transmitter and receiver block diagram. **10**
b) Explain QAM with transmitter and receiver block diagram. **10**
6. a) Give the statement for sampling theorem. Explain PAM, PWM, PPM with proper waveforms. **10**
b) Explain Armstrong method for FM generation. **10**
7. Write short notes on any **four**. **20**
- a) Pre-emphasis and de-emphasis.
 - b) Image frequency and its rejection.
 - c) Shot noise and thermal noise.
 - d) Frequency division multiplexing.
 - e) Companding.
