

Q.P. Code :13502

(Time: 3 Hours)

[Total Marks : 80]

Please check whether you have got the right question paper.

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **three** questions from the remaining questions.

(3) Assume **suitable** data if **necessary**.



1. Attempt any **four**:- 20
- (a) Explain Pre-emphasis and De-emphasis.
  - (b) Compare the SSB and VSB techniques.
  - (c) Calculate the maximum bandwidth requirement for FM broadcast if the maximum deviation allowed is 75 kHz and the maximum modulation frequency allowed is 15 KHz.
  - (d) Write note on PAM telemetry system.
  - (e) Explain OSI reference model.
2. (a) Explain in brief :- 10
- (i) Frequency Shift Keying (FSK)
  - (ii) Quaternary Phase Shift Keying (QPSK)
- (b) An Amplitude modulated waveform has the form: 10
- $$X_c(t) = [10 (1 + 0.6 \cos 2000 \pi t + 0.6 \cos 4000 \pi t) \cos 20,000 \pi t]$$
- i) Sketch the amplitude spectrum of  $X_c(t)$ .
  - ii) Find the power content of each spectral component including the carrier.
  - iii) What is the modulation index ?
  - iv) Find the power carried by the sidebands and total power.
3. (a) Define and describe pulse position modulation. Explain with waveforms how it is derived from PWM. 10
- (b) Explain the various communication modes as simplex, half duplex and duplex in detail. 10
4. (a) Draw the ASK, BPSK, QPSK and BPSK waveforms for digital data 101001011. 10
- (b) (i) Draw the circuit diagram of a Foster Seeley phase discriminator and explain its principle of operation with phasor diagram. 08



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(ii) Is it required to transmit the complex modulating signal in which the highest frequency component is 4 KHz. Compare the bandwidth required for AM, SSB and FM. Given that the maximum frequency deviation is 16 KHz.

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5. (a) Draw the block diagram of Linear Delta Modulation system (transmitter and receiver) and explain the working with a suitable waveform. Also explain slope-overload error. What is the maximum slope of the input signal, the system can handle without distortion ?

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(b) With the help of neat sketches explain voltage, current and position telemetry Systems.

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6. Write Short notes on any **four** : -

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- (a) SSB modulation
- (b) Multiplexing techniques
- (c) FM Noise Triangle
- (d) Feedback Telemetry
- (e) GPIB Bus

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