

Total No. of Questions : 4]

SEAT No. :

PE47

[Total No. of Pages : 2

[6579]-349

T.E. (E & TC/Electronics/Electronics(VLSI Design & Technology)) (Insem)

DIGITAL COMMUNICATION

(2019 Pattern) (Semester - I) (304181)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer any one Question out of Q.No. 1 or 2 and Q.No. 3 or 4.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

- Q1) a)** Show that if a wide sense stationary process $X(t)$ is passed through a LTI filter with impulse response $h(t)$, then its output has constant mean square value. **[7]**
- b)** Explain Ergodic Process **[3]**
- c)** Show that the random process $X(t) = A \cos(\omega_c t + \Phi)$ where Φ is a random variable Uniformly distributed in the range $(0, 2\pi)$ is a wide sense stationary process. **[5]**

OR

- Q2) a)** Explain classification of random process. **[7]**
- b)** List different sources of Noise. Explain narrow band noise and represent a narrow band noise in terms of in phase and quadrature component. **[8]**

- Q3) a)** In a digital modulation system, the bit rate of NRZ data is 1 Mbps and carrier frequency is 100 MHz and average energy is 0.02 unit. Find the symbol rate of transmission, Euclidian distance d and bandwidth required for following techniques: **[8]**

- i) BPSK
- ii) QPSK
- iii) 16-PSK systems

- b)** Explain M-ary PSK transmitter & receiver. **[7]**

OR

P.T.O.

Q4) a) Describe offset QPSK generation with neat schematic, waveforms and Signal space representation. [8]

b) Compare BPSK, QPSK and BFSK with reference to following points [7]

- i) Mathematical expression
- ii) Symbol duration
- iii) Probability of Error
- iv) Bandwidth
- v) Euclidean distance
- vi) Spectrum
- vii) Signal Space Representation

