

Total No. of Questions : 4]

SEAT No. :

P-5048

[Total No. of Pages : 2

[6187]-449

T.E. (E&TC) (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 side indicate full marks.
- 4) Assume suitable data if necessary.

Q1) a) A random process is defined as $x(t) = A \cdot \cos(\omega_c t + \phi)$ where ϕ is uniformly distributed random variable in the range $(-\pi, +\pi)$ is a wide sense stationary process. [8]

b) Show that the total normalised noise power can be obtained by superposition of the powers of individual noise components. [5]

c) Define ergodic random process. [2]

OR

Q2) a) What is narrowband noise? Explain generation of narrowband noise from its in-phase & quadrature components. [8]

b) Find the PSD at the output of filter with $H(f) = j2\pi f$ when a R-P. $x(t) = A \cdot \cos(2\pi f_c t + \theta)$ is applied at the input, where θ is uniformly distributed R.V. over the interval $(0, 2\pi)$. [5]

c) Explain thermal noise. [2]

Q3) a) With the help of block diagram explain. QPSK MODEM. Write the equation of QPSK signal, probability of error, required bandwidth of QPSK. [8]

b) In a digital CW modulation scheme, the bit rate of NRZ data stream is 1 mbps and carries frequency of transmission is 100 MHz. Find the symbol rate of transmission and bandwidth requirement of the channel for BPSK and 16-ary PSK systems. [5]

c) What is matched filter? [2]

P.T.O.

OR

- Q4)** a) Draw the diagram of integrates and dump receives filter and explain its working. Also, derive the equation of SMR at the output. [8]
- b) Compare QPSK and BFSK digital modulation schemes. [5]
- c) With the help of spectrum, state the bandwidth requirement of BFSK. [2]
