BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Tech.(RA)-2022
Course Name – Analog and Digital Communication
Course Code - PCC-ECR402
(Semester IV)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i)   Identify, in communication system noise is most likely to affect the signal-

   a) at transmitter   b) in channel
   c) in information source   d) at destination

(ii) State, communication is the process of-

   a) keeping in touch   b) broadcasting
   c) exchanging information   d) entertainment by electronics

(iii) Select, in which modulation process threshold effect is more dominant.

   a) FM   b) AM
   c) PCM   d) PM

(iv) A signal is band - limited at fm Hz is sampled at a rate less than 2fm. Observe the reconstructed signal.

   a) smaller in magnitude   b) higher in magnitude
   c) have higher frequency suppressed   d) distorted

(v)   If the noise level of a signal is increased then examine the capacity of a band limited AWGN channel-

   a) is increased   b) is decreased
   c) remains constant   d) none of these

(vi) State the spectral density of white noise.

   a) exponential   b) uniform
   c) Poisson   d) Gaussian

(vii) Eye pattern is used to estimate-

   a) ISI   b) quantization noise
   c) error rate   d) none of these

(viii) The bit rate of a digital communication system is 34 Mbps. The modulation scheme is QPSK. Calculate the bout rate of the system.

   a) 68 Mbps   b) 34 Mbps

c) 17 Mbps   d) 85 Mbps

(ix) The signal to quantization noise ratio in n bit PCM system is associate-

a) independent value of n

b) increase with increasing value of n

c) depends upon the sampling frequency employed

d) decreases with the increasing value of n

(x) In commercial TV transmission in India picture and sound signals are modulated respectively by employing-

a) VSB and FM

b) VSB and VSB

c) FM and VSB

d) AM and FM

(xi) Fading is define-

a) change in polarization only at receiver end

b) change in frequency only at receiver end

c) fluctuation in signal strength at receiver end

d) change in phase only at receiver end.

(xii) ASK is an extend of combination of shift keying-

a) analog modulation

b) amplitude modulation

c) digital modulation

d) none of these

(xiii) The most common detector employed in an AM radio broadcast receiver is-

a) envelope detector

b) coherent detector

c) discriminator

d) ratio detector

(xiv) Which one of the following modulation techniques is the more efficient for pulse telemetry?

a) PAM

b) PCM

c) PDM

d) PPM

(xv) A carrier of 100 W is amplitude modulated to the depth of 40%. Calculate the total transmitted power.

a) 116 W

b) 112 W

c) 108 W

d) 118 W

Group-B
(Short Answer Type Questions)

$3 \times 5 = 15$

2. Define shot and thermal noise. (3)

3. A carrier signal having a power of 50 KW is modulated to a level of 10%. Compute the total sideband power. (3)

4. Explain the noncoherent detection technique of BASK with necessary diagram. (3)

5. Applying Carson's rule calculate the bandwidth of a FM transmission system when modulating frequency and frequency deviation are 20 KHz and 120 KHz respectively. (3)

6. Organize the data stream 101101 using the following line coding techniques: (a) Unipolar RZ (b) Polar NRZ (c) Bipolar RZ (3)

OR

State Nyquist's criterion for zero Inter Symbol Interference (ISI). (3)

Group-C
(Long Answer Type Questions)   5 x 6=30

7. With a neat sketch explain the generation of the SSB-SC signal by using the phase-shift method.   (5)

8. With a neat sketch explain the indirect method of FM generation.   (5)

9. Draw the block diagram of a QPSK demodulator and explain the working principle.   (5)

10. Draw the block diagram for generation of PCM system and explain it.   (5)

11. The total power content of an AM wave is 600 W. Calculate the percent of modulation of   (5)
the signal if each of the sidebands contains 75 W of power.

12. Design an envelope detector circuit and express its principle of operation.   (5)
OR
A bandwidth of 20 MHz is to be considered for the transmission of AM signals. If the   (5)
highest audio frequencies used to modulate the carriers are not to exceed 3KHz, justify,
how many stations could broadcast within this band simultaneously without interfering
with one another?

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