BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Sc.(ANCS)-Hons-2023
Course Name – Communication Fundamentals
Course Code - BNC20001
(Semester II)

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) A carrier is simultaneously modulated by two sine waves with modulation indices of 0.3 and 0.4. Calculate the total modulation index?
   a) 0.707   b) 0.5
   c) 1   d) none of these

(ii) Calculate the ratio of modulating power to total power at 100 percent modulation
   a) 1:3   b) 1:2
   c) 2:3   d) none of these

(iii) In a PCM system each quantization level is encoded into 8bits.Calculate the signal-to-quantization noise ratio ?
   a) 48dB   b) 64dB
   c) 128dB   d) 256dB

(iv) The BW of PCM system having 2 quantisation level is B.If the quantisation level is is enhanced to 8, Calculate the bandwidth?
   a) B   b) 2B
   c) 3B   d) 4B

(v) In a PCM system, if the numbers of quantization levels are 16 and maximum signal frequency is 4KHz, compute the transmission bit rate.
   a) 10kbps   b) 12kbps
   c) 15kbps   d) 64kbps

(vi) A 400W carrier wave is modulated to a depth of 65%. Compute the total power of modulated wave.
   a) 512.5W   b) 493W
   c) 484.5W   d) 609.6W

(vii) If modulation index of an AM wave is increased from 1.5 to 2, then calculate the transmitted power.
a) remains same
b) increases by 20%
c) increases by 41%
d) increases by 50%

(viii) Calculate lower frequency component in AM wave, given that highest frequency component is 900KHz and bandwidth is 12KHz?
a) 832KHz
b) 600KHz
c) 868KHz
d) 888KHz

(ix) Maximum frequency present in a signal is 2.5 kHz. Then calculate Nyquist rate
a) 10 KHz
b) 1.5 KHz
c) 2.5 KHz
d) 5 KHz

(x) Select that the thermal noise power is proportional to_____.
a) B
b) $\sqrt{B}$
c) B^2
d) 2B

(xi) Select from the following that Quantizing noise occurs in _____.
a) time-division multiplex
b) frequency division multiplex
c) pulse-code modulation
d) pulse-width modulation

(xii) Select the analog system from following.
a) PCM
b) PAM
c) DPCM
d) DM

(xiii) Select shot noise is produced by_____.
a) Electrons
b) Photons
c) Electrons & Photons
d) none of these

(xiv) Consider the following types of modulation: i. Amplitude Modulation ii. Frequency Modulation iii. Pulse Modulation iv. Phase Modulation
Which of the above modulations are used for telecasting TV programmes?
a) 3 and 4
b) 1 and 2
c) 1 and 4
d) 2 and 3

(xv) Select from following Foster Seeley discriminator is used.
a) FM detection
b) AM detection
c) PCM detection
d) ADM detection

Group-B
(Short Answer Type Questions)   3 x 5=15

2. Write short note on shot noise.   (3)

3. Illustrate BASK Signal.   (3)

4. The peak to peak value of an AM voltage has a maximum value of 4V and a minimum   (3)
value of 1V. Find the percentage of modulation.

5. Differentiate between PAM, PWM and PPM signals   (3)

6. Compare and contrast AM and FM system.   (3)

OR

Compare and contrast DSB-SC system and VSB system. (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. Present comparative study of BASK, BPSK and BFSK signals. (5)

8. Write short notes on equivalent noise temperature. (5)

9. Distinguish between analog communication and digital communication systems. (5)

10. In FM signal, a carrier signal is frequency modulated with a sinusoidal signal of 4 KHz resulting in a maximum frequency deviation of 10 KHz. Find the band width and modulation factor. (5)

11. A certain transmitter radiates 20 KW with unmodulated carrier and 25 KW when the carrier is sinusoidally modulated. Calculate the modulation index. If another sine wave corresponding to 75% modulation is transmitted simultaneously, determine the total radiated power. (5)

12. Summarize the need for modulation in communication systems. (5)

OR
Draw the block diagram of communication system and explain the function of each block. (5)

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