BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Bachelor of Computer Applications/ Bachelor of Science (Honours) in Computer Science/ Bachelor of Science (Honours) in Hardware & Networking

Course Name - Communication Systems

Course Code - BCA203A / BCS203A / BHN201A

(Semester – 2)

Time allotted: 3 Hours   **Full Marks : 70**

[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)   10 x 1 = 10

1. *Choose the correct alternative from the following*

(i)   Which of the following modulated signals can be detected by an envelope detector?
   a. DSB-SC   b. DSB-FC
   c. SSB-SC   d. FM

(ii)   In a particular modulating system, when the modulating frequency is doubled, the modulation index is halved, and the modulating voltage remains constant. The modulation system is
   a. amplitude modulation   b. phase modulation
   c. frequency modulation   d. any of three

(iii)   Thermal noise is independent of
   a. bandwidth   b. temperature
   c. center frequency   d. Boltzmann constant

(iv)   One of the drawbacks of FM signal is
   a. high noise   b. limited range
   c. low signal strength   d. none of these

(v)   In generation of modulated signal, a varactor diode can be used for
   a. FM generation only   b. AM generation only
   c. PM generation only   d. both AM and PM generation

(vi)   The most common modulation system used for telegraphy is
   a. frequency-shift keying   b. two-tone modulation
   c. pulse-code modulation   d. single-tone modulation

(vii) Quantizing noise occurs in

    a. time-division multiplexing   b. pulse-code modulation

    c. frequency division multiplexing   d. pulse-width modulation

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

    a. 112 W   b. 100 W

    c. 140 W   d. 108 W

(ix) Number of sidebands in FM signal

    a. 2   b. 1

    c. 0   d. none of these

(x) Shot noise is produced by

    a. Electrons   b. Photons

    c. Electrons & Photons   d. none of these

Group – B

(Short Answer Type Questions)   3 x 5 = 15

Answer any *three* from the following

2. Draw the block diagram of communication system and explain the function of each block.   5

3. Explain amplitude modulation. Derive the expression for modulated wave of a single tone amplitude modulation and also obtain the relevant frequency spectrum.   5

4. A modulating signal $10 \sin (2\pi \times 10^3\ t)$ and a carrier signal $15 \sin (2\pi \times 10^5\ t)$ are used for amplitude modulation. Determine the modulation index, carrier power and total power.   5

5. Compare FM wave with PM wave.   5

6. Differentiate among PAM, PWM and PPM signals.   5

Group – C

(Long Answer Type Questions)   3 x 15 = 45

Answer any *three* from the following

7. (a) Explain Frequency modulation and derive an expression for FM wave with sinusoidal modulation.   1+4

    (b) Define frequency deviation? Justify that the total transmitted power in FM remains constant always.   2+3

    (c) State and explain Carson's rule. In FM signal, a carrier signal is frequency modulated with a sinusoidal signal of 3 KHz resulting in a maximum frequency deviation of 8 KHz. Find the band width and modulation index.   2+3

8.   (a)   What are the different kinds of AM? Why suppressed carrier SSB signal cannot be used for compatible AM broadcasting? What form of SSB could be so used and why?   2+2+2

     (b)   Draw the circuit diagram of Balance modulator for generation of DSB-SC signal and also explain its operation.   5

     (c)   The peak to peak value of an AM voltage has a maximum value of 3V and a minimum value of 1.5V. Find the percentage of modulation and the amplitude of unmodulated carrier voltage?   4

9.   (a)   Write down sampling theorem. What is Aliasing effect? State how it can be minimized?   2+1+2

     (b)   Explain Delta modulation with necessary diagram. What are the disadvantages of delta modulation? Explain all and also explain how these disadvantages are removed?   3+5+2

10. (a)   Describe vestigial sideband transmission. Give its application.   5

     (b)   What do you mean by quantization and quantization error in communication system?   2+2

     (c)   Explain midtread and midrise quantizer with necessary diagram.   6

11. (a)   Present comparative study of BASK, BPSK and BFSK signals.   9

     (b)   Explain how can you calculate noise figure in terms of signal to noise ratio for amplifier.   6