WEST BENGAL STATE UNIVERSITY

B.Sc. Honours/Programme 3rd Semester Examination, 2020, held in 2021

ELSHGEC03T/ELSGCOR03T-ELECTRONICS (GE3/DSC3)

Time Allotted: 2 Hours   Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

GROUP-A

1.   Answer any *five* questions from the following: 2×5 = 10

   (a) Define narrow band and wide band FM.

   (b) What do you mean by balanced modulator?

   (c) Calculate the bandwidth of a narrow band FM wave, if m_f =0.5 and f_m=1 kHz.

   (d) Explain the terms: modulation envelope and over modulation.

   (e) Why an FM system is preferred over AM system?

   (f) Compare AM with PAM.

   (g) What do you mean by carrier wave and modulated wave?

   (h) Mention applications of any two bands of electromagnetic communication spectrum.

GROUP-B

Answer any *six* questions from the following   5×6 = 30

2. (a) What do you mean by digital signal?   2+3

   (b) Distinguish between analog and digital communication process.

3.   Define modulation index of an AM wave. An AM broadcast transmitter radiates   1+2+2
      10 kW of unmodulated carrier power and 12.5 kW of total power when the carrier
      is modulated by a single frequency sinusoidal baseband signal. What is the depth
      of modulation? If another sinusoidal signal modulates the carrier simultaneously
      to a depth of 60%, what will be the total radiated power?

4.   State and prove sampling theorem.   5

5.   With appropriate diagram, explain the mechanism of frequency division   5
      multiplexing.

6. Derive an expression for total power and efficiency of a single tone AM wave. 3+2

7. Explain the working principle of an envelope detector for the detection of an AM wave. Draw the necessary diagrams. 5

8. What are the various types of analog pulse modulation techniques? Explain each of them with suitable applications. 5

9. (a) Why modulation is needed? 2+3

   (b) How do we get the expression of Narrow Band FM (NBFM) out of it?

10.(a) What will happen if the efficiency of an AM wave becomes greater than 33.33%? 2+2+1

   (b) What do you mean by aliasing effect? How it can be avoided?

11.(a) Derive an expression for an FM wave with sinusoidal modulation. 2+3

   (b) Differentiate between PM and FM.

   N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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