	ADAMAS UNIVERSITY		
	END-SEMESTER EXAMINATION : MAY 2021		
	(Academic Session: 2020 – 21)		
Name of the Program:	**B.TECH [ECE]**	**Semester:**	**IV**
Paper Title :	**Communication System I**	**Paper Code:**	**EEC42104**
Maximum Marks :	**40**	**Time duration:**	**3 Hrs**
Total No of questions:	**08**	**Total No of Pages:**	**02**
(Any other information for the student may be mentioned here)	1. **At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.** 2. **All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.** 3. **Assumptions made if any, should be stated clearly at the beginning of your answer.**		

Answer all the Groups
Group A
Answer all the questions of the following $5 \times 1 = 5$

1.   a) State Carson rule.
b) Define AM Vestigial sideband.
c) Write the properties of Autocorrelation function.
d) The carrier amplitude after AM varies between 4 volts and 2 volt. Calculate the depth of Modulation.
e) What are the advantages of single sideband transmission?

GROUP –B
Answer *any three* of the following $3 \times 5 = 15$

2.   Discuss in detail about DSB-SC & explain the operation of DSB balanced modulator with neat diagram.   [5]

3.   Consider the following signals

$$x(t) = \begin{cases} \sin(t), & 0 \le x \le 2\pi \\ x, & \text{otherwise} \end{cases}$$

and

$$y(t) = \begin{cases} A\sin(\omega t), & 0 \le x \le 2\pi \text{ and } \omega \in (N) \\ 0, & \text{otherwise} \end{cases}$$

If the energy of x(t) is E_1, What will be the energy, E_2 of y(t)? Establish the relation between E_1 and E_2.   [5]

4.   What do you mean by modulation index? A 400 watts carrier is modulated to a depth of 75 percent. Find the total power in the AM wave. Assume that the modulating is sinusoidal.   [5]

5.   Explain the operation of square law detector   [5]

6. a) What is the maximum transmission efficiency of an amplitude modulated system for 100% modulation?

b) A carrier signal c(t)= 20cos $(2\pi\ 10^6$ t) is modulated by a message signal m(t)= 5 cos $(2\pi\ 10^4$ t) to generate a DSBSC signal. Calculate bandwidth and power?

c) Compare AM, DSBSC and SSBSC?   [3+3+4=10]

7. . a) Derive the expression for Narrow band frequency modulated signal.

b) Consider an FM signal s(t)=10 cos$(2\pi\ 10^6$ t+8 sin $4\pi\ 10^3$ t).Determine i)Modulation index ii) frequency deviation iii) power iv) bandwidth

[5+5=10]

8.   What are the various pulse modulation schemes? Explain and compare these schemes.
[10]

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