

Student Name:

Enrollment No:

Mid-Term Examination – November 2023

Programme: B.Tech (IOT)

Paper Code: IOT-301

Time: 1½ Hrs.

Semester: Fifth Semester (Aug 2023 - Jan 2023)

Paper Name: Data Transmission Methodologies

Maximum Marks: 30

Note:

- Question No. 1 is compulsory.
- Attempt any two questions from the remaining questions.
- Some questions have internal choice also.
- All questions carry equal marks.
- Only scientific calculator is allowed.

Q.No.		Marks	CO
Question 1			
1(a)	Explain time-variant and time-invariant systems with examples.	[2]	1
1(b)	Write the limitations of analog communication system.	[3]	1
1(c)	A 10K watt carrier is amplitude modulated by two sine waves to a depth of 0.5 and 0.6 respectively. Calculate total power of modulated carrier.	[3]	2
1(d)	Write Carson's rule to calculate bandwidth of FM wave.	[2]	2
Question 2			
2	<p>(a) Draw the block diagram of electronic communication system and state the function of each block.</p> <p style="text-align: center;">OR</p> <p>(b) Describe Energy and Power theorem. Find the energy and power of following signals: (i) $x(n) = (1/2)^n u(n)$ (ii) $x(n) = u(n) - u(n-5)$</p>	[10]	1
Question 3			
3	<p>(a) With a neat block diagram, explain the followings: (i) Synchronous detection for SSB-SC (ii) Phase-shift method of AM SSB-SC generation</p> <p style="text-align: center;">OR</p> <p>(b) With a neat block diagram, explain Armstrong's method of FM generation.</p>	[10]	2
Question 4			
4	<p>(a) Explain digital modulation techniques. Discuss what are the advantages of digital signal over analog signal?</p> <p style="text-align: center;">OR</p> <p>(b) An AM transmitter radiates 9kW of power when the carrier is unmodulated and 10.125kW of power when the carrier is sinusoidal modulated. Find the modulation index & percentage modulation. Now if another sine wave corresponding to 40% modulation is transmitted Simultaneously. Calculate total radiated power.</p>	[10]	2