GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2022
TELEMETRY AND REMOTE CONTROL
EI701

TIME ALLOTTED: 3Hours **FULL MARKS:70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

		Marks	CO No
(i)	The bandwidth of FM is a) less than b) equal to c) greater than d) less than equal to the bandwidth of AM	1	CO3
(ii)	Remote sensing techniques make use of the properties of __________ emitted, reflected or diffracted by the sensed objects: a) Electric Wires b) Sound waves c) Electromagnetic waves d) Wind waves	1	CO4
(iii)	For total coverage round the earth the minimum no. of Satellite needed is a) 4 b) 7 c) 3 d) 2	1	CO6
(iv)	If there are 2 channel and sampling frequency of each channel is 8KHz then line speed is – a) 64 kbps b) 128 kbps c) 256 kbps d) 512 kbps	1	CO2
(v)	Repeaters inside communications satellites are known as a) Transceivers b) Transponders c) Transducers d) TWT	1	CO5
(vi)	The extra bit in MODEM is used for- a) Error correction b) Error detection c) Noise d) Distortion	1	CO3

(vii)	The complementary error function, erfc(.) is known as a) the probability of misinterpreting a bit , a '0' to be '1' and '1' to be '0' b) the probability of misinterpreting a bit , a '0' to be '0' and '1' to be '1' c) the probability of misinterpreting a bit , a '0' to be '1/2' and '1' to be '-1/2' d) all of the above	1	CO2
(viii)	Probability density function defines a) Amplitudes of random noise b) Density of signal c) Probability of error d) All of the above	1	CO1
(ix)	The circuit used to regenerate clock pulses from the transmitted PAM signals is called ____ a) Clock demodulator circuits b) Timer circuits c) Clock receiving circuits d) Clock recovery circuits	1	CO4
(x)	The wave length that is choose for optical communication is a) 1550nm b) 1880nm c) 2880nm d) 780nm	1	CO2
(xi)	For frequency telemetry 4-20mA Signal is transformed into frequency range of a) 5-15Hz b) 50-65 Hz c) 65-70Hz d) 1-2 Hz	1	CO1
(xii)	For step index fibre the NA across the core is a) variable b) constant c) dependent on core radius d) none of these	1	CO4

GROUP – B

(Short Answer Type Questions)

Answer any ***three*** from the following: **3×5=15**

			Marks	CO No
2.	(a)	What do you mean by: Land link, telemeter channel, telemeter transmitter and receiver?	2	CO1
	(b)	Explain with a circuit diagram for synchronization pulse generation with input blank synchronization channel.	3	CO2
3.	(a)	Why is frequency telemetry system considered more advantageous over voltage or current telemetry system even in short distance telemetry?	2	CO4
	(b)	Draw the transmitter circuit diagrams of Frequency telemetry system and explain.	3	CO4
4.		Draw and explain basic architecture of GSM.	5	CO3

5.		Describe the function of a TDM-PCM system.	5	CO2
6.	(a)	Define the term 'telemetry'.	2	CO1
	(b)	Draw and explain the general block diagram of a Telemetry system.	3	CO1

GROUP – C
(Long Answer Type Questions)

Answer any ***three*** from the following: **3×15=45**

			Marks	CO No.
7.	(a)	What is MODEM? What is the purpose of it?	2	CO3
	(b)	Explain X-Protocol of MODEM.	5	CO3
	(c)	What is the drawback of X- protocol and how it can be resolved?	5	CO3
	(d)	Discuss about advantages and disadvantages of current and voltage telemetry systems	3	CO1
8.	(a)	How does TDM system differ from FDM system?	2	CO2
	(b)	Draw a hardware circuit and explain the operation of an 8-channel TDM-PAM telemetering transmitter system and draw the pulse waveforms at the outputs of the clock generator, counter, multivibrator and gates for one time frame.	8	CO2
	(c)	If the sampling frequency is 8Khz. and we use 8-bit ADC then calculate line speed of two channels TDM-PCM.	2	CO2
	(d)	Describe the operation of sample and hold circuit with suitable circuit diagram.	3	CO2
9.	(a)	Explain the operation of a position telemetry system using synchro transmitter and receiver.	3	CO1
	(b)	Draw the basic architecture of Earth Station and hence explain the function of the Earth Station.	7	CO3
	(c)	Determine the orbital velocity of a satellite moving in a circular orbit at a height of 150 km above the surface of earth given that gravity constant $G= 6.67\times10^{-11}$ N-m^2/kg^2, mass of the earth $M=5.98\times10^{24}$ kg, radius of earth R=6370 km.	3	CO3
	(d)	What are the advantages and disadvantages of satellite communication system?	2	CO3
10.	(a)	Make a comparative study between the fiber splicing and fiber connector.	3	CO4
	(b)	What are the different types of fiber splicing? Describe each technique with suitable diagram.	6	CO4
	(c)	Describe different types of fiber connectors used for fiber coupling.	6	CO4
11.		Write short notes on any three of the following:	3 x 5 =15	
	(a)	Portable & Pipeline telemetry	5	CO1
	(b)	Remote control System	5	CO4
	(c)	comparator circuit used in telemetry	5	CO1
	(d)	Sample and Hold Circuit and its application in Telemetry.	5	CO2
	(e)	Losses in Optical Fiber	5	CO4