

**BACHELOR OF INSTRUMENTATION & ELECTRONICS ENGINEERING FINAL  
EXAMINATION, 2019  
(4<sup>th</sup> Year, 2<sup>nd</sup> Semester)**

**TELEMETRY AND REMOTE CONTROL**

Time: Three Hours

Full Marks: 100

**Module-1: Answer any one question**

1. i) Define:

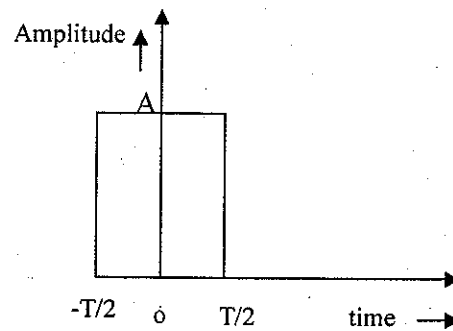
2x3=6

- a) Energy and Power Signal
- b) Odd and Even Signal
- c) Vector and Scalar Signal

iii) Find the Fourier Transformation of

$$x(t) = \begin{cases} A & \text{for } -T/2 < t < T/2 \\ 0 & \text{otherwise} \end{cases}$$

5



iv) Prove the following properties of the Fourier Transformation

3x3=9

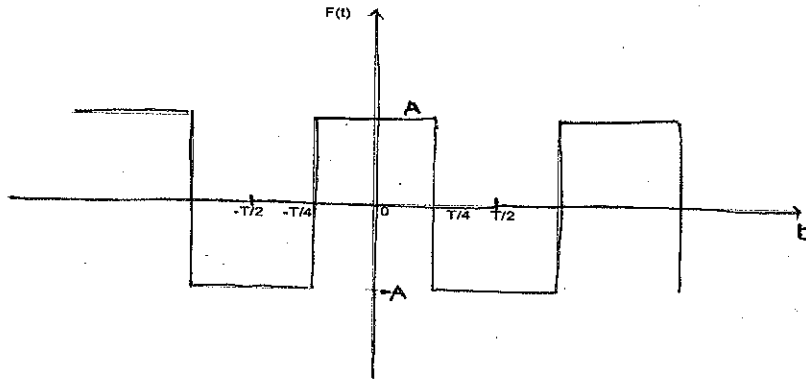
- a) Convolution
- b) Time scaling
- c) Frequency Shifting

2. i) Determine Fourier Transformation equation from Fourier series expression.

10

ii) Obtain the Fourier Components of the signal given below

10



**Module 2: Answer any one question**

3. a) Explain linear block codes.

b) The parity check matrix of a (7,4) linear block code is expressed as

$$[H] = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

i) Obtain the generator matrix. ii) List all code vectors. iii) What is the minimum distance between code vector. iv) How many errors can be detected and how many errors can be corrected.

5+15=20

4. i) Describe the process to generate PAM, PPM and PWM

3x3=9

ii) Describe PCM transmitter and receiver

7

iii) Discuss on regenerative repeater.

4

**Module -3: Answer any two**

5. a) Find out the mathematical expression of phase modulated signal.

b) Why FM and PM are inseparable?

c) Describe generation of FM using VCO.

5+5+10=20

6. a) State and prove Nyquist sampling theorem.

b) What is quantization?

c) Discuss mid-tread and mid-rise quantization.

d) Deduce the expression for quantization noise?

5+5+5+5=20

7. a) Describe differential pulse code modulation (DPCM) transmitter and receiver.

b) Describe quantization noise associated with delta modulation.

c) What is companding? Describe different types of companders

10+6+4=20

8. a) Describe adaptive delta modulation (ADM) transmitter and receiver with proper diagram.

b) State the advantages of ADM over DM.

c) Discuss TDM and FDM system

8+4+8

**Module -4: Answer any one**

- 9) a) What are Payload and Bus of a satellite?  
b) State the differences between Geosynchronous, MEO and LEO satellite. 4+6+10=20  
d) Describe different types of satellite.
- 10) a) Discuss applications of satellite.  
b) Describe satellite-launching steps with diagram 6+14=20
11. i) Give the block diagram of a digital optical communication system and explain the function of each block?  
ii) Distinguish between optical fiber communication system and conventional communication system? And List out the advantageous and disadvantage of optical fiber communication?  
iii) Describe numerical aperture in step index and graded index fiber? 5+5+5+5
-