



**BBC-003-0496005**

Seat No. \_\_\_\_\_

**B. Sc. / M. Sc. (Applied Physics) (Sem. VI)**  
**(CBCS) Examination**

**July - 2021**

**Paper - XXIII : Digital Communication & Electronics**  
*(New Course)*

**Faculty Code : 003**

**Subject Code : 0496005**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

- Instructions :** (1) Attempt any FIVE questions.  
(2) Numbers in the right margin indicate marks.

- 1** Attempt following short questions : (**Two** marks each) **14**
- (1) Why digital communication is better?
  - (2) Write Nyquist criteria for sampling.
  - (3) What is adaptive delta modulation?
  - (4) What is CDF?
  - (5) Why analog communication is better?
  - (6) Explain electromagnetic spectrum for different devices in communication.
  - (7) Define Channel Capacity.
- 2** Attempt following short questions : (**Two** marks each) **14**
- (1) Write Bay's Rule.
  - (2) Define Conditional Probability.
  - (3) Define Joint Probability.
  - (4) What is PDF?

- (5) What is the unit of message entropy?
- (6) What is meant by Coding? How many types of coding is done?
- (7) Give two examples of analog communication technology used in today's world.

**3** Do as directed. **14**

- (1) Compare analog and digital communication.
- (2) List advantages of digital communication.

**4** Do as directed. **14**

- (1) A Bag contains 10 Black, 12 Red, 8 White Balls. Three balls are drawn in succession. Find the probability that the fruits will be of different type.
- (2) A card is drawn from a deck of cards. Find the probability that it is (a) Not Red (b) Jack of Heart.

**5** Do as directed. **14**

- (1) A discrete memoryless source has five message with probability
  - $P(X_1) = 0.3$
  - $P(x_2) = 0.3$
  - $P(x_3) = 0.2$
  - $P(x_4) = 0.2$
 Using Shannon Fano coding technique, find the code for transmission.

- (2) For given data, what will be source code?

Messages	Probability
M1	0.4
M2	0.3
M3	0.2
M4	0.1

- 6** Do as directed. **14**  
(1) Explain Binary Symmetric channel  
(2) Discuss Properties of Probability Distribution Function.
- 7** Do as directed. **14**  
(1) What is Probability? How it is related to communication?  
(2) Explain Delta Modulation.
- 8** Do as directed. **14**  
(1) Discuss properties of Probability.  
(2) Discuss properties of Cumulative Distribution Function.
- 9** Do as directed. **14**  
(1) Why Channel Capacity is a prominent parameter in communication?  
(2) Discuss properties of information.
- 10** Do as directed. **14**  
(1) What is Entropy of a message? How and why it is measured?  
(2) Why quantization is required in ADC?
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