



**PB-003-498003**

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

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

**March / April – 2020**

**Paper - 7 : Signal Processing & Communication**  
*(Core - 7) (New Course)*

**Faculty Code : 003**  
**Subject Code : 498003**

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

[Total Marks : 70

**Instructions :**

- (1) All the questions are compulsory.
- (2) Numbers in the right margin indicate marks.

**1 Attempt any seven short questions : (two marks each) 14**

- (1) Why signal processing is required ? Is there any disadvantage of it ?
- (2) Why Bandwidth is considered as most precious element for any electronic.
- (3) Give four examples of signal processing technology in today's world.
- (4) Define Signal.
- (5) Define System.
- (6) Define Modulation.
- (7) What is Modulation Index ?
- (8) What care must be taken for successful communication ?
- (9) What is the unit of information ?
- (10) What is meant by Impulse response of any system ?

**2 (a) Write answer of any two : (five marks each) 10**

- (1) Explain Linear Convolution.
- (2) What is meant by correlation ? Explain in detail.
- (3) What is LTI ? List properties of LTI.
- (4) With clear examples, explain different operations on signals.

- (b) Write answer of any **one** : 4  
 Check following systems : (All properties)
- (1) Given  $y(n) = x(-n)$  and  $y(n) = nx(n)$
  - (2) Given  $y(n) = x(n) - 3x(n-2)$  and  $y(n) = e^{x(n)}$ .
- 3** (a) Write answer of any **two** : (**five** marks each) **10**  
 Explain following for electronic communication system :  
 (Mainly why and where they are used)
- (1) Mixer
  - (2) Oscillators
  - (3) Frequency synthesizers
  - (4) Phase Locked Loops.
- (b) Write answer of any **one** : 4
- (1) Which are different transmission modes ?
  - (2) Explain Phase Modulation and Demodulation.
- 4** (a) Write answer of any **two** : (**five** marks each) **10**
- (1) Explain Standard Test signals used for experiments.
  - (2) Explain Linear and Non linear system
  - (3) Explain Time Variant and Invariant system
  - (4) State true / false - and Justify your answer  
 "Causal systems are always static".
- (b) Write answer of any **one** : 4
- (1) Plot :
    - (i)  $\delta(5n)$
    - (ii)  $u(2-n)$ .
  - (2) Plot :
    - (i)  $r(n+4)$
    - (ii)  $u(3-n)$ .

- 5 (a) Write answer of any **two** : (**five** marks each) **10**
- (1) Discuss Amplitude Modulation and Demodulation.
  - (2) What is meant by Overmodulated, Undermodulated and Perfectly modulated waveforms ? Explain with neat sketch.
  - (3) Write and prove properties of convolution.
  - (4) Explain frequency modulation and demodulation.
- (b) Write answer of any **one** : **4**
- Find Convolution of following by two different methods :  
(any **two** method)
- (1)  $\{1, \underline{2}, 1, 4\}$  and  $\{2, 3, \underline{-2}, 2\}$
  - (2)  $\{2, 1, \underline{1}, 2\}$  and  $\{\underline{-2}, 1, -1, 1\}$ .
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