

8. Write short notes on any *two* of the following : 7½, 7½

- (a) M-ary Orthogonal Signals
- (b) Single Carrier versus Multicarrier modulations
- (c) OFDM Modulation
- (d) Spread Spectrum Signals.

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Roll No. ....

**BB-821**

**M. Tech. EXAMINATION, May 2018**

(Second Semester)

(B. Scheme) (Main & Re-appear)

ECE (Industry Integrated)

MTEI502B

MODERN DIGITAL COMMUNICATION  
TECHNIQUES

*Time : 3 Hours]*

*[Maximum Marks : 75*

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt *Five* questions in all, selecting at least *one* questions from each Part. All questions carry equal marks.

### Part A

1. (a) What is the difference between a low pass signal and band pass signal ? 7  
(b) What is a Band Limited Process ? How is it random ? Show that power spectral density of a typical band limited process. 8
2. (a) Explain the Central Limit Theorem. 7  
(b) Give example of a continuous and discrete random process. 8

### Part B

3. (a) Draw a neat diagram to explain frequency shift keying. Why are keying techniques required ? 7  
(b) Explain QAM (Quadrature Amplitude Modulation). 8

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4. (a) What are Multidimensional Signaling Schemes ? What are their applications ? 10  
(b) What is Pulse Amplitude Modulation ? 5

### Part C

5. What is Additive White Gaussian noise ? What is a Matched Filter Receiver ? Show its implementation. What do you understand by optimal detection ? 15
6. (a) Calculate error probability of PSK. 7  
(b) How do likelihood functions play a key role in statistical interference ? 8

### Part D

7. Give the Nyquist criteria as a solution if we have to design  $g_T(t)$  and  $g_R(t)$  to guarantee ISI free transmission, where  $g_T(t)$  is a pulse shape and  $g_R(t)$  is a filter. Make necessary assumptions. 15

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P.T.O.