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Seat No.	
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**[4757]-197**

**S.E. (I.T.) (Second Semester)**

**EXAMINATION, 2015**

**DATA COMMUNICATION**

**(2008 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 100**

**N.B. :—** (i) Answers to the two sections should be written in separate answer-books.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Use of calculator is allowed.

(v) Assume suitable data, if necessary.

**SECTION I**

1. (a) Draw ISO-OSI reference model. What are the responsibilities of : [8]

(i) Physical layer

(ii) Data link layer

(iii) Network layer.

(b) Explain PCM with the help of block diagram in detail. What are the Distortions in PCM ? How is it eliminated ? [10]

P.T.O.

*Or*

2. (a) Explain Nyquist bit rate and Shannon capacity theorem. [8]  
(b) Explain various transmission impairments present in Data communication. [10]
3. (a) Explain TDM and Statistical TDM with the help of diagram. [8]  
(b) Explain BPSK and QAM. Draw constellation diagram of it. [8]

*Or*

4. (a) Explain the following shift keying techniques with suitable examples : [8]  
(i) ASK  
(ii) FSK  
(iii) PSK  
(iv) QAM.  
(b) Explain the concept of multiplexing. Explain FDM and WDM. [8]
5. (a) Draw an electromagnetic spectrum for wireless communication. Explain Ground wave, Sky wave and Space wave propagation. [8]  
(b) Explain the terms ADSL, ADSL lite, HDSL, and SDSL. [8]

*Or*

6. (a) Draw frequency spectrum for wireless communication and explain various types of unguided media. [8]
- (b) What is switching network ? Explain different methods of switching. [8]

## SECTION II

7. (a) What is ARQ ? Explain different techniques of ARQ. [8]
- (b) What is HDLC ? Explain with the help of its frame format. [8]

*Or*

8. (a) Explain error detection and error correction in block coding. [8]
- (b) What is CRC ? Generate the CRC code for message 1001101010. Given generator polynomial  $g(x) = x^4 + x^2 + 1$ . [8]
9. (a) Discuss CSMA/CA random access technique. How collision avoidance is achieved in this technique ? [8]
- (b) Explain pure and slotted aloha. [8]

*Or*

10. (a) Discuss Gigabit Ethernet with reference to the following : [8]
- (i) MAC Sub Layer
- (ii) 1000 BaseX specification.
- (b) Explain FDMA, TDMA and CDMA. [8]

11. Write short notes on : [18]

- (a) Connecting Devices
- (b) SONET Layers
- (c) Backbone Networks.

*Or*

12. Write short notes on : [18]

- (a) Virtual LAN
- (b) Working of Switch and Router
- (c) Two-layer and Three-layer switches.