



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.Tech(EIE)/SEM-2/CIM-205A/2012  
2012**

**INTRODUCTION TO DATA COMMUNICATION**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer Question No. 1 and any four from the rest.

**GROUP – A**

1. Justify the correctness of the statements with reasons :

$$7 \times 2 = 14$$

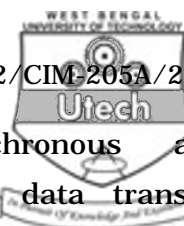
- i) Digital transmissions have better noise immunity than analog transmission.
- ii) FDM is more expensive than TDM.
- iii) Transmission range of FM is small compared to AM.
- iv) Bus Topology Network is better choice compared to Ring topology network considering network redundancy.
- v) In synchronous communication data transfer blocks at a time while asynchronous communication transfers single type at a time.



- vi) In frequency modulation telemetry system, the capacity of channels offered is less.
- vii) A communication satellite is basically a RF repeater ( transponder ) station which has made broadband long distance communication feasible and ensures a high quality of service.

### GROUP – B

- 2. What are the importances of modulation and demodulation in communication system ? Explain the double-sideband amplitude modulation. Discuss with circuit diagram about (a) Square law and balance modulators and (b) Envelope detection. 2 + 4 + 4 + 4
- 3. (a) What is pulse code modulation ? Explain with block diagram of (i) PCM generation and quantization characteristics and (ii) PCM receiver and reconstructed waveform.  
b) Build a binary PCM system with  $q = 8$  and (i) draw the direct-conversion ADC circuit for sign/magnitude code and (ii) weighted-resistor decoder circuit. 2 + 4 + 3 + 5
- 4. a) Illustrate the AM, FM and PM for (i) a triangular and (ii) sinusoidal modulating signal. Discuss about these FM generation techniques (iii) Direct FM and VCOs and (iv) phase modulators & indirect FM.  
b) Explain frequency detector with linear and FM-to-AM conversion. 3 + 4 + 4 + 3



5. Give the differences between synchronous and asynchronous transmissions. Discuss the data transfer mechanism of IEEE-488 bus. Briefly explain the features of RS-232 communication protocol. 3 + 7 + 4
  
6.
  - a) What is LAN ? Describe various LAN topologies.
  - b) Describe the operation of satellite communication earth station. What is the advantage of synchronous satellite communication ? 2 + 7 + 4 + 1
  
7.
  - a) Mention briefly the salient features of Fiber Optic communication system. A step index fiber has  $n_1 = 1.44$  and  $n_2 = 1.42$  respectively. Calculate the numerical aperture.
  - b) How does the hydraulic transmission take place ? Briefly explain pulse amplitude modulation and pulse code modulation telemetry system. 4 + 2 + 2 + 6
  
8. Write short notes on any *four* of the following :  $4 \times 3\frac{1}{2}$ 
  - a) Current telemetry system
  - b) Modem
  - c) Sampling techniques
  - d) Nyquist frequency
  - e) FDM system
  - f) TDM system.

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