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16172

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All questions are **compulsory**.
 - (2) Illustrate your answers with **neat** sketches **wherever** necessary.
 - (3) Figures to the **right** indicate **full** marks.
 - (4) **Assume** suitable data, **if necessary**.
 - (5) Mobile Phone, Pager and **any other** Electronic Communication devices are **not permissible** in Examination Hall.

Marks

1. A) Attempt **any six** :

12

- a) State sampling theorem.
- b) Give four advantages of satellite communication.
- c) The amplitude of carrier varies between 5 V and 1 V. Calculate modulation index.
- d) State any two advantages of TDM over FDM.
- e) Draw a neat sketches of star and bus network topology.
- f) Define : Acceptance angle and critical angle.
- g) What is multiplexing ? State its types.
- h) Compare between AM and FM (any 2 points).

B) Attempt **any two** :

8

- a) Describe the generation of ASK in brief.
- b) Describe TDM with suitable block diagram.
- c) What is modulation ? What is the need of modulation ?

2. Attempt **any four** :

16

- a) Draw and describe the block diagram of generation of PWM.
- b) Draw and describe simple diode detector with input and output waveforms.
- c) Encode the binary data stream 1000010 into Return to zero, non-return to zero (NRZ), AMI and Manchester code.
- d) Give classification of satellite on the basis of their location and application.
- e) Describe the mobile to mobile call procedure.
- f) Describe the following term related to noise :
 - i) Signal to Noise Ratio (SNR)
 - ii) Noise figure.

3. Attempt **any four** :

16

- a) What are the advantages of pulse modulation over continuous wave modulation ?
- b) Draw the block diagram of PCM. Write its working principle.
- c) State any four specification of LASER and LED each.

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- d) Describe working principle of uplink and downlink model of satellite communication with block diagram.
- e) Describe the working of basic cellular mobile communication system with the help of neat schematic diagram.
- f) Describe the following interferences occurred in cellular telephone network :
 - i) Co-channel interference
 - ii) Adjacent channel interference.

4. Attempt any four :**16**

- a) Define modulation index of AM. Calculate modulation index of AM signal with $V_{\max} = 20 \text{ mV}$ and $V_{\min} = 10 \text{ mV}$.
- b) Draw block diagram delta modulation and state function of each block.
- c) State different frequency bands used in satellite communication.
- d) State advantages of multimode graded index fiber, single mode step index fiber.
- e) Write electrical characteristics of RS-232 standard.
- f) With the help of suitable diagram describe the concept of cellular frequency reuse. State mathematical formula which gives the total number of cellular channels, those are available in the cluster.

5. Attempt any four :**16**

- a) Draw block diagram of BPSK generation. State functions of each block.
- b) Compare ASK, FSK, PSK on the basis of waveform, variable parameters, noise immunity and bandwidth requirement.
- c) Describe the working of transponder used in satellite communication.
- d) State functions of hubs, repeaters, routers and bridges.
- e) Draw the block of MODEM. Describe the function of each block.
- f) Describe parallel data transmission mode.

6. Attempt any four :**16**

- a) Which errors are occurred in delta modulation ? How to overcome these errors ? Which circuit is used for this purpose ? Draw and explain that circuit in detail.
- b) Describe the working principle of avalanche photodiode with the help of suitable diagram.
- c) Compare step index with graded index fiber on the basis of :
 - i) Core radius
 - ii) Light source
 - iii) Index profile diagram
 - iv) Intermodal dispersion.
- d) List the layers of OSI model and state function of any three layer.
- e) Draw and describe star LAN configuration.
- f) Differentiate between FDMA, TDMA, CDMA on the basis of following parameters :
 - i) Multiplexing technique
 - ii) Power efficiency
 - iii) Synchronization
 - iv) Guard band.