

17438

16172

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. (A) Attempt any SIX of the following : 12
- (a) Compare AM and FM (any four points).
  - (b) Draw uplink and downlink model. Mention uplink and downlink frequencies used in satellite.
  - (c) List any four types of digital modulation techniques.
  - (d) Name network devices one each, which operates at physical level, data link layer, network layer, application layer.
  - (e) What is FDM ? Where is it used ?
  - (f) List different frequency bands with their frequency ranges in electromagnetic spectrum.
  - (g) State working principle of TDM and its any one application.
  - (h) State the function of transponder in satellite communication.

**(B) Attempt any TWO :****8**

- (a) State sampling theorem. Give the difference between natural and flat top sampling.
- (b) Draw and explain block diagram of cellular mobile phone.
- (c) Define bit, frame, packet and segments. Write the name of OSI layer which uses these entities.

**2. Attempt any FOUR :****16**

- (a) State the meaning of the terms :
  - (i) Data rate
  - (ii) Bit rate
  - (iii) Baud rate
  - (iv) Channel bandwidth
- (b) Draw FSK waveform for a given bit sequence 10101110. State its advantages and disadvantages over ASK.
- (c) What are the types of digital to digital encoding ? How encoding differs from modulation ?
- (d) Draw the block diagram of PCM transmitter. Explain the function of each block.
- (e) A broadcast transmitter radiates 50 kW of carrier power. What will be the radiated power at 85 percent modulation ?
- (f) Explain PWM generation with its waveform.

**3. Attempt any FOUR :****16**

- (a) Compare PAM, PWM and PPM. (4 points)
- (b) Draw AM waveforms for under modulation, over modulation and 100% modulation.
- (c) Describe the working principle of CDMA with neat diagram.
- (d) What is DPSK ? State its principle. Draw the block diagram to generate DPSK.
- (e) What is demodulation ? Explain AM demodulation by diode detector.
- (f) Explain (i) Tele-surgery (ii) Tele dermatology

**4. Attempt any FOUR :****16**

- (a) Define cell splitting and state its need.
- (b) State various handoff techniques used in mobile communication and explain any one.
- (c) Explain the principle of operation of hubs, repeaters, bridges and routers.
- (d) What is network security ? Explain with examples.
- (e) Draw block diagram of single channel biotelemetry system for ECG and briefly explain its operation.
- (f) What is internet based medical services ? Give ethical and legal aspects of it.

**5. Attempt any FOUR :****16**

- (a) Draw block diagram of satellite communication system and explain it.
- (b) Draw architecture of OSI and TCP/IP model. Why TCP/IP is preferred in network system ?
- (c) Explain various modes of data transmission.

**P.T.O.**

- (d) Compare Star and Ring topology with respect to :
  - (i) Arrangement of nodes
  - (ii) Unit used for data transmission
  - (iii) Ease of installation
  - (iv) Maintenance
- (e) Compare LAN, WAN and MAN. (4 points)
- (f) With block diagram explain working of Tele cardiology.

**6. Attempt any FOUR :**

**16**

- (a) Represent the data 10110100 using following formats :
    - (i) Polar RZ
    - (ii) Unipolar NRZ
    - (iii) Bipolar AMI
    - (iv) Manchester Code
  - (b) What is QPSK ? State its principle. Draw block diagram to generate QPSK.
  - (c) What is Quantization ? With neat diagram show quantization error.
  - (d) What are the different types of satellite orbits ? Explain (i) elevation angle  
(ii) Azimuth angle.
  - (e) Compare TDMA, FDMA and CDMA. (4 points)
  - (f) Why uplink frequency is higher than downlink frequency ? Write frequency ranges used for various bands.
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