

17438

**21819**

**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) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (5) 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) State frequency range for UHF and VHF bands in electromagnetic spectrum.
- (b) State types of multiple access techniques.
- (c) State the network devices used for
  - (i) connecting two similar networks
  - (ii) connecting two dissimilar networks
- (d) List types of digital modulation techniques.
- (e) State types of multiplexing.
- (f) Define :
  - (i) Base station
  - (ii) Mobile switching centre
- (g) List types of data encoding techniques.
- (h) What is foot print and station keeping as applicable to satellite.

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**P.T.O.**

**(B) Attempt any TWO of the following :****8**

- (a) Draw the ASK, PSK, FSK waveform for following data stream :  
Data stream – 10110101
- (b) State sequential steps for mobile (cellular) to mobile (cellular) call procedure.
- (c) Compare LAN and WAN with respect to following points :
  - (i) extend of geographical area
  - (ii) basic structure diagram
  - (iii) speed
  - (iv) application

**2. Attempt any FOUR of the following :****16**

- (a) Define modulation. State the need of modulation.
- (b) Compare PAM, PPM and PWM with respect to following points :
  - (i) Bandwidth
  - (ii) Transmitted power
  - (iii) Variable parameter of carrier
  - (iv) Output waveform.
- (c) For the binary data stream 11000010, draw the return to zero, non-return to zero, AMI and Manchester codes.
- (d) With neat sketch, explain working principle of BPSK.
- (e) Define demodulation. Draw circuit diagram of amplitude demodulation using diode detector.
- (f) What is sampling ? Draw and explain natural sampling and flat top sampling.

**3. Attempt any FOUR of the following :****16**

- (a) State advantages of pulse modulation over amplitude modulation.
- (b) What is the bandwidth requirement for FM in which the modulation index is 5 and maximum deviation is 15 kHz. (Assume highest needed sideband = 6)
- (c) Define handoff mechanism and list different types of handoff.
- (d) State the bandwidth requirements for FSK, BPSK, QPSK and DPSK.
- (e) Compare AM and FM on the basis of sidebands, bandwidth, noise immunity and transmission frequencies used.
- (f) State two advantages and two disadvantages of telemedicine.

**4. Attempt any FOUR of the following :****16**

- (a) Draw neat block diagram of mobile communication system and state function of each block.
- (b) What is co-channel and adjacent channel interference ?
- (c) State the meaning of the terms :
  - (i) hub
  - (ii) repeater
  - (iii) router
  - (iv) gateway
- (d) Explain the term digital signature and message authentication related to network security.
- (e) Draw and explain block diagram of multichannel biotelemetry system.
- (f) What is Biotelemetry ? Describe briefly its operation with block diagram.

**P.T.O.**

**5. Attempt any FOUR of the following :****16**

- (a) What is network topology ? Describe star and mesh topology with diagram.
- (b) Draw the architecture of TCP/IP model. Why TCP/IP is preferred in network systems ?
- (c) State different modes of data transmission. Differentiate between synchronous and asynchronous transmission.
- (d) What is telecardiology ? Describe its operation with block diagram.
- (e) With neat diagram explain the transponder model of satellite.
- (f) Draw architecture of OSI model. State the functions of any two layers.

**6. Attempt any FOUR of the following :****16**

- (a) Differentiate between FDM & TDM based on any four points.
  - (b) Define PCM. Write applications of PCM.
  - (c) Draw the block diagram of DM. State the function of each block.
  - (d) State applications of satellite communication system.
  - (e) What are uplink and downlink frequencies in satellite communication ? Write uplink and downlink frequency ranges of S-band and C-band.
  - (f) What are different types of satellite orbits ? What is geostationary satellite ? State advantages of geostationary satellite.
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