



# 17472

11819

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** :

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- a) State any two advantages and disadvantages of PAM.
- b) Define foot print and altitude.
- c) Define following terms related to noise :
  - i) signal to noise ratio
  - ii) noise figure.
- d) State any four advantages of FDM.
- e) Draw neat sketches of mesh and ring topology.
- f) Define acceptance and critical angle.
- g) List any two advantages of pulse modulation over AM.
- h) Name the different data encoding technique.

B) Attempt **any two** :

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- a) Draw block diagram of QPSK generation, state its working principle.
- b) Describe TDM with suitable diagram.
- c) Draw well labelled waveform of the following signal :
  - a) modulating signal
  - b) unmodulated carrier signal
  - c) 50% modulated AM wave
  - d) 100% modulated AM wave.

**P.T.O.**

**2. Attempt any four :**

- a) Draw the diagram of generation of PAM, write its working principle.
- b) Draw circuit diagram of FM modulation using varactor diode and explain its working.
- c) Encode the following binary data stream into return to zero (RZ), Non Return to Zero (NRZ), AMI and Manchester Codes Data Stream : 1100 0010.
- d) Write working principle of downlink model of satellite communication with block diagram.
- e) What happens to cell structure when telephone traffic is higher in any particular cell ? Name the technique used to increase the cell capacity.
- f) Compare AM and FM on the basis of following parameters :
  - i) Bandwidth
  - ii) Modulation index.
  - iii) Waveforms
  - iv) Noise immunity.

**3. Attempt any four :**

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- a) Write the working principle of PWM and PPM.
- b) Draw block diagram of adaptive delta modulation, write its working principle.
- c) Draw the diagram of avalanche photo diode, write its working principle.
- d) Draw the diagram of multimodel step index fiber, state its performance characteristics.
- e) How frequencies are reused in mobile communication. Explain with neat diagram.
- f) How a call is progressed from a mobile (cellular) to a wireline (PSTN) ?

**4. Attempt any four :**

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- a) Calculate modulation index of FM, if the maximum frequency derivation of the carrier is  $\pm 1.5$  KHz and maximum modulation frequency is 10 KHz.
- b) Draw block diagram of PCM and state function of each block.
- c) Compare FDMA, TDMA and CDMA on basis of following parameters.
  - i) Principle
  - ii) Synchronization
  - iii) Power efficiency
  - iv) Guard band.
- d) State four specification of LASER.
- e) Draw the block diagram of TCP/IP model and state function of any three layers.
- f) Define cochannel and adjacent channel. Explain interference caused by cochannel, adjacent channel in cellular mobile communication with help of diagram.

**5. Attempt any four :**

- a) Draw and describe block diagram of BPSK transmitter and receiver.
- b) Compare FSK and PSK with reference to the following point :
  - i) Variable characteristics
  - ii) Bit rate
  - iii) Bandwidth
  - iv) Noise immunity.
- c) State different frequency bands with their values used in satellite communication.
- d) Draw block diagram of modem and write function of each block.
- e) State concept of message confidentiality and integrity.
- f) State operating principle of LAN and MAN with diagram.

**6. Attempt any four :**

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- a) Which error is occurred in delta modulations ? Which circuit is used to overcome this ?  
Draw and explain operating principle of same.
  - b) Draw constructional diagram of PIN diode, write its operating principle.
  - c) State any four power losses associated with an optical fiber.
  - d) Describe serial data transmission mode.
  - e) List the layers of OSI model and state function of any three layers.
  - f) Write the working principle of transponder with help of block diagram.
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