Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.TECH(IT-NEW)/SEM-7/IT-705E/2013-14

2013

ADVANCED DATA COMMUNICATION AND CODING

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.

GROUP – A

(Multiple Choice Type Questions)

Choose the correct alternatives for the following :

$10 \times 1 = 10$

1. Which signal must satisfy the following condition $x (t) = x (- t)$?

   a) Periodic signal   b) Even signal

   c) Odd signal   d) None of these.

2. QPSK is an M-ary encoding scheme where the values of N and M are

   a) 1, 2   b) 2, 3

   c) 1, 4   d) 2, 4.

7410(N)   [Turn over

iii) What type of digital modulation is known as OOK ?

    a) ASK   b) FSK

    c) BPSK   d) DPCM.

iv) "sinc function" is used to

    a) increase ISI   b) remove ISI

    c) introduce ISI   d) none of these.

v) In Pseudo-ternary Bipolar representation '0' is represented by

    a) natural zero voltage

    b) positive voltage

    c) negative voltage

    d) alternative positive and negative voltage

vi) .... is the standard defined by the American National Standard Authority, ANSI T1 for synchronous operation used in North America.

    a) DXC   b) STM-1

    c) ADM   d) SONET.

vii) One type of optical fiber is the .... that is cheap, easy to use and suitable for short-distance communication.

    a) glass fiber   b) iron fiber

    c) copper fiber   d) plastic fiber.

viii) The type of access used in GSM technology is

    a) FDMA/TDMA   b) CDMA

    c) OFDMA   d) none of these.

ix) INTELSAT stands for

    a) International Telecommunications Satellite

    b) India Telecommunications Satellite

    c) Inter Telecommunications Satellite

    d) none of these.

x) The .... is a database that contains information about the identity of mobile equipment that prevents calls from stolen, unauthorized, or defective mobile stations.

    a) EIR   b) HLR

    c) AUC   d) XME.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Derive the expression for C/N ratio in satellite communication.

3. State Nyquist sampling theorem. Explain the different types of sampling processes.

4. What is the effect of solar eclipse on a satellite ?

5. Given the data stream

1110010100

Sketch the transmitted sequence of rectangular pulses for each of the following line codes :

    a) Unipolar NRZ

    b) Unipolar RZ

    c) Polar RZ

    d) Polar NRZ

    e) Manchester.

6. What do you mean by Fading ? Explain briefly. How can we overcome this problem ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Draw and explain the architecture of GSM.

    b) Discuss GPRS location management procedure.

    c) Explain the role played by HLR VLR and AUC during call set up. $5 + 5 + 5$

8. a) Explain in brief the key roles played by BSC and MSC in call set up procedure in mobile communication.

    b) Draw and explain GPRS network architecture. What are GPRS radio interfaces ?

    c) What is near and for problem in CDMA based system ?

    $7 + (4 + 2) + 2$

9. a) Write Kepler's laws related to orbital period of satellite.

    b) Why the uplink frequency is greater than downlink frequency ? What are apogee and perigee of a satellite ?

    c) What is sub-satellite point ? What is the difference between geo-synchronous and geo-stationary orbit ?

    $5 + (3 + 3) + (2 + 2)$

10. a) Draw and explain PCM technique.

    b) Draw and explain the block diagram for generation and detection of BFSK signal.

    c) What is adaptive delta modulation ? How it overcomes the problems of delta modulation ? $5 + 6 + (2 + 2)$

11. Write short notes on the any *three* of the following :

    3×5

    a) SONET

    b) Transponder and polarization hopping

    c) QPSK

    d) ISI and Eye Pattern

    e) Delta modulation.