Name : .....

Roll No. : .....

Invigilator's Signature : .....

2010

COMMUNICATION ENGINEERING

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)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

i) The modulation index of an FM signal is given by

a) δ / f_m b) f_m / δ

c) $\delta * f_m$ d) none of these.

ii) A superheterodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz. The image frequency is

a) 750 kHz b) 900 kHz

c) 1650 kHz d) 2100 kHz.

iii) The basic modulator and demodulator circuit in PSK are

a) PLLs b) Balanced modulator

c) Shift register d) Linear summer.

iv) The channel capacity C of a white channal for a given bandwidth B is given by

a) $C = Bly_2 (1 + S/N)$ b/s

b) $C = Bly_2 (1 + N/S)$ b/s

c) $C = nBly_2 (1 + S/N)$ b/s

d) none of these.

v) Quadrature amplitude modulator is

a) Amplitude modulation only

b) QPSK only

c) AM plus QPSK

d) AM Plus FSK.

vi) The typical bandwidth of a satellite bends

a) 36 MHz b) 40 MHz

c) 70 MHz d) 500 MHz.

vii) Which diode is a popular microware oscillator ?

a) IMPATT b) Gunn

c) Varactor d) Schotkey.

viii) PCM is preferred to PAM becouse of the

a) resistance to quantising error

b) simplicity

c) lower cost

d) superior noise immunity.

ix) Which of the following is not of information ?

a) bit b) decit

c) Hz d) nat.

x) A parity check code can

a) detect a single bit error

b) correct a single bit error

c) detect two bit error

d) correct two biterror

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain the working principle of synchronous demodulator.

3. State and explain sampling theorems for band limited signal. 1 + 4

4. Draw the block diagram of superheterodyne receiver and explain briefly its operation.

5. What is frequency discriminator ? Explain its principle.

6. Draw ASK, FSK and BPSK signals to transmit data stream 10100011.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Draw the block diagram of a PCM system. What is quantization noise ? 3 + 2

   b) Explain with schematic diagram the principles of modulation and demodulation of a PSK system. 5

   c) What are the basic elements of Satellite Communication system ? Explain with a diagram of the system. 5

8. a) Describe the generation and detection of an FSK system. 5

   b) What is the function of a modem ? Explain. 5

   c) How does noise affect digital communication system ? 5

9. a) Define modulation index of AM signal. Express it in terms of maximum and minimum voltage of modulated signal. 2 + 2

   b) Derive the relation between output power of AM transmitter and depth of modulation. 3

   c) What is DSB – SC ? With neat diagram, show how DSB – SC signal can be generated using balanced modulator. 2 + 6

10. a) Explain the generation of PAM signal with suitable diagram. How is PCM signal generated from PAM signal ? 3 + 3

    b) How does TDM differ from FDM ? 4

    c) What is DPSK ? Draw and explain how DPSK is non-coherently detected. 5

11. a) Draw the scheme of an optical fibre-based communication system. 3

    b) Explain delta modulation using necessary waveforms. 5

    c) What are the limitations for delta modulation ? 2

    d) How does ADM overcome these limitations ? 5

12. Write short notes on any *three* of the following : 3 × 5

    a) DPSK

    b) FDM

    c) Balanced modulator

    d) Envelope detector

    e) Armstrong method of FM generation