



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH/EE(NEW/OLD)/SEM-8/EE-802A(N)/EC-802C(O)/2010

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 channel for a given bandwidth B is given by
 - a) $C = B \log_2 (1 + S/N)$ b/s
 - b) $C = B \log_2 (1 + N/S)$ b/s
 - c) $C = nB \log_2 (1 + S/N)$ 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 bands
 - a) 36 MHz
 - b) 40 MHz
 - c) 70 MHz
 - d) 500 MHz.
- vii) Which diode is a popular microwave oscillator ?
 - a) IMPATT
 - b) Gunn
 - c) Varactor
 - d) Schotkey.
- viii) PCM is preferred to PAM because 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. $3 \times 5 = 15$

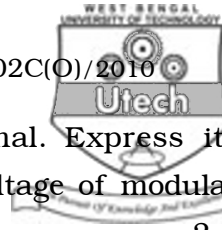
2. Explain the working principle of synchronous demodulator.
3. State and explain sampling theorems for band limited signal.
 $1 + 4$
4. Draw the block diagram of superheterodyne receiver and explain briefly its operation.
5. What is frequency discriminator ? Explain its principle.
6. Draw ASK, FSK and BPSK signals to transmit data stream 10100011.

GROUP – C

(Long Answer Type Questions)

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

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