



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (EE-O)/SEM-8/EI-802B/2010

2010

REMOTE CONTROL & TELEMETRY

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 any *ten* of the following :

10 × 1 = 10

- i) PCM is preferred to PAM because of its
 - a) resistance to quantizing error
 - b) simplicity
 - c) lower cost
 - d) superior noise immunity.
- ii) A buffer amplifier has a gain of
 - a) infinity
 - b) zero
 - c) unity
 - d) dependent.
- iii) What is the maximum distance the voltage telemetry supports ?
 - a) 3000 m
 - b) 300 m
 - c) 30 m
 - d) 30 km.



- iv) Radio signals are made up of
- voltages & currents
 - electrons & protons
 - noise & data
 - electric & magnetic fields.
- v) For an FM wave represented by the voltage equation $e = 8 \sin (6 \times 10^8 t + 5 \sin 4 \times 10^4 t)$ V the carrier & modulating frequencies are
- 127.3 MHz, 9.5 kHz
 - 95.5 MHz, 6.37 kHz
 - 190 MHz, 6.37 kHz
 - none of these.
- vi) Each signal in an FDM system
- modulates a sub-carrier
 - modulates the final carrier
 - is mixed with all the others before modulation
 - serves as a sub-carrier.
- vii) Modem is an acronym of
- Modulation
 - Demodulation
 - Modulation & demodulation
 - Amplification.
- viii) The maximum bandwidth that an analog signal can use with a sampling frequency of 200 kHz is
- 27 kHz
 - 54 kHz
 - 400 kHz
 - 406 kHz.
- ix) What is the minimum value of signal to noise ratio kept in current telemetry system ?
- ≥ 2
 - ≤ 2
 - ≥ 4
 - ≤ 4 .



- x) Sampling an analog signal produces
- PAM
 - AM
 - FM
 - PCM.
- xi) The ratio of peak modulating voltage to the peak carrier voltage is referred to as
- the voltage ratio
 - decibels
 - the modulation index
 - the mix factor.

GROUP – B
(Short Answer Type Questions)

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

- Explain with neat diagram, the principle of operation of voltage to frequency converter.
- What do you mean by quantization of a signal ? What are the advantages of quantization ? $3 + 2$
- Name & explain any two types of modulation scheme that are used in telemetry system.
- How can inter-symbol interference be eliminated ? Explain.
- What is a data acquisition system ? What are the components involved in it ?

GROUP – C
(Long Answer Type Questions)

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

- Explain with diagram, the principle of a power system telemetry. What are the transducers used in such system ? Explain.
 - What is the necessity of coding ? Distinguish between source coding, line coding & channel coding.

$5 + 4 + 2 + 4$



8. a) Explain with suitable diagram the scheme of audio-telemetry channel over RF links.
b) What are the functions of waveguide in microwave communication ?
c) Explain with suitable circuit diagram, how flat top PAM pulses are generated. How are PAM pulses used for PCM coding ? $6 + 3 + 4 + 2$
9. a) Draw the block schematic diagram of TDM, PCM & FM systems of telemetering & make appropriate levels, both on the transmitting & receiving sides. What is a time frame in the system ?
b) How does a TDM system differ from FDM system ?
c) Why is synchronisation necessary in all TDM systems ? $10 + 3 + 2$
10. a) Describe the principle of operation of a modem.
b) Draw the scheme of a sample & hold circuit. Explain its operation & application.
c) How is bandwidth related to the information capacity of a channel for digital transmission ? $5 + 6 + 4$
11. Write short notes on any *three* of the following : 3×5
- a) ISDN
 - b) PLL
 - c) Supervisory telecontrol system
 - d) Pipeline telemetry.
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