



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

DEAE V

EET 2307

TELEMETRY & NETWORKING I

SEMESTER EXAMINATIONS

SERIES: FEBRUARY 2011 SERIES

TIME: 2 HOURS

Instructions to Candidates:

1. You are required to have the following for this examination;
 - Answer booklet
2. This paper contains **FIVE** Questions. Answer Question **ONE (COMPULSORY)** and any other **TWO** Questions.

(COMPULSORY)

Question ONE

- a) Explain
- i) The THREE ways of modulating information using a sequence of pulses.
 - ii) Any THREE parameters considered when selecting pulse code modulated (PCM) waveforms for a particular application. (6 marks)
- b) i) Describe the FIVE elements of data communication.
- ii) Explain the causes of the following dispersions in an optical fibre.
- I) Material dispersion
 - II) Waveguide dispersion
 - III) Intermodal dispersion (11marks)
- c) i) For a two wire open transmission line show that:
- I) The Propagation constant $\gamma = \sqrt{(R + j\omega L)(G + i\omega C)}$.
 - II) The characteristic impedance is $Z_0 = \sqrt{\left(\frac{R + j\omega L}{G + j\omega C}\right)}$
- ii) Explain TWO major transmission line losses. (13marks)

(ANSWER ANY OTHER TWO QUESTIONS)

Question TWO

- a) i) Explain the following concepts
- I) Sampling theorem
 - II) Quantization
- ii) Outline any TWO PCM system advantages over other types of modulation.
- iii) Given the following PCM binary code 11100110100 sketch its PCM pulse representation using:
- I) Return – to – zero (RZ)
 - II) Return – to – bias (RB)
 - III) Nonreturn – to – zero (NRZ(L)) (12marks)
- b) Distinguish between the following PCM concepts
- i) Adaptive DPCM and Delta Modulation
 - ii) Time division multiplexing and frequency division multiplexing. (8 marks)

Question THREE

- a) i) Outline any THREE characteristics of Optical fibre transmission system
ii) With aid of sketches, illustrate the function of the three and four port fibre couplers. (9 marks)
- b) With the aid of diagrams, distinguish between the step index and graded index optical fibres cables based on:
i) Refractive index profile
ii) Number of modes propagating through the cable. (11marks)

Question FOUR

- a) i) Describe the following encoders
I) Tachometer
II) Incremental
ii) State any ONE advantage and disadvantage of Gray code over natural binary code encoder.
iii) Outline the principles on which optical displacement transducers depend upon for their operation. (8 marks)
- b) With the aid of a diagram explain how angular displacement are encoded using a four track rotary shaft encoder disc. (8 marks)
- c) Distinguish between the two simplest sychro units in a synchro system. (4 marks)

Question FIVE

- a) Explain the following signal multiplexing methods
i) Frequency division multiplexing
ii) Time division multiplexing
iii) Space division multiplexing
iv) Code division multiplexing (8 marks)
- b) i) Outline any THREE factors that are considered in the choice of a given transmission channel.
ii) Describe the following categories of noise in a data transmission system.
I) Man-made
II) Erratic disturbances
III) Spontaneous fluctuations (12marks)