



MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE
IN ELECTRICAL AND ELECTRONICS ENGINEERING

SUPPLEMENTARY EXAMINATION

EEE 401: COMMUNICATION SYSTEMS II

DATE: 28/8/2017

TIME: 8.30 - 10.30 AM

INSTRUCTIONS

Answer questions One and any other Two Questions.

Question One carries 30 marks. The remaining questions carry 20 marks each.

QUESTION ONE

- a) Explain with illustration the process of analog to digital conversion. (6 marks)
- b) A 256 level uniform quantizer is used to process voice signal. Calculate channel capacity required to transmit this voice signal. (4 marks)
- c) Discuss sources of signal impairments in a PCM system (4 marks)
- d) Show with illustration comparison of PCM, DPCM and DM systems. (6 marks)
- e) Explain the following:-
 - i) Shannon's Law (2 marks)
 - ii) Slope overload (2 marks)
 - iii) Effect of under sampling (2 marks)

- f) Distinguish between bit rate and baud rate. (4 marks)

QUESTION TWO

- a) Discuss three examples of bandpass data transmission systems. (6 marks)
- b) Explain why synchronization is required in digital communications. (4 marks)
- c) Determine the transmission capacity for channel to transmit voice in digitized form where SNR of 40dB is required. (6 marks)
- d) Discuss the various noise in a digital communication system. (4 marks)

QUESTION THREE

- a) Nyquist, Hartley and Shannon contributed immensely in information theory. Discuss with relevant formulae the contribution of each in arriving at the channel capacity. (7 marks)
- b) Discuss briefly the m in an m -level quantizer and its effects on signal transmission requirements (7 marks)
- c) Explain the drawbacks in delta modulation (6 marks)

QUESTION FOUR

- a) A signal is expressed with equation $4+2\cos(2\pi 540t)+3\sin(2\pi 750t)$. Show the Nyquist the sampling rate. (6 marks)
- b) A particular digital encoding system is using 16 bits per symbol,
i) Calculate the S/N resulting from such a system (4 marks)
ii) Comment on the quantization levels and where you will find this system (4 marks)
- c) Discuss the various types of temporal encoding techniques available (6 marks)

QUESTION FIVE

- a) Discuss data compression systems giving reasons for it (4 marks)
- b) Discuss companding as used in the PCM systems. (4 marks)
- c) Explain the some 3 commonly used signal compression technics (6 marks)
- d) Discuss digital signal transmission and detection where in-phase and quadrature components are present. (6 marks)