



# MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 414: MULTIMEDIA TECHNOLOGIES

DATE: \_\_\_\_\_

TIME: \_\_\_\_\_

**Instructions: Answer Question ONE and any other TWO Questions**

## QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain the meaning of the following concepts as used with multimedia (8 marks)
  - i. Multimedia authoring
  - ii. Pulse code modulation (PCM)
  - iii. Quantization of Audio
  - iv. Digitization of sound
- b) Explain the main *advantages* of multimedia systems. (4 marks)
- c) In terms of computing, explain any three fundamental multimedia attributes (3 marks)
- d) Explain the forces driving the multimedia evolution (4 marks)
- e) Distinguish the following terms Hue, Saturation (4 marks)
- f) The Ministry of Education would like to develop an intelligent multimedia Computer-Based Learning system to teach Multimedia System for the secondary school students.
  - i. How do you ensure that the learning system that you are going to develop is effective? (5 marks)
  - ii. If artificial intelligence (knowledge-based) is to be incorporated in this system, briefly describe the intelligent functionality that you would incorporate into the system. (5 marks)

## QUESTION TWO (20 MARKS)

- a) Explain the key differences between I-frames, P-frames and B-frames in MPEG-2 video compression. (3 marks)
- b) Machakos University registry intends to protect her documents using watermarking feature. Explain how the University can use the following applications of watermarking to achieve this. (8 marks)
  - i. Ownership assertion
  - ii. Fingerprinting
- c) Explain the two main kinds of MIDI messages (4 marks)
- d) State components of multimedia (5 marks)

## QUESTION THREE

- a)
  - i) Define the term steganalysis (2 marks)
  - ii) Explain the two types of steganalysis techniques (4 marks)
- b)
  - i) Explain the various applications of multimedia technology (6 marks)
  - ii) Explain why lossy data compression is sometimes preferred over lossless 2 marks
- c) Using an appropriate diagram, describe various video production process components (6 marks)

## QUESTION FOUR (20 MARKS)

- a) State Nyquist's Sampling Theorem (2 marks)
- b) A computer science student was required to develop an interactive multimedia system during their usual class lesson
  - i. What are the key issues that need to be considered when designing the navigational structure of an interactive multimedia system? (5 marks)
  - ii. Discuss four different considerations that need to be taken into account as good design principles for designing this system. (8 marks)
  - iii. Briefly explain various multimedia authoring tools you should use for the above project (5 marks)

## QUESTION FIVE (20 MARKS)

- a) Using an appropriate diagram of Audio production process, explain how it works (6 marks)
- b) Explain different ways of editing audio in the production process (4 marks)
- c) Explain the significance of performing Chroma subsampling in image/video data compression (4 marks)
- d) Pulse Code Modulation (PCM) consists of three steps to digitize an analog signal. Explain these steps (6 marks)