MACHAKOS UNIVERSITY

University Examinations for 2022/2023

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) Discuss the forces driving the multimedia evolution (4 marks)

d) Distinguish the following terms Hue, Saturation (4 marks)

e) 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. Discuss 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) Describe the two main kinds of MIDI messages (4 marks)

d) State components of multimedia (5 marks)

QUESTION THREE (20 MARKS)

a) i) Define the term steganalysis (2 marks)

ii) Explain the two types of staganalysis 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. Highlight 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) Describe 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. Discuss these steps. (6 marks)