MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SPECIAL/SUPPLIMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 405: COMPRESSION TECHNIQUES

DATE: 20/1/2021 **TIME: 2:00 – 4:00 PM**

INSTRUCTION: Answer Question ONE and any other TWO Question

QUESTION ONE (COMPULSORY)

a) Explain why an image may have different sizes in different file formats (4 marks)

b) Justify the need for data compression (6 marks)

c) List any five lossy data compression algorithms (6 marks)

d) Describe audio compression (8 marks)

e) State the steps in run length coding and pattern substitution (6 marks)

QUESTION TWO (20 MARKS)

a) Differentiate between (6 marks)

i. Compression and decompression

ii. Huffman and shano-fano

b) Compare and contrast MPEG and JPEG (8 marks)

c) State H.32x Family (4 marks)

d) Define entropy (2 marks)

QUESTION THREE (20 MARKS)

a) Explain the advantages of data compression in the following areas (6 marks)

(i) Multimedia.

(ii) Communication.

(iii) Databases

b) Encode the message "AAABDCEFBBAADCDF" using: (8 marks)

i) Run length (3 marks)

ii) Pattern substitution (3 marks)

iii) Huffman (8 marks)

QUESTION FOUR (20 MARKS)

a) Explain entropy and calculate the average entropy for the message: **WELL COME TO MACHAKOS UNIVESITY CHRISTION UNION!** (10 marks)

b) Compare and contrast arithmetic and LZW coding algorithms (6 marks)

c) Differentiate between source and channel coding (4 marks)

QUESTION FIVE (20 MARKS)

a) Using a typical example, differentiate compression ratio and compression factor (6 marks)

b) Explain three types of motion and prediction techniques in video compression (6 marks)

c) Given that Alphabet: X = {D, E, F} and Message:DEDEFEDEDE, encode the message using the LZW algorithm (8 marks)