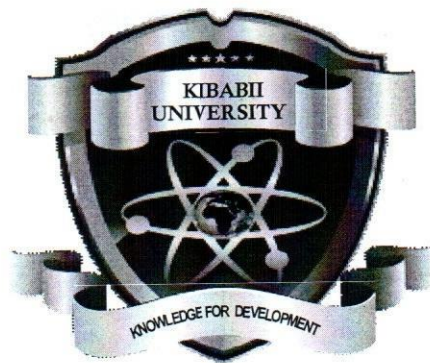


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UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR THREE SEMESTER ONE EXAMINATIONS
FOR THE DEGREE OF BACHELOR OF SCIENCE
(COMPUTER SCIENCE)

COURSE CODE : CSC 352E..
COURSE TITLE : HIGH SPEED MULTIMEDIA
NETWORKS

DATE: 13 / 12 / 2022

TIME: 2.00 P.M. – 4.00 P.M.

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO

QUESTION ONE (COMPULSORY) [30 MARKS]

- (a) Define the following terms applicable high speed multimedia networks [1 mark]
- (i) Multimedia systems [1 mark]
 - (ii) Broadband [1 mark]
 - (iii) Data compression
- (b) State the four basic characteristics of multimedia systems [4 marks]
- (c) The main data compression methods are lossless and lossy compression. List two categories of data compression that are categorized under lossy compression methods [3 marks]
- (d) (i) List the three technologies applicable in delivering high speed LANs [3 marks]
(ii) Illustrate using a diagram the operation of CSMA/CD in high speed LANs [7 marks]
- (e) State and briefly describe three ways the Internet should evolve to better support multimedia [6 marks]
- (f) (i) What is the basic cause of traffic congestion in multimedia networks [2 marks]
(ii) In typical packet switching networks, state two conditions which can easily cause congestion [2 marks]

QUESTION TWO [20 MARKS]

- (a) State the meaning of the following terms applicable in high-speed multimedia networking
- (i) Video [1 mark]
 - (ii) Digital Image [1 mark]
- (b) (i) State the goal of traffic congestion control in high speed multimedia networks [2 marks]
(ii) Highlight three effects for traffic congestion and why it is undesirable in multimedia networks [3 marks]
- (c) (i) What is data compression in high-speed multimedia networks [2 marks]
(ii) Describe Huffman coding method and how it achieves data compression. [7 marks]
- (d) An Internet phone is a basic example of real-time interactive applications in multimedia networks. What key condition occasion the occurrence of the following two limiting performance features?
- (i) Network loss [2 marks]
 - (ii) Delays [2 marks]

QUESTION THREE [20 MARKS]

- (a) (i) Define the term “jitter” used in multimedia networking [2 marks]
(ii) Briefly state the three classes of multimedia network applications [3 marks]
- (b) (i) TCP/IP is the original protocol suite for internetworking. State the specific roles TCP and IP in the internetworking? [2 marks]
(ii) Explain the two vital functions of dynamic routing in IP-based internetworking [4 marks]
- (c) State and briefly describe three fundamental characteristics of multimedia applications [6 marks]
- (d) Enumerate three requirements that call for high speed LANs in multimedia networking [3 marks]

QUESTION FOUR [20 MARKS]

- (a) State the roles of each of the four terms applicable for end application layer of the Internet architecture stack
- (i) Web [1 mark]
 - (ii) FTP [1 mark]
 - (iii) VOIP [1 mark]
 - (iv) H.323 [1 mark]
- (b) Highlight two significant trends that have altered the role of PCs and LANs leading to the emergence of high-speed LANs [2 marks]
- (c) 802.11 is an IEEE standard used by industry for wireless access. Briefly discuss the following two popular 802.11 versions applicable in wireless LANs.
- (i) 802.11b [2 marks]
 - (ii) 802.11g [2 marks]
- (d) (i) Explain two ways in which stations access medium in IEEE802.3 Medium Access Control [4 marks]
- (ii) List three differences between SIP and H.323 technologies in multimedia networks [3 marks]
- (e) Illustrate using examples how compression is achieved in run-length compression method [3 marks]

QUESTION FIVE [20 MARKS]

(a) Define the following terms applicable in high-speed multimedia networking;

- (i) Router* **[1 mark]**
- (ii) PoP* **[1 mark]**
- (iii) Dark Fiber* **[1 mark]**
- (iv) Channelization* **[1 mark]**

(b) List three channelization methods applicable in multiple access control in traffic management **[3 marks]**

(c) State the difference in terms of peak download speeds between Evolved High-Speed Packet Access (HSPA+) and advanced 4G LTE (LTE-Advanced Pro) in digital mobile networks **[2 marks]**

(d) Discuss the four key technical ingredients for successful ATM networking **[6 marks]**

(e) The Moving Picture Experts Group (MPEG) method is used to compress video. Explain how video compression is achieved using MPEG method **[5 marks]**