



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 403: NETWORK APPLICATIONS

DATE: 29/4/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer **question ONE** and any other **TWO** questions.

QUESTION ONE (30 MARKS)

- a) Explain the meaning of the following terms
- i. Business/ Application Logic (1 mark)
 - ii. Cooperative processing Methodology (1 mark)
 - iii. Heterogeneous Environment (1 mark)
 - iv. Platform (1 mark)
 - v. Service (1 mark)
- b) Distinguish between
- i. User and Client
 - ii. Tier and Layer
 - iii. Thin Client and Thin Server
 - iv. Client and Server (8 marks)
- c) Define OSI Model? Explain the function, protocols and services of each layer? (9 marks)
- d) Discuss the functions of any FOUR layers of the TCP/IP protocol suite (8 marks)

QUESTION TWO (20 MARKS)

- a) Define the term descriptor and state its significance in network programming (3 marks)
- b) In a client – server set up, the server is said to be persistent. Explain the meaning of persistent (2 marks)
- c) With the use of a suitable language construct, illustrate the general structures of any two functions performed by the client side of the interaction and any two performed by the server side (7 marks)
- d) Distinguish centralized networks from distributed networks (2 marks)
- e) Distinguish between the following concepts as used in Network Programming:
 - i. Blocking vs Non – blocking servers
 - ii. connection – oriented vs connectionless communication
 - iii. carrier sense vs collision detection (6 marks)

QUESTION THREE (20 MARKS)

- a) differentiate between a process and a thread (2 marks)
- b) Briefly explain the meaning of a Remote Procedure Call (RPC) (2 marks)
- c) Using a well-labeled diagram, explain the components of an RPC based application (5 marks)
- d) We need to download text documents at the rate of 100 pages per sec. Assume that a page is an average of 24 lines with 80 characters in each line and one character requires 8 bits (ascii). What is the required bit rate of the channel? (6 marks)
- e) A digitized voice channel is made by digitizing a 4-kHz bandwidth analog voice signal. We need to sample the signal at twice the highest frequency (two samples per hertz). We assume that each sample requires 8 bits. What is the required bit rate? (5 marks)

QUESTION FOUR (20 MARKS)

- a) Differentiate between an API and a socket as used in network programming. (2 marks)
- b) Explain the tasks performed by each of the following socket functions:
 - i. listen()
 - ii. accept()
 - iii. close() (6 marks)

- c) Write suitable program structures to show how each of the above functions is implemented.
Include relevant parameters for each function. (12 marks)

QUESTION FIVE (20 MARKS)

- a) List SIX (6) functions needed from a network API (6 marks)
- b) State TWO (2) drawbacks and TWO(2) strengths of Client/Server programming (4 marks)
- c) In the context of socket programming, explain the role of the following socket primitives/APIs:
- i. send() (2 marks)
 - ii. recv() (2 marks)
 - iii. htons() (2 marks)
 - iv. socket() (2 marks)
 - v. close() (2 marks)