(Knowledge for Development)

# KIBABII UNIVERSITY

## UNIVERSITY EXAMINATIONS
## 2020/2021 ACADEMIC YEAR

## END OF SEMESTER EXAMINATIONS
## YEAR THREE SEMESTER ONE EXAMINATIONS

## FOR THE DEGREE OF
## BACHELOR OF COMPUTER SCIENCE

**COURSE CODE :** CSC 370E

**COURSE TITLE :** NETWORK PROGRAMMING

**DATE:** 15/07/2021 **TIME:** 9:00 A.M – 11:00 A.M.

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO**

## QUESTION ONE (COMPULSORY) [30 MARKS]

a) Differentiate the following terminologies as used in network programming

i. A process and a thread. **[2 marks]**

ii. A concurrent server and an iterative server **[2 marks]**

iii. Asymmetric and Symmetric Data Representations **[2 marks]**

b) A service is specified by a set of primitives. Discuss the five (5) types of connectionless service primitives. **[5 marks]**

c) Discuss the purpose and port numbers for the following protocols.

i. Echo **[2 marks]**

ii. Telnet **[2 marks]**

iii. Whois **[2 marks]**

iv. IMAP **[2 marks]**

d) Discuss the three 3-way handshake and how it is achieved in networking world. **[4 marks]**

e) Write a SMTP client java program code. **[7 marks]**

## QUESTION TWO [20 MARKS]

a) Describe the key role of Input streams and output streams as used in networking programming. **[2 marks]**

b) Most modern network programming is based on a client/server model. Using a suitable diagram discuss the typical client/server model. **[4 marks]**

c) Write a java program to Send and Receive a message using Connectionless Sockets **[7 marks]**

d) Write a java program to send a single datagram packet. **[7 marks]**

## QUESTION THREE [20 MARKS]

a) How do I open a socket when programming a client? **[2 marks]**

b) Outline the steps for creating a simple server program and simple client program. **[5 marks]**

c) Write a program illustrating creation of a server socket, waiting for client request, and then responding to a client that requested for connection by greeting it. **[7 marks]**

d) Write a program illustrating establishment of connection to a server and then reading a message sent by the server and displaying it on the console. **[6 marks]**

## QUESTION FOUR [20 MARKS]

a) Identify the services and port numbers associated with the following protocols. **[3 marks]**

i. SMTP

ii. LOGIN

iii. HTTPS

b) Differentiate between DatagramSocket( ) and DatagramSocket(int port) methods of the DatagramSocket API **[2 marks]**

c) The java.net.Socket class represents a socket, and the java.net.ServerSocket class provides a mechanism for the server program to listen for clients and establish connections with them. Explain the steps that occur when establishing a TCP connection between two computers using sockets. **[7 marks]**

d) Write a Socket-based Java program that close the socket on the client side and server side. **[8 marks]**

## QUESTION FIVE [20 Marks]

a) There are two communication protocols that one can use for socket programming: datagram communication and stream communication. Distinguish between the two. **[4 marks]**

b) Identify the four steps followed when programming a client. **[4 marks]**

c) Write a java program code that perform the following functions:

i. Open a socket with exception handling. **[4 marks]**

ii. Create an output stream to send information to the server socket using the `PrintStream` class of java.io. **[4 marks]**