

CS



(Knowledge for Development)

KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2021 / 2022 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS
YEAR THREE SEMESTER TWO EXAMINATIONS**

**FOR THE DEGREE OF
BACHELOR OF COMPUTER SCIENCE**

COURSE CODE : CSC 370E

COURSE TITLE : NETWORK PROGRAMMING

DATE: 18/11/2022

TIME: 08.00 A.M – 10.00 A.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

- a) Define a socket [2 Marks]
- b) Discuss the following protocols, highlighting the port numbers and whether it utilizes TCP, UDP or both protocols.
- i. FTP [2 Marks]
 - ii. TELNET [2 Marks]
 - iii. LOGIN [2 Marks]
 - iv. HTTPS [2 Marks]
- c) Using a suitable example discuss the process of creating server and client sockets with exceptions handled explicitly. [6 Marks]
- d) What are URN, URL, and URI? Explain the differences between them. [6 Marks]
- e) Explain why the URL encoding is very important to web applications [2 Marks]
- f) The URL class also supplies methods for extracting the parts (protocol, host, file, port and reference) of a URL object. Write the code for the following output: [6 Marks]

```
http://www.apple.com:80/ipad/index.html
protocol = http
host = www.apple.com
filename = /ipad/index.html
port = 80
ref = null
```

QUESTION TWO [20 MARKS]

- a) Explain any FOUR advantages of TCP over UDP communication [4 Marks]
- b) Write a URL-based program that pulls content from www.yahoo.com. [7 Marks]
- c) Computer networks of any size share some common limitations to varying degrees that must be accounted for in network simulations, with the internet being the most limited in all three regards. Discuss three fundamental problems likely to be experienced in any network simulation [6 Marks]
- d) Distinguish between multicast and unicast sockets [3 Marks]

QUESTION THREE [20 MARKS]

- a) Explain the function of the following concepts
- i. DNS [2 Marks]
 - ii. Firewall [2 Marks]
- b) What is the meaning of a socket as used in Network programming [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 [5 Marks]
- d) Write a Socket-based Java server program that responds to client messages as follows: When it receives a message from a client, it simply converts the message into all uppercase letters and sends back the same to the client. Write both client and server programs demonstrating this [9 Marks]

QUESTION FOUR [20 MARKS]

- a) Write a simple program that can read a host name and convert it to an IP address [5 Marks]
- b) Write a simple UDP server program that waits for client's requests and then accepts the message (datagram) and sends back the same message. [8 Marks]
- c) Write a corresponding client program for creating a datagram and then sending it to the above server and then accepting a response. [7 Marks]

QUESTION FIVE [20 MARK]

- a) Closing sockets is very important aspect. However, it's advisable to always close the input and output streams before closing sockets. Write code construct to close the input, and output streams and socket for:
- i. Client [4 Marks]
 - ii. Server [4 Marks]
- b) Explain the operation of the following network designs
- i. Client-Server computing [2 Marks]
 - ii. Peer-to-Peer computing [2 Marks]
- c) State any TWO areas where UDP can be very useful [2 Marks]
- d) Explain using a well-labelled diagram TCP/IP protocol [6 Marks]

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