Sample

THE OPEN UNIVERSITY OF SRI LANKA
BSc (IT) DEGREE PROGRAMME: LEVEL 04
DEPARTMENT OF COMPUTER SCIENCE
COU4305: COMPUTER NETWORKS
FINAL EXAMINATION: 2024/2025
DURATION: **TWO HOURS (2 HOURS)**

Date: **16.11.2025** Time: **1.30 pm – 3.30 pm**

Answer FOUR Questions ONLY.

QUESTION 1

1.1) List the four (04) main categories of components in a computer network and provide examples for each category. [04 Marks]

1.2) What are the three (03) classifications of Computer Networks based on ownership? [03 Marks]

1.3) Write cable color codes of both sides of a crossover UTP network cable. [08 Marks]

1.4) Tape drive can read/write data at 100Mbps / 50Mbps respectively. Suppose a database of 100GB needs to be transferred from Colombo to bandaragama and travel time between two locations is 50 Minutes. A tape can store 20GB of data and 1 minute of tape exchange time is needed when reading from tape or writing to tape. Assuming there are no additional delays in travel time between locations and first tape insertion times. Calculate time needed to transfer 100GB file from Colombo to bandaragama through tapes [10 Marks]

QUESTION 2

2.1) Differentiate between PURE ALOHA and SLOTTED ALOHA protocols. [04 Marks]

2.2) List the layers of the OSI model and describe functionality of each layer. [14 Marks]

2.3) Give one example each for Connection-oriented and Connectionless services. [02 Marks]

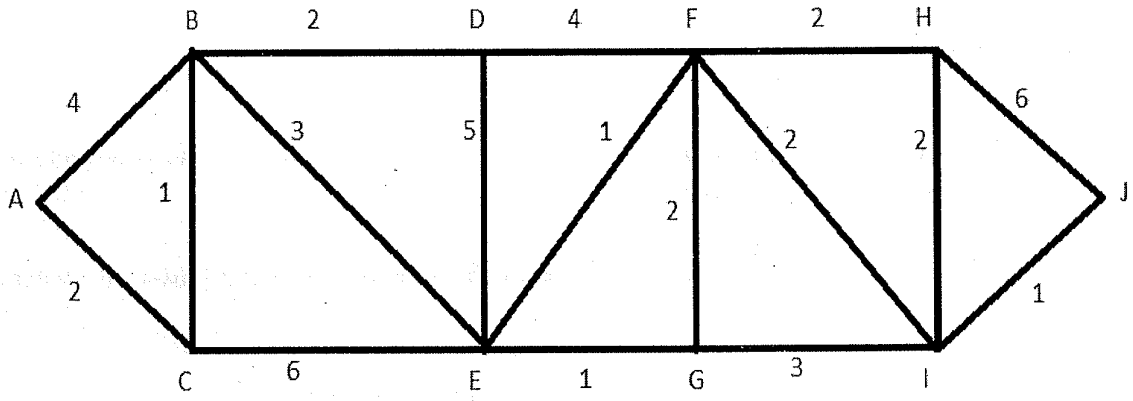
2.4) Describe the operation of unrestricted simplex protocol. [05 Marks]

QUESTION 3

3.1) Explain the count-to-infinity problem in the distance vector routing. [05 Marks]

3.2) Explain the TCP/IP three-way handshake operation for connection establishment, using a diagram. [08 Marks]

3.3) Calculate shortest path from Node A to Node J using Dijkstra's shortest path algorithm. Draw successive steps in your answer. [12 Marks]



QUESTION 4

4.1) List three (03) reserved ranges for private IP addresses for IPv4. [03 Marks]

4.2) Draw IPv4 header and describe its fields. [08 Marks]

4.3) For a given IP address 125.179.160.200 and the subnet mask 255.255.240.0 Calculate the following:

1. Network address
2. Broadcast address
3. First host address
4. Last host address [04 marks]

4.4) Assuming above network address in 4.3.1 is sub-netted to 4 branches Kurunegala (100 hosts), Kandy (50 hosts), Kegalle (25 hosts), Matara (14 hosts) and Anuradhapura (10 hosts), calculate subnet address, broadcast address of each branch. [10 Marks]

QUESTION 5

5.1) What is meant by congestion in a computer network? [03 Marks]

5.2) Differentiate between open loop and closed loop congestion control. [04 Marks]

5.3) Describe the functionality of Warning-bit and choke packet in congestion control of networks. [06 Marks]

5.4) Draw TCP header and describe its fields [06 Marks]

5.5) Give CISCO cli commands to do the following. Assume you are in USER mode for each of the following questions.

1. set user mode password to *sumithawith*
2. set IP address of router ethernet port 1 to 192.168.2.1/24
3. display routing table of a router [06 Marks]

QUESTION 6

6.1) What is cryptography? [03 Marks]

6.2) List the **four (04)** steps of the RSA encryption. [04 Marks]

6.3) State the standard port numbers and uses of following services and protocols.

1. FTP
2. HTTP
3. SMTP
4. DNS [08 Marks]

6.4) Decode the following cyphertext with transposition cypher. Use the keyword BAIKONUR.

wntoefphilouioayvsmttlttigeusuliotyrsrawulesnhoettlocytunbrohalhclaqaeuwclfasodsa sukouoheceedefr

[10 Marks]