IFT 208 TQ for 2024/2025

1

(a) Briefly discuss the following concepts in Data Communication Network **(1mark)**

i. Switch **(2 marks)**

ii. Router **(2 marks)**

iii. Gateway, **(2 marks)**

iv. CSMA/CD **(2 marks)**

(b) Based on the geographical coverage, network can be classified into LAN, MAN, WAN. Explain each of these three. **(6 marks)**

2

(a) Explain OSI model with the aid of a suitable diagram**.** Provide 2 protocols in each layer from 1 to 7 of OSI model **(7 marks)**

(b) Explain four classifications of Network Topology with 1 advantage and 1 disadvantage **(8 marks)**

3

(a) Explicitly explain the operation of Address Resolution Protocol (ARP) **(3 marks)**

(b) Differentiate between Unicast, Multicast, and Broadcast **(3 marks)**

(c) Explicitly describe the basic concept and working principles of STP (with a suitable diagram) putting into consideration the process of Root Bridge Election and the port roles **(3 marks)**

(d) Explain the port states and its transitions **(6 marks)**

4

a. Explain the 5 classes of IP Address (**1.5marks each = 7.5marks)**

b. Find the i) Network Addresses, ii) Broadcast Addresses, iii) Number of IP Addresses, iv) Number of Available Addresses, and v) Range of Available Addresses of the following addresses

I. 192.168.1.0/24 **2.5marks**

II. 10.128.20.10/8 **2.5marks**

III. 172.16.10.1/16 **2.5marks**

5

(a) A switch processes the frames entering an interface over a transmission medium in three ways: Flooding, forwarding, and discarding. Explain these three **(4.5 marks)**

(b) Differentiate between STP, RSTP, and MSTP **(4.5 marks)**

(c) Explain information transfer process in a network communication putting data encapsulation and decapsulation into consideration **(6 marks)**

6

(a) Differentiate between Layer 2 and Layer 3 switches **(4 marks)**

(b) Describe the problems of layer 2 switch loops on a campus switching network **(8 marks)**

(c) Explain what could be used as tie-breakers by a router in selecting the optimal route in its routing table. **(3 marks)**

7

(a) Briefly describe the Versatile Routing Platform (VRP) and its functions. (5 marks)

(b) The two commonly used device management modes are the Web System and the Command Line Interface (CLI). Briefly explain each. (2 marks each = 4 marks)

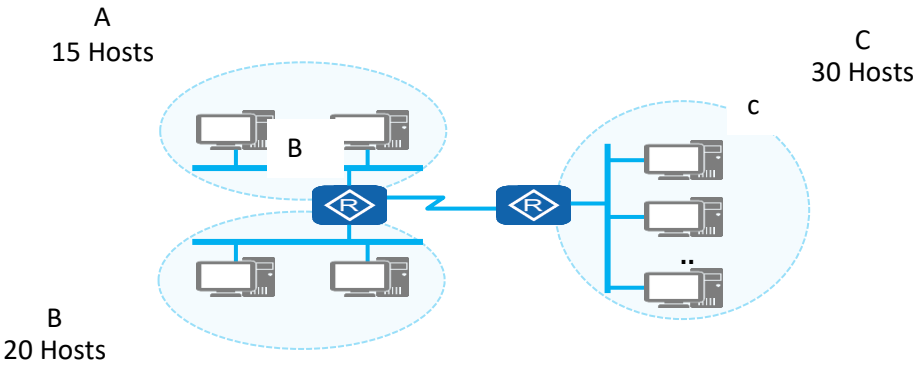
8

(a) Why are IP addresses needed in computer network? **(3 marks)**

(b) Briefly explain each of the following with suitable example(s)

i. Public IP address ii. Private IP address iii. Special IP address **(2 marks each = 6 marks)**

(c) An existing class C network segment is 192.168.1.0/24. Use the VLSM to allocate IP addresses to three subnets as shown in the diagram below. **(2 marks each = 6 marks)**



9

(a) With the aid of a diagram, briefly the describe the routing table and its components **(6 marks)**

(b) Describes the three (3) methods through which routers can obtain its routes **(9 marks)**

10

(a) What is VLAN and why is it needed in a network **(3 marks)**

(b) Differentiate between Interface-based and MAC address-based VLAN assignment **(4 marks)**

(c) Describe VLAN frame processing for both Access and Trunk interface **(8 marks)**

11

(a) Explain what could be used as tie-breakers by a router in selecting the optimal route in from its routing table. **(4 marks)**

(b) Explain information transfer process in a network communication putting data encapsulation and decapsulation into consideration **(5 marks)**

(c) Differentiate between TCP and UDP with four valid points. **(6 marks)**

12

a. For each of the following basic VRP configuration command, give its general syntax and a brief description **(2 marks each = 12 marks)**

i. Configure a system name

ii. Configure a system clock

iii. Configure a command level

iv. Configure a password -based login mode

v. Configure an IP address for an interface

vi. Display current effective configuration

b. Explain AAA with an application scenario bearing in mind the implementation protocol RADIUS **(3 marks)**