SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

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Higher National Diploma in Information Technology

First Year, Second Semester Examination – 2017

HNDIT1213 – Data Communications and Networks

Instructions for Candidates:
Answer any five (05) questions only.

No. of questions : 06
No. of pages : 04
Time :03 Hours

Question 1

I. Define data and signal. [04 Marks]

II. Write three (03) advantages of computer networks? [03 Marks]

III. What are the five (05) conditions to be satisfied to establish a successful communication? [05 Marks]

IV. Briefly describe the three (03) characteristics of a sine wave. [06 Marks]

V. What is the relationship between period and frequency? [02 Marks]

(Total 20 Marks)

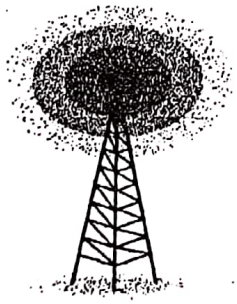
Question 2

I. What do you mean by network topology? [02 Marks]

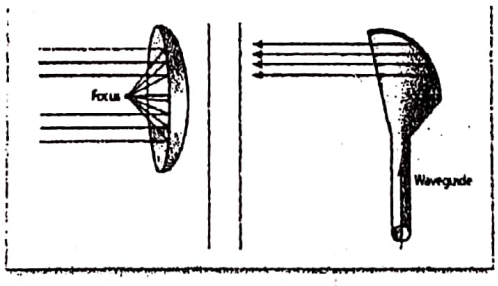
II. Name three (03) network topologies. [03 Marks]

III. Name a network device which can perform both switching and routing? [01 Marks]

IV. Identify the types of antenna given below. Breifly explain them. [04 Marks]



Type 1



Type 2

V. What are the two types of cryptographic algorithms? Briefly explain. [04 Marks]

VI. A student is communicating with another student when writing an exam with encrypted text using Caesar's cipher (Key 4) . The encrypted message is " **hs rsx ewo qi xli erwaiv**". Find the plain(original) text he sent. [06 Marks]

(Total 20 Marks)

Question 3

I. Define the term "Data Communication Protocol". Give two (02) examples. [03 Marks]

II. Name the seven (07) layers of OSI model. [04 Marks]

III. Write the function for each of the above layers. [07 Marks]

IV. The protocol data units (PDUs) in different OSI layers are called in different names. Identify the names of the PDU for each of the layers given below.

a. Layer 2
b. Layer 3
c. Layer 4

[03 Marks]

V. Name one (01) device which operates for each of the following layers. [03 Marks]

a. Layer 1
b. Layer 2
c. Layer 3

(Total 20 Marks)

Question 4

I. Define analog and digital signal. [04 Marks]

II. What do you mean by "Periodic signal". [02 Marks]

III. Sketch the wave forms for each of the following encoding schemes for the bit stream "**01001110**". [08 Marks]

a. Unipolar
b. NRZ- L
c. NRZ-I
d. Manchester

IV. A student has viewed the MAC address of his PC as 00:05:9A:3C:78:00 . [06 Marks]

a. How does he get the above MAC address of the PC using MS-DOS?
b. What is the organizational unique identifier for his MAC Address?
c. What is the usage of broadcast MAC Address?

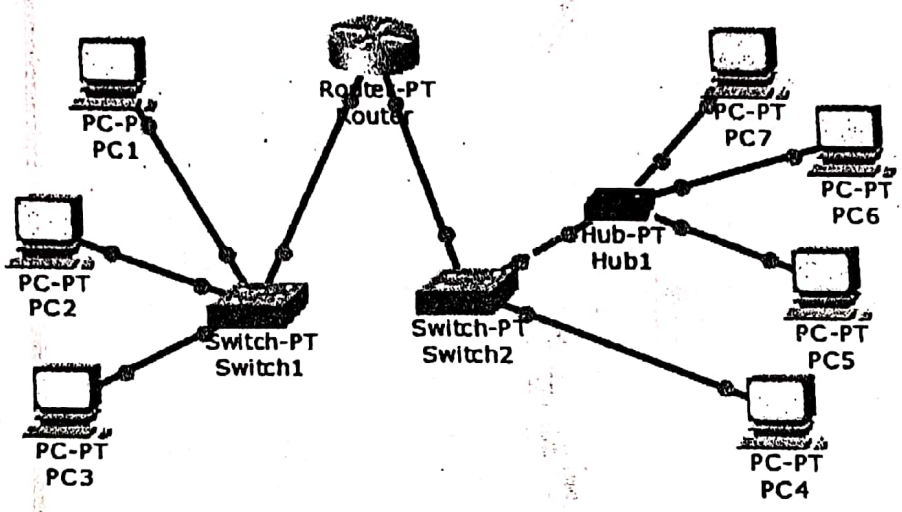
(Total 20 Marks)

Question 5

I. , Write the two (02) types of transmission media. Give two examples for each. [04 Marks]

II. Write three (03) advantages of fiber cables over the copper cables. [03 Marks]

III. A student designed a network diagram using a network simulator as given below. He used a router, a hub, two switches and seven (07) computers for this network.



a. If he wants to connect these two switches together, which type of cable can be used? [02 Marks]

b. PC4 needs to send a message to PC7 only. Is it possible to send a message only for PC7 ? Justify your answer briefly. [03 Marks]

c. How many broadcast domains available in this network diagram? Draft it using skethes. [03 Marks]

d. How many collision domains available in this network diagram? Draft it using skethes. [05 Marks]

(Total 20 Marks)

Question 6

I. What is the need of IP address in computer network ? [02 Marks]

II. Write down the followings, according to the given IP address using CIDR notation: 176.228.32.230/25.

a. Default class of the above IP address. [02 Marks]

b. Network address on this subnet [02 Marks]

c. Number of hosts on this subnet [02 Marks]

d. First host on this subnet [02 Marks]

e. Last host on this subnet [02 Marks]

f. Broadcast address on this subnet [02 Marks]

g. Number of subnetworks [02 Marks]

III. Assume you are working as the network administrator in a computer laboratory, a PC assigned an IP address of 192.168.20.101 with network mask 255.255.255.0. The router in your laboratory network have been configured using an external IP address which obtained from Internet Service Provider (ISP) 138.76.29.20

a. What is the process of mapping local IP addresses to single public IP address ? Breifly explain it. [02 Marks]

b. When you try to access the facebook.com (69.171.230.68) from your PC, in which IP address that facebook server will identify you? [01 Marks]

c. When you send a file to a friend's PC assigned with the IP address of 192.168.20.150, What is the source address of the packet headers regarding the file that you send?

[01 Marks]

(Total 20 Marks)