SLIATE

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SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

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

Higher National Diploma in Information Technology

First Year, Second Semester Examination – 2015

HNDIT1213- Data Communications and Networks

IT2004- Introduction to Data Communications & Computer Networks

Instructions for Candidates:	No. of questions : 06
Answer any **Five (05) questions**	No. of pages : 04
All questions carry equal marks.	Time : **Three (03) hours**

Q1

i.   What do you mean by a computer network?   (02 marks)

ii.   How can we apply data communication in our daily life? Give four examples.

(04 marks)

iii. List any three key elements of data communication systems and briefly describe them.

(03 marks)

iv.   The direction of data flow between two devices can take place in three modes.

   a.   Name the three modes.   (03 marks)

   b.   Briefly describe each of them.   (03 marks)

v.   When connected together, computers become even more powerful. Justify your

answer with examples.   (05 marks)

(20 marks)

Q2.

i.   Briefly explain the following terms.   (04 marks)

   a.   Analog signals

   b.   Period

   c.   Composite signal

   d.   Periodic signal

ii.   Frequency of a sine wave is 100 Hz .Calculate the period of sine wave in millisecond.

(02 marks)

iii. Following functions describe the Vertical Shifting of Sine Waves. Display them graphically.

a. $s(t) = (-2) + A \sin(\omega t)$
b. $s(t) = 2 + A \sin(\omega t)$ (02 marks)

iv.   If a periodic signal is decomposed into four sine waves with frequencies of 60, 180, 500, and 760 Hz, what is its bandwidth?   (02 marks)

v.   A Time Domain represents three sine waves, which has the amplitude of 10, 15, and 20. Frequencies for the above waves are 5, 10, and 15. Draw the frequency domain for the above sine waves.   (02 marks)

vi.   Name the two types of Transmission Impairments?   (02 marks)

vii. Describe the function of the MODEM.   (04 marks)

viii. List two type of Analog to Analog Modulation   (02 marks)

(20 marks)

Q3.

i.   Network media is divide into two categories. Name and give an example for each.

(04 marks)

ii.   CAT5e cable can be cramped in two ways. Name them.   (02 marks)

iii. Explain the wireless propagation methods with a diagram.   (03 marks)

iv.   What is the difference between a hub and a switch?   (02 marks)

v.   Write short notes on three of the following topics.   (09 marks)

a. Star topology (explain using a diagram)
b. Ring topology (explain using a diagram)
c. CSMA/CA
d. Token-passing   **(20 marks)**

Q4.

i.   Define term Data Communication Protocol.   (02 marks)

ii.   Name three protocols that are used in UDP (User Datagram Protocol).   (03 marks)

iii. List layers in each of OSI and TCP/IP using a diagram.   (04 marks)

iv.   State the function of each layer in OSI model.   (07 marks)

v.   Discuss four advantages of Layard Architecture.   (04 marks)

(20 marks)

Q5.

i.   Briefly explain two components of an IP address.   (02 marks)

ii.   Change the following IPv4 addresses from binary notation to dotted decimal notation.

         10000001   00001011   00001011   11101111   (02 marks)

iii.   There are three main classes of IP addresses in IPv4 classification. Name two of them.

                                                                         (02 marks)

iv.   Answer the followings according to the given host IP address and the subnet mask.

         Host IP Address   **172.100.98.220**

         New Subnet Mask   **255.255.255.128**

         a. Class of the above host IP address   (02 marks)

         b. Number of subnet bits   (01 marks)

         c. Number of subnet can be created using new subnet mask   (02 marks)

         d. Number of Host Bits per subnet   (01 marks)

         e. Number of Hosts per subnet   (02 marks)

         f. First host on this subnet   (02 marks)

         g. Last host on this subnet   (02 marks)

         h. Broadcast address on this subnet   (02 marks)

(20 marks)

Q6.

i.   Name four levels of addresses used in an internet employing the TCP/IP protocols.

                                                                         (04 marks)

ii.   Write the command to view the MAC address of our computer using command

       prompt.   (02 marks)

iii.   Define term Network Security   (02 marks)

iv.   Briefly explain the process of encryption algorithm and decryption algorithm.

                                                                         (04 marks)

v.   Briefly explain the followings: (04 marks)
   a. Symmetric key cryptography algorithms
   b. Substitution cipher

vi. Assume that you are a Network Administrator of a company. Discuss action taken to
     improve the security of the computer network in your company.   (04 marks)

(20 marks)