RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES
B.Sc. (General) Degree in Information and Communication Technology
Second Year Semester II Examination April/May 2015

ICT2305 – COMPUTER NETWORKS

Answer **all** questions   Time: **3 hours**

1).

    a) What are the basic elements of a data communication system?   [10 marks]

    b) Briefly describe the following network topologies.
        i) Star
        ii) Mesh
        iii) Ring
        iv) Tree   [20 marks]

    c) Describe the functions and responsibilities of each layer of the TCP/IP model. [40 marks]

    d) Write short notes about the following networking devices:
        i) Network Interface Card (NIC)
        ii) Switch
        iii) Router   [30 marks]
    [Total: 100 marks]

2).

    a) Briefly describe connection-oriented transmission and connectionless transmission.
      [30 marks]

    b) Compare and contrast packet switching and circuit switching technologies.   [30 marks]

    c) What is multiplexing in data transmission?   [20 marks]

    d) How can single bit errors and burst errors in data transmission be detected?   [20 marks]
    [Total: 100 marks]

3).

    a) What are routing protocols and routed protocols?   [20 marks]

    b) Discuss the advantageous and the disadvantageous of static routing and dynamic routing.
      [30 marks]

    c) What is an Autonomous system?   [10 marks]

    d) Briefly describe the operation of following protocols:
        i. ARP   ii. ICMP   iii. IP   iv. DNS   [40 marks]
    [Total: 100 marks]

4).

    a) Briefly describe parallel transmission and serial transmission.   [20 marks]

    b) What are the properties of signals in data transmission?   [20 marks]
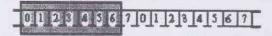
    c) Briefly describe stop and wait flow control.   [20 marks]

    d) **Figure 1** shows an initial setup of sliding windows of two systems (A and B) which are ready to do a data transmission. Shaded area (0 to 6) is the size of the windows of the systems. Frames are going to be exchanged in the following sequence:

        i.   Two frames from A to B
        ii.   Two frames from B to A
        iii.   One frame from A to B
        iv.   Two frames from B to A
        v.   Three frames from A to B

    Draw a diagram which displays sliding window mechanism of the windows of two systems for the above scenario.   [40 marks]

Destination System B   **Source System A**

Figure 1 – Window size of the systems

[Total: 100 marks]

5).

    a) Assume a new faculty (Engineering) is established in Rajarata University of Sri Lanka (Mihintale premises). You have been appointed as the network engineer of the university. The faculty has four (04) departments, namely, Electronics Engineering, Computer Science and Engineering, Electrical Engineering, and Civil Engineering. Also there is an administration section. Each department has a separate building. At the initial stage each department consists of three (03) computers to be connected to the network. Administration section also has a separate building in which the server room [Network Core] is located. Administration section also has (03) computers.

        i) Draw the design diagram for the new network of the new faculty.   [20 marks]

        ii) Identify and name the type of devices and links in your diagram.   [30 marks]

    b) Find the following based on the design given in (a) above:
        i)   Number collision domains   [15 marks]

        ii)   Number of broadcast domains   [15 marks]

    c) Compare and contrast wired medium and wireless medium?   [20 marks]

[Total: 100 marks]