Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
B.Sc. (Engg.) 3rd year 1st Semester Final Examination, 2014. (Session: 2011-12)

Course Code: **CSE 3101**   Time: **3.00 hours**
Course Title: **Data Communication**   Total Marks: **50**

[N B: *Answer any five (5) questions and figures in the right margin indicate full marks*]

1.	a)	Define data communication, analog data and digital data.	2
	b)	Describe characteristics, which effect data communication system.	4
	c)	Describe different component in a data communication system.	4
2.	a)	What are the responsibilities of the physical layer in the OSI model?	3
	b)	What are the differences among a port address, a logical address and a physical address?	3
	c)	What are the differences and similarities between TCP/IP and OSI model?	4
3.	a)	Write the differences between guide and unguided media.	2
	b)	How can a composite signal be decomposed into its individual frequencies?	2
	c)	What do you understand by transmission impairments? Explain causes of impairment.	1+3
	d)	What is the propagation time if the distance between the two points is 12,000 km? Assume the propagation speed to be 2.4×10^8 m/s in cable.	2
4.	a)	Define PCM. Explain PCM technique.	1+3
	b)	For the bit stream 01001110 sketches the waveform using the following encode format	4
		i) Unipolar NRZ	
		ii) Polar NRZ	
		iii) Menchester	
		iv) Differential Menchester	
	c)	What are the differences between parallel and serial transmission?	2
5.	a)	Why analog-to-analog conversion is necessary, explain it with example.	3
	b)	Briefly describe Amplitude Modulation and Phase Modulation.	4
	c)	What is multiplexing? Describe TDM, WDM.	1+2
6.	a)	What are switched networks? Classify the switched networks.	1+1
	b)	List four major components of a packet switch and their functions.	4
	c)	What kinds of errors are undetected by the checksum?	2
	d)	What is Hamming distance? What is the minimum Hamming distance?	1+1
7.	a)	Explain why collision is an issue in a random access protocol but not in controlled access or channelizing protocol?	2
	b)	Define IFS. Draw flow diagram for CSMA/CD and CSAM/CD	2+3
	c)	Find netid, hostid and number of addresses of the bellow IP address 205.16.37.39/28	3

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Course Code: **CSE 3103**

Course Title: **Computer Architecture**

Time: **3.00 hours**

Total Marks: **50**

[N B: *Answer any five (5) questions and figures in the right margin indicate full marks*]

1. a) What is the major difference between combinational and sequential circuits? 2

    b) Draw the circuit diagram of 2-to-4 line decoder with NAND gates and explain its operations. 4

    c) What do you understand by *arithmetic shift* microoperation? Explain. 4

2. a) Define memory-reference instruction. 2

    b) Illustrate the stored program organization of a computer. 3

    c) What do you understand by program interrupt? Draw and explain flow-chart for interrupt cycle. 5

3. a) Define *subroutine*. Write an assembly language program to demonstrate the use of subroutines. 1+4

    b) Draw and explain flow-chart for multiplication program. 5

4. a) What is *pipeline register*? 1

    b) Describe the steps for the address sequencing in a microprogram control unit to execute a single computer instruction. 4

    c) Draw the block diagram of microprogram sequencer for control memory and explain its operation. 5

5. a) What is the purpose of using addressing mode techniques in computer? 2

    b) How can you classify computer instructions? Explain your idea about logical and bit manipulation instruction. 1+4

    c) Write a program to perform the following operation for RISC-type CPU-
$$X=(A+B)*(C+D)$$ 3

6. a) Draw and explain the block diagram of the hardware for implementing the addition and subtraction operation. 4

    b) Draw and explain flow-chart for decimal division. 6

7. What is virtual memory? Explain how the logical address is translated into physical address in the virtual memory system with neat diagram. 2+8

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Course Code: CSE 3105

Course Title: Computer Peripherals & Interfacing

Time: 3.00 hours

Total Marks: 50

*[N B: **Answer any five (5) questions and figures in the right margin indicate full marks]***

1. a) Explain the different ways of programmed I/O utilization.   4

   b) What is interrupt I/O? Mention different interrupts types.   1+2

   c) List the various advantages and disadvantages of memory mapped I/O and isolated I/O.   3

2. a) Write the features of 8255A.   1

   b) Explain in brief the different operation modes of 8255A.   5

   c) What do you mean by control word format? Write a program to initialize 8255 in the configuration given below: (1) Port A: Output with handshake; (2) Port B: Input with handshake; (3) Port C_L: Output; (4) Port C_U: Input and assume address of the control word resister of 8255 is 32H.   1+3

3. a) Draw the internal block diagram of 8279 and explain its working procedure.   5

   b) Explain the different input modes of 8279.   5

4. a) Explain the working function of DMA controller 8237 with its block diagram.   5

   b) Discuss the DMA data transfer method.   3

   c) What do you mean by cycle stealing in DMA?   2

5. a) What are the different types of key switch used in keyboard?   2

   b) What do you mean by key debounce using hardware and software?   2

   c) Explain the working procedure of 4×4 matrix keyboard with 8086 and 8255.   6

6. a) What are the different sensors those are used to A/D & D/A system?   3

   b) Explain the basic concept of digital to analog converters with an example.   4

   c) Calculated the values of the LSB, MSB and full-scale output for an 16-bit DAC for the 0 to 12 V range.   3

7. a) What do you mean by analog to digital converters? Explain the successive approximation A/D converter technique.   1+4

   b) Explain the different steps in the interfacing 8-bit A/D converters.   5

Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
3rd Year 1st Semester, B. Sc. (Engg.) Examination- 2014
Course: CSE 3107 (Algorithm Design and Analysis)

Full Marks: 50

Time: 3 hours

N.B.
a) Answer any **FIVE** of the following questions.
b) The figures at right side indicate full marks of the question.

1. (a)   What is an algorithm? 2
   (b)   What are the criteria that an algorithm satisfies? 3
   (c)   What are the steps for algorithm specification? 5

2. (a)   What is the worst-case running time of insertion sort? How would you order the elements in the   2
          input array to achieve the worst case?
   (b)   For each of the following questions, Choose T (True) or F (False). Explain your choice.   8
          i.   Bineary search algorithm requires the search space to be sorted first.
          ii.   A tree can contain a single cycle only, not more than one.
          iii. The complexity of solving $\sum_1^n n$ for any integer value of n can be improved from $O(n^2)$
                to $O(1)$.
          iv.   In a top-down approach to dynamic programming, the larger subproblems are solved
   before the smaller ones.

3. (a)   Draw the graph of the following adjacency matrix.   2

	1	2	3	4	5
1	0	1	0	0	1
2	1	0	1	1	1
3	0	1	0	1	0
4	0	1	1	0	1
5	1	1	0	1	0

   (b)   Many algorithms typically follow *divide-and-conquer* approach. Explain. Describe an   5
          algorithm that follows *divide-and-conquer* paradigm.
   (b)   Write short notes on: i) Heaps ii) Linear-time sorting iii) Bubble-sort   3

4. (a)   For each statement below, say whether it is true or false, and a one sentence and/or one picture   2
          explanation.
          i.   The heaviest edge in a graph cannot belong to a minimum spanning tree.
          ii.   Given an undirected graph, it can be tested to determine whether or not it is a tree in   3
   O(V + E) time. A tree is a connected graph without any cycles.

   (b)
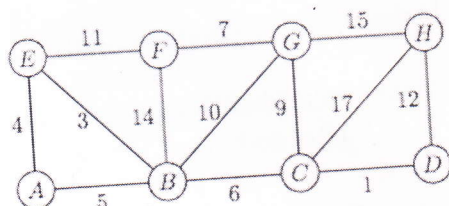
Consider the weighted graph above.
i) Run Prim's algorithm starting from vertex A. Write the edges in the order which they are
added to the minimum spanning tree.
ii) Run Kruskal's algorithm starting from vertex A. Write the edges in the order which they are
added to the minimum spanning tree.

A

(c) Suppose we have a directed, weighted graph G that might have negative-weight edges. Suppose 3
we know that all the shortest paths in G use at most k edges. Show how to compute shortest
paths from a source vertex **s** in G in **O(k(V+E))** time.

(d) What are the principles of Dynamic Programming (DP)? 2

5 (a) Show the DFS tree that results from running DFS 5
on the following graph and classify the edges as
tree edges, back edges, forward edges, or cross
edges. Start at vertex a and examine edges in
alphabetical order of destination vertex.
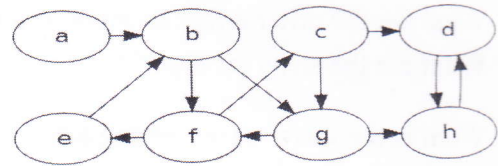
(b) Write down the steps for breadth first search algorithm? Explain these steps with example. 5

6 (a) Differentiate between backtracking and branch – and – bound algorithm. 3

(b) Draw the space tree to generate first solution to 4 queen's problem. With the first solution, 5
generate another solution, making use of board's symmetry.

(c) Explain P and NP problems. 2

7 What is convex hull? Describe graham scan algorithm to find the convex hull of a given set of 10
points also compare it with monotone chain algorithm.

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3rd Year 1st Semester, B. Sc. (Engg.) Examination- 2014
Course: MAT 3121 (Numerical Analysis)

Full Marks: 50

Time: 3 hours

N.B.
a) Answer any **FIVE** of the following questions.
b) The figures at right side indicate full marks of the question.

1. a) Define absolute and relative error. Establish the general formula for errors. 5
   b) Find the error in evaluation of the fraction $\cos°10'/\log_{10}242.7$, assuming that the angle may be in error by $1'$ and that the number 242.7 may be in error by a unit in its last figure. 5

2. a) Establish the Newton- Raphson method to determinate a root of $f(x) = 0$. 5
   b) Use the Newton-Raphson method to find a root of the equation $x^3-2x-5 = 0$ up to four decimal places. 5

3. a) Define interpolation and extrapolation with examples. Derive Newton's interpolation formula for unequal intervals. 5
   b) Using Newton's divided difference formula, find the value of f(2), f(5) from the following table: 5

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

4. a) Apply Lagrange's formula to find out the form of the function f(x), using the following table: 5

x	0	1	3	4
y=f(x)	-12	0	12	24

   b) Solve the following system of linear equation by LU Factorization method: 5
   $3x + y + 2z = 3$
   $2x - 3y - z = -3$
   $x + 2y + z = 4$

5. a) Establish general quadrature formula for equidistance ordinates and derive Simpson's one-third rule. 5
   b) Using the trapezoidal rule evaluate (a) $\int_0^\pi t \sin t \, dt$ (b) $\int_{-2}^2 \frac{t \, dt}{5+2t}$ 5

6. a) Discuss Euler's method for solving first order ordinary differential equation. Give modification of Euler method. How is the modified Euler's method better than Euler's Method? 5
   b) Using modified Euler's method find the value of y when x = 0.1 of the equation $y' = x^2 + y$, when y(0) = 1. 5

7. a) Derive second order Runge – Kutta method for solving IVP. 5
   b) Use Runge-Kutta fourth order method to estimate y at x = 0.2, 0.4 when $y'(x) = \frac{dy}{dx} = 1 + y^2$ with y(0) = 0 and assume h = 0.2. 5