Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

B.Sc. (Engg.) 2nd Year 2nd Semester Final Examination-2015 (Session: 2013-14)

Course Title: Operating System and Systems Programming; Course Code: CSE 2203

Total Marks: **50** Time: **3.00 hours**

Answer any five from the given questions.

[Note: Numbers on right margin indicate the marks for each question. Answer the question sequentially]

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1. **a)** How does the distinction between kernel mode and user mode function as a rudimentary form of protection (security) system? **2**

b) What are the reasons behind the creation of an environment of cooperating process rather than independent process? **3**

c) Analyze the usefulness of multi-process architecture in case of **Chrome** browser. **3**

d) What is the purpose of a command line interpreter? **2**

2. **a)** Describe how a race condition is possible and what might be done to prevent the race condition from occurring. **4**

b) A shared variable **x** initialized to zero is operated by four processes $\mathbf{P_1}$, $\mathbf{P_2}$, $\mathbf{P_3}$, $\mathbf{P_4}$. Process $\mathbf{P_1}$ and $\mathbf{P_2}$ increment **x** by one, while process $\mathbf{P_3}$, $\mathbf{P_4}$ decrement **x** by two. Each process before reading perform 'wait' on a semaphore '**S**' and signal on '**S**' after store. If semaphore '**S**' is initialized to two, find what is the **maximum** and **minimum** possible value of x after all process complete execution (***with necessary explanation***). What should you do two get standard value? **6**

3. **a)** Describe **Petterson's Solution** to critical section problem. **4**

b) Introduce **Bounded-Buffer problem** and solve it with semaphore. **4**

c) What is the meaning of the term *busy waiting*? **2**

4. Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Arrival Time (Burst)	Priority
P_1	2	2
P_2	1	1
P_3	8	4
P_4	4	2
P_5	5	3

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5, all at time 0

i). Draw three **Gantt charts** that illustrate the execution of these processes using the following scheduling algorithms: **FCFS**, nonpreemptive priority (a larger priority number implies a higher priority), and **RR** (quantum = 2) **3**

ii). What is the turnaround time of each process for each of the scheduling algorithms in (i)? **3**

iii). What is the waiting time of each process for each of these scheduling algorithms? **3**

iv). Which of the algorithms results in the minimum average waiting time (over all processes)? **1**

5. **a)**

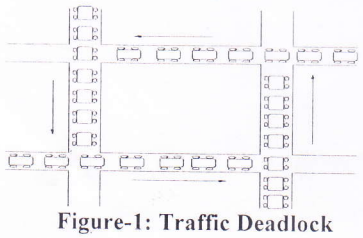

Figure-1: Traffic Deadlock

Consider the traffic deadlock depicted in **Figure-1**. **4**

i).Show that the four necessary conditions for deadlock hold in this example.

ii).State a simple rule for avoiding deadlocks in this system.

b) This is a snapshot of a system at particular instance of time. Now, answer the following questions using the banker's algorithm: **6**

	Allocation			*Max*			*Available*		
	A	*B*	*C*	*A*	*B*	*C*	*A*	*B*	*C*
P_0	0	1	0	7	5	3	3	3	3
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

i)What is the content of the matrix **need**?

ii).Is the System in a **safe state**?

iii).If a request from process P_1 arrives for (1, 0, 2) can the request be granted immediately?

6. a) Name two differences between logical and physical addresses.
   b) Describe address translation process with block diagram. for paging
   c) Consider a simple paging system with the following parameters: 2^{32} bytes of physical memory; page size of 2^{10} bytes; 2^{16} pages of logical address space.
      i).How many bits are in a logical address?
      ii).How many bits in frame?
      iii).How man bits in the physical address specify the frame?
      iv).How many entries in the page table?
      v).How many bots in each page able entry?

7. a) With neat diagram, explain the layered structure of UNIX operating System. 5
   b) What is Virtual Memory? Discuss the benefits of virtual memory technique? 5

Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

2nd Year 2nd Semester Final Examination-2016 (Session: 2013-14)

Course Title : Bangladesh Studies and Sociology **Full Marks:** 50

Course Code: SOC 2223 **Time:** 3 Hours

Note: i) Answer any FIVE questions from the following questions
ii) Numbers in the right margin indicate marks for each question.

1.	Critically discuss the social and cultural history of Bangladesh.	**10**
2.	What do you mean by economic globalization? Is economic globalization responsible for deepening polarization of income and wealth across the globe? Discuss.	**10**
3.	Define Sociology. Discuss the sociological perspectives of social phenomena.	**10**
4.	What is culture? Briefly discuss its contents with characteristics.	**10**
5.	Define Social norms. How social norms and values are connected to each other? Critically discuss 'anomie' as a state of normless.	**10**
6.	What is technology transfer? Critically discuss the types and dynamics of the technology transfer.	**10**
7.	Define crime. What are the socioeconomic cases of increasing juvenile delinquency in present Bangladesh? Explain	**10**

Begum Rokeya University, Rangpur

Department of Computer Science & Engineering

2nd year 2nd Semester Final Examination-2015; Session: 2013 -2014

Course Title: Economics
Course Code: ECO 2224

Time: 3.0Hours
Full Marks: 50

[N.B. ***Answer any Five (5) Questions, Number of each question is indicated to the right***]

1. (a) What is opportunity cost? What is the law of increasing opportunity cost? **2**

(b) Explain the relationships between specialization, exchange and Comparative Advantage? Answer with example. **3**

(c) Suppose a nation with fixed quantities of resources is able to produce any of the following combinations bread and ovens: **5**

Loves of Bread(Millions)	Ovens(Thousands)
75	0
60	12
45	22
30	30
15	36
0	40

i) Using the data in table, graphs the PPF of the country.
ii) If this country chooses to produce both ovens and bread, what will happen to the PPF over time? Why?
iii) Illustrate (on your original curve) and show the effect of a new technology discovered on the production possibility curve.

2. (a) What is demand? **2**

(b) Explain the law of demand through a demand schedule. **3**

(c) Why does a demand curve slope downward to right? **5**

3. (a) What is meant by 'price elasticity of demand'? Analysis different types of price elasticity of demand with graphs. **3**

(b) Using the midpoint formula, calculate elasticity for the following changes in demand by a household: **5**

Demand for	P_1	P_2	Q_1	Q_2
Rural telephone service	\$0.25 per min	\$0.15 per min	300 min. per month	400 min. per month
Orange juice	1.49 per qt	1.89 per qt	14 qt per month	12 qt per month

(c) Find the relationship between elasticity and total revenue(TR) **2**

4. (a) How can you get budget line from a budgetary constraint? **4**

(b) What are the conditions for consumer's equilibrium? **2**

(c) How does a consumer choose a combination of two goods? **4**

5. (a) Define carefully variable cost (VC), fixed cost(FC), total cost(TC) and marginal cost(MC), average cost of a competitive firm. Graphically show relationship between TC, MC and AC. **5**

(b) The following table gives total output or total product as a function of labor units used: **5**

Labor	Total output
0	0
1	5
2	9
3	12
4	14
5	15

i) Find the TP and AP of labor and graphs its.
ii) Does the table indicate a situation of diminishing returns? Explain your answer.

6. (a)	How does the circular flow of diagram shows the flow of payments and income of an economy?	
(b)	Define carefully GDP, GNP, NNP and disposable personal income(Y_d).	
(c)	Calculate GDP using expenditure approach.	3
7. (a)	What is inflation? How can we measure the rate of inflation?	4
(b)	Briefly discuss the components of aggregate income(Y).	3
(c)	What will happen to the aggregate income if government will decide to i) increase government expenditure (g); ii) reduce personal income tax (t)?	3

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

B.Sc. (Engg.) 2nd Year 2nd Semester Final Examination-2015 (Session: 2013-14)

Course Title: **Numerical Analysis**; Course Code: **MAT 2221**

Total Marks: **50** Time: **3.00 hours**

Answer any five from the given questions.

[Note: Numbers on right margin indicate the marks for each question. Answer the question sequentially]

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1. **a)** i)Define absolute and relative errors. **2**

ii)Determine the absolute and relative errors when approximating P by P′ where $P = 0.4000\times10^{1}$ and $P'=0.4100\times10^{1}$ **3**

b) Discuss about different types of numerical errors with examples. **5**

2. **a)** Write the steps of elementary row operations. **5**

b) Solve the system of equations: **5**

$$x_1 - 3x_2 + 2x_3 - x_4 + 2x_5 = 2$$
$$3x_1 - 9x_2 + 7x_3 - x_4 + 3x_5 = 7$$
$$2x_1 - 6x_2 + 7x_3 + 4x_4 - 5x_5 = 7$$

3. **a)** Write the algorithm for Gaussian elimination (matrix form). **5**

b) Reduce the matrix $A = \begin{bmatrix} 1 & 2 & -3 & 1 & 2 \\ 2 & 4 & -4 & 6 & 10 \\ 3 & 6 & -6 & 9 & 13 \end{bmatrix}$ to its row canonical form. **5**

4. **a)** Discuss the bisection and iteration method for finding the roots of the equation $f(x) = 0$. **4**

b) Using the method of iteration find a real root of the equation $2x = cosx + 3$ (correct to three decimal places). **6**

5. **a)** Define interpolation and extrapolation with examples. Derive Newton's interpolation formula for unequal intervals. **5**

b) Determine by Lagranges's formula the percentage number of criminal under 35 years from the given data: **5**

Age	% of criminals
Under 25 years	52.00
Under 30 years	67.00
Under 40 years	84.10
Under 50 years	94.40

6. **a)** Use the most accurate three point formula to determine the missing entry in the following table: **5**

x	$f(x)$	$f'(x)$
-0.3	-0.27652	
-0.2	-0.25074	
-0.1	-0.16134	
0	0	

b) Define Numerical quardrature. Derive general quadrature formula for equidistant ordinates. **5**

7. **a)** Derive Simpson's rule. **5**

b) Find $\int_0^{\pi/4} e^{3x} Sin2x\, dx$ using Trapezoidal rule and Simpson's rule and compare the results with comments **5**

Begum Rokeya University, Rangpur.

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B.Sc. (Engg.) 2nd Year 2nd Semester Final Examination-2015 (Session: 2013-14)

Course Title: **Complex Variable, Laplace and Fourier**; Course Code: **MAT 2222**

Total Marks: **50** Time: **3.00 hours**

Answer any five from the given questions.

[Note: Numbers on right margin indicate the marks for each question. Answer the question sequentially]

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1. **a)** Define a complex number. If z is any complex number, then show that, $|Re(z)| + |Im(z)| \leq \sqrt{2}|z|$. 5

b) Define a branch point. Prove that $f(z) = \ln z$ has a branch point at $z = 0$. 5

2. **a)** Define analytic function. State and prove the necessary condition for a function to be analytic. 5

b) Prove that the function, 5

$$f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2+y^2}, \text{ when } z \neq 0$$
$$= 0, \quad \text{when } z = 0$$

is not analytic at origin although the Cauchy Riemann equations are satisfied there.

3. **a)** Prove that an analytic function with constant modules is constant. 5

b) Define harmonic function. Prove that $U = 3x^2y + 2x^2 - y^3 - 2y^2$ is a harmonic function. Find its harmonic conjugate v and express U+iV as analytic function of Z. 5

4. **a)** Evaluate $\int_{(0,1)}^{(2,5)} (3x + y)dx + (2y - x)dy$ 5

Along, (i) the curve $y = x^2 + 1$
(ii) the straight line joining (0,1) and (2,5)
(iii) the straight line from (0,1) to (0,5) and then from (0,5) to (2,5)
(iv) the straight line from (0,1) to (2,1) and then from (2,1) to (2,5)

b) Prove the **Cauchy theorem** for the case of a triangle. 5

5. **a)** Determine the **Fourier Cosine Series** over period 4 when $f(x) = x, 0 < x < 4$ and deduce hence, $\frac{\pi^2}{8} = 1 + \frac{1}{3^2} + \frac{1}{5^2}$ ---------- 5

b) State and Prove **Parseval's theorem.** 5

6. **a)** Find the Fourier transform of , 5

$$F(x) = \begin{cases} 1, & When\ -a < x < a \\ 0, & when\ -a > x > a \end{cases}$$

Here show that,

$$\frac{\pi}{2} = \int_0^\infty \frac{Sin\ a\lambda}{\lambda}\, d\lambda$$

and also show that,

$$\int_{-1}^{1} \frac{Sin\ \eta}{\eta}\, d\eta = \pi$$

b) Define Fourier Series. Find Fourier coefficients a_o, a_n and b_n. 5

7. **a)** Find, (i) $L^{-1}\left\{\frac{1}{s^2-1}\right\}$ 5

(ii) $L^{-1}\left\{\frac{a^3}{s(s+a)^3}\right\}$

b) State and prove convolution theorem for Laplace transformation. 5

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

B.Sc. (Engg.) 2nd Year 2nd Semester Final Examination-2015 (Session: 2013-14)

Course Title: **Microprocessor and Assembly Language (Improvement)**; Course Code: **CSE 2205**

Total Marks: **50** Time: **3.00 hours**

Answer any five from the given questions.

[Note: Numbers on right margin indicate the marks for each question. Answer the question sequentially]

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1. (a)	Draw the pin-in and pin-out diagram for 8086 microprocessor and explain function of different modes pins.	**2+6=8**
(b)	Differentiate between microprocessor and microcontroller.	**2**
2. (a)	What is pipelining? How it is achieved in 8086? Discuss in brief.	**1+4=5**
(b)	List the 8086 addressing modes and give an example of each.	**5**
3.	Explain different types of registers in 8086 microprocessor.	**10**
4. (a)	Explain the difference between a JMP instruction and CALL instruction.	**3**
(b)	List the four instructions which control the interrupt structure of the 8086 microprocessor.	**4**
(c)	Draw and explain the timing diagram of memory write cycle with example.	**3**
5. (a)	What are the different classifications of microprocessor? Write their merits and demerits.	**3+3=6**
(b)	Why the memory of 8086 is segmented? What are the various segments and how are they initialized.	**1+3=4**
6. (a)	Bring out the importance of using procedures in assembly language programming.	**3**
(b)	What is a recursive procedure? Write a recursive procedure to calculate the factorial of a number N.	**1+4=5**
(c)	How do you pass parameters to a MACRO?	**2**
7. (a)	What do you mean by interrupt? What are the different interrupts in 8086?	**2+4=6**
(b)	Discuss MUL, NEG, DIV, DW instructions of 8086.	**4**