

Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

1st Year 2nd Semester Final Examination, 2015 (Session: 2013-14) (2014-15)

Course Code: CSE 1201

Time: 3 Hours

Course Title: Discrete Mathematics

Total Marks: 50

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

1. a) How can this English sentence be translated into a logical expression? "You cannot ride the roller coaster if you are less than 4 feet tall unless you are older than 16 years old." 3
b) Prove that $\neg[r \vee (q \wedge (\neg r \rightarrow \neg p))] \equiv \neg r \wedge (p \vee \neg q)$ by using a truth table. 2
c) Why arithmetic operator is not used in propositional logic? Determine weather $[\neg p \cap (p \rightarrow q)] \rightarrow \neg p$ is a tautology. 2+3

2. a) Define proposition. What is Difference between declarative sentence and propositions 1+2
b) 1. Which of these are propositions or Declarative sentence? Discuss with explanation. 3
i) What is your name?
ii) 4+5=x
iii) Is Dhaka is capital of Bangladesh.
iv) I am Rahim.

- c) Define Contradictions. Using rule of logic to show that logic this is $\neg[r \vee (q \wedge (\neg r \rightarrow \neg p))]$ equivalent to $\neg r \wedge (p \vee \neg q)$. 1+3

3. a) What do you mean by closure of the relation? 1
b) Define are reflexive, symmetric, antisymmetric relations. 3
c) Consider the following five relations on the set $A = \{1, 2, 3, 4\}$: 3

R1 = {(1, 1), (1, 2), (2, 3), (1, 3), (4, 4)}
R2 = {(1, 1)(1, 2), (2, 1), (2, 2), (3, 3), (4, 4)}
R3 = {(1, 3), (2, 1)}

Determine which of the relations are reflexive, symmetric, Antisymmetric with explaination.

- d) Show that the premises "Everyone in this discrete mathematics class has taken a course in computer science" and "Marla is a student in this class" imply the conclusion "Marla has taken a course in Computer Science" 3

4. a) Define mathematical induction. Use mathematical induction to prove that $1 + 2 + 3 + \dots + n = n(n + 1)/2$ for all positive integers n. 1+3
b) Write short note for the following: i) Graph ii) Tree iii) Proofs 6

5. a) What is *Algorithm*? Write an *Algorithm* to find the maximum element in a finite sequence. 3
b) Write down DIVISION ALGORITHM. Evaluate the following quantities: 3
i. 13 mod 3 ii. -97 mod 7 iii. -101 mod 13 iv) 199 mod 19

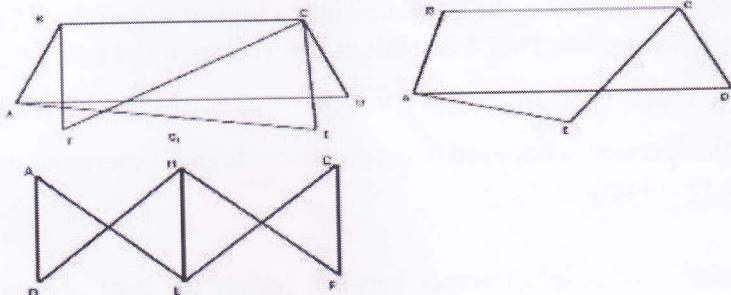
- c) What is *pairwise relatively prime*? Determine whether the integers 10, 17, and 21 are *pairwise relatively prime* and whether the integers 10, 19, and 24 are *pairwise relatively prime*. 3

- d) Find the base 8 expansion of $(12345)_{10}$. 1

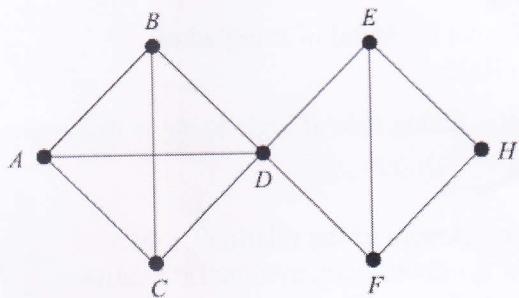
6. a) What is PRODUCT RULE? 4
b) In a version of the computer language BASIC, the name of a variable is a string of one or two alphanumeric characters, where uppercase and lowercase letters are not distinguished. Moreover, a variable name must begin with a letter and must be different from the five strings of two characters that are reserved for programming use. How many different

variable names are there in this version of BASIC.

- c) What is Dirichlet drawer principle? How many students must be in a class to guarantee that at least two students receive the same score on the final exam, if the exam is graded on a scale of 0 to 100 points. 3
7. a) Briefly discuss bipartite graph with example. 3
 b) Determine which of the following graphs are bipartite and which are not. If a graph is bipartite, state if it is completely bipartite. 3



- c) Write down some differences between graph and tree. 2
 d) What is Cutpoints of graph? Find out cutpoint of the following graph. 2



Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

1st Year 2nd Semester B.Sc. (Engg.) Examination-2015

Course No. : CSE 1203 Course Title: Structured Programming Language

8

Full Marks: 50

Time: 03 hours

N.B.: Instruction for Candidates:

- i) The figures in the right margin indicate full marks.
- ii) Answer any **FIVE** questions from the followings.
- iii) All questions must be answered sequentially.

1. a) Write down the scope of computer programming? Does it mean a value to you? How? 2
b) Distinguish between the following pairs: 3
 - i) main() and void main(void)
 - ii) int main() and void main()
- (c) What do you know about compile time error and run time error? 2
- d) What is the difference between the & and && operators and the -> and . operators? 2
- e) #include<stdio.h>

```
int main() {
    int i;
    for (i = 0; i<=6; i++)
        printf("%d",i);
    return 0;
}
```

1
2. a) What will be printed by the following code? 2

```
void main()
{
    unsigned int x;
    int b;
    x = 18;
    for( b = 0; x != 0; x >>1)
        if(!(x & 01))
            b++;
    printf("%d\n",b);
}
```
- b) What is symbolic constant? In a C program, a symbolic constant is defined like: 2#define EPS 1e-10, what is the data type of this constant?
- c) How can you avoid using goto in C, Explain. 3
- d) Write a C program to determine the ranges of char, int, float, double, long double, long int (both signed and unsigned). 3
3. a) What will the following C code fragments print 4
 - i) int k, j=5; printf ("%d", k=j==6); printf ("%d", k= ++j==6);
 - ii) int a= 8; a = a>>5?100:200 printf ("%d",a);
- b) When does C perform automatic type conversions in expression? Mention the general rules that a C compiler follows during automatic type conversion. 4
- c) We specify the data type of a variable when declaring them at the beginning of a C program. When we declare a variable as integer, usually 4 bytes (32 bits) are allocated in the memory for that variable. Hence, we can store any value within the following range $[-(2^{31} + 1), +(2^{31} - 1)]$, briefly explain why, instead of 32 bits, only 31 bits is used. How can you modify the basic data types to extend their limits? 2

4. a) Write a program to count and print the number of negative and positive numbers in a given set of numbers. Test your program with a suitable set of numbers. Use scanf to read the numbers. Reading should be terminated when the value 0 is encountered. 3
- b) What is a nested loop? When is a “switch” statement preferable over an “if” statement? In a switch statement, what will happen if a break statement is omitted? 2
- c) Compare between while and do ... while, in terms of their functions. 2
- d) What will the following C code fragment print? 2
- ```
main()
{ char string [] = " HELLO WORLD";
int m;
for (m = 0; string [m] != '\0'; m++)
If ((m %2) == 0)
printf("%c", string [m]);
```
5. a) Distinguish between scope and visibility of variables. 2
- b) Write the prototype of a function named search that takes an integer value and an integer type array as arguments and returns the array index where the value is first found. 3
- c) State the problems we are likely to encounter when we pass global variables as parameters to functions. 2
- d) Does C check if array indices going out of bounds during compile time? Explain with example. 3
6. a) Using pointers, write a function that receives a character string and a character as arguments and deletes all occurrences of this character in the string. The function should return the corrected string with no holes. 3
- b) What is the output of the following code segments: 2
- ```
int m[2];
*(m+1)= 100;
*m= *(m+1);
printf("%d", m[0]);
```
- c) Distinguish between (*m) [5] and *m [5]. 2
- d) Write a program that will copy m consecutive characters from a string s1 beginning at positions n into another string s2. 3
7. a) What is the significance of EOF? 2
- b) When a program is terminated, all the files used by it are automatically closed. Why is it then necessary to close a file during execution of the program? 2
- c) Describe an algorithm that will append the contents of one file to the end of another file. 3
- d) Write a program that compares two files and returns 0 if they are equal and 1 if they are not equal. 3

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

1st Year 2nd Semester Final Examination, 2015 (Session: 2014-15)

Course Title: Basic Electronics; Course Code: EEE 1223

Time: 3.00 Hours

Full Marks: 50

Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

1. (a) What are the drawbacks of intrinsic semiconductor? 3
 (b) Sketch the atomic structure of silicon and insert an impurity of arsenic and explain the merit of such doping. 4
 (c) What are the differences between n-type and p-type semiconductor material? 3
2. (a) Explain with figure the mechanism of current flow in a forward biased p-n junction. 3
 (b) Explain the action of different biasing voltage applied to the p-n junction. 4
 (c) Define breakdown voltage knee voltage and zener voltage. 3
3. (a) Write the different applications of diode? Explain how diode acts as a rectifier. 4
 (b) Explain the working principle of full wave rectifier and also drive an expression for the efficiency of a full wave rectifier. 6
4. (a) Write the characteristics of zener diode. What is LED? 3
 (b) Explain how zener diode maintains constant voltage across load? 4
 (c) An ac voltage of peak value 22 V is connected in series with a silicon diode and load resistance of 560Ω . If the forward resistance of the diode is 22Ω , calculate (i) peak current through diode, (ii) peak output voltage. 3
5. (a) What is transistor? Write the name of the three terminals of a transistor and why they are so called? 3
 (b) Draw transistors as switch. What is voltage across transistors and current through transistors when transistor is ON and OFF? 4
 (c) Explain the relation among α , β and γ . 3
6. (a) What is transistor biasing? Write the different biasing methods of transistor with their merits and demerits. 5
 (b) Explain the voltage divider bias method of transistor with circuit diagram. 4
 (c) Define the stability factor. 1
7. (a) Distinguish between FET and BJT on the basis of any four factors. 2
 (b) What are the different types of FET? 2
 (c) Explain the construction and working of a JFET. 2

Department of Computer Science and Engineering

Begum Rokeya University, Rangpur

1st Year 2nd Semester Final Examination - 2015 (Session: 2014-15)

Full Marks: 50 MAT 1221/1223: Differential and Integral Calculus Time: 3 Hours

[Answer any **five** questions of the following. Each question carries a total of 10 marks]

1. (a) Define *domain* and *range*. Find the domain and range of the following functions (1)

i. $f(x) = \sqrt{x-2}$ (2)

ii. $f(x) = \frac{x^2-1}{x+1}$ (2)

- (b) Define *one-to-one* and *onto* function with examples. (3)

- (c) Find the inverse of the function $f(x) = 3x + 2$ (2)

2. (a) i. Test the existence of $\lim_{x \rightarrow 3} \frac{|x-3|}{x-3}$ and find the value of the limit if any. (3)

ii. Evaluate: $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - \frac{1}{\sin x} \right)$ (2)

- (b) Given, (5)

$$f(x) = \begin{cases} kx^2, & x \leq 2 \\ 2x + k, & x > 2 \end{cases}$$

Find the value of k , if possible that will make $f(x)$ continuous at $x = 2$

3. (a) Prove that the slope of the tangent at $P(x, y)$ of a function $y = f(x)$ is equal to the differential coefficient of that function at that point. (5)

- (b) Test whether $f(x) = |x|$ is differentiable at $x = 0$ or not. (5)

4. (a) Find the differential coefficient ($\frac{dy}{dx}$) of the followings (**any three**): (3 × 3) (9)

i) $y = \frac{1-\cos x}{1+\cos x}$ ii) $y = \frac{\sin x}{1+\cos x}$ iii) $y = e^{\sin x} \sin a^x$ iv) $y = x^2 + 3x - 2\tan(x)$ v) $y = x^5 e^x$

- (b) What is calculus? Write some applications of calculus. (1)

5. (a) Find n th derivative of $\frac{x}{x^2+4}$ (5)

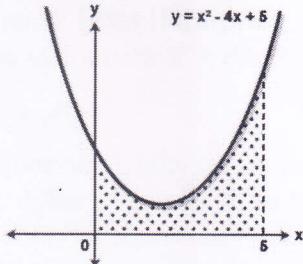
- (b) i. Discuss the second derivative test for extrema. (2½)

- ii. Locate the extrema of $f(x) = x^4 - 2x^2$ (2½)

6. (a) State and prove Rolle's theorem. (5)

- (b) Find the area of the region (shaded area on the graph below) by the parabola (5)

$y = x^2 - 4x + 5$ and the lines $x = 0, x = 5$ and the x -axis. (Hint: You can use integration to work out the area under a curve)



7. Evaluate **any three** of the followings: $(3 \frac{1}{3} \times 3)$ (10)

i) $\int \frac{x}{\sqrt{x^2-9}} dx$ ii) $\int \frac{\sin x}{\cos^2 x} dx$ iii) $\int \frac{dx}{x^3(a+bx)}$ iv) $\int \frac{dx}{5+4\sin x}$ v) $\int_0^2 (4x^2 - 5x + 7) dx$ vi) $\int_0^4 x \sqrt{x^2 + 9} dx$

Begum Rokeya University, Rangpur
 Department of Computer Science and Engineering
 1st Year 2nd Semester Final Examination -2015
 Course: ECO 1225 (Economics)

Time: 3 hours

Full Marks: 50

N.B.

- a) Answer any **FIVE** of the following questions.
- b) The figures in the margin indicate full marks.
- c) All parts of each question must be answered consecutively.

- | | | |
|----|--|---|
| 1. | a) Briefly describe the factors on which a household's decision about what quantity of a particular output to demand depends. | 5 |
| | b) How does market mechanism work to solve the basic problems in a free market economy? | 5 |
| 2. | a) The elasticity of demand can vary between 0 and minus infinity, discuss. | 3 |
| | b) How can one calculate elasticity by using midpoint formula? | 2 |
| | c) Explain why oil producers would succeed and banana producers would fail in rising revenues as they raise prices. | 5 |
| 3. | a) What are the conditions for consumer's equilibrium? | 2 |
| | b) How does a consumer choose a combination of two goods? | 3 |
| | b) For most normal goods, the income effect and substitution effect work in the same direction; so when the price of a good rises, both the income and substitution effects lead to a lower quantity demanded. How would this change if the good is an inferior good? | 5 |
| 4. | a) Define average and marginal product of labour. | 4 |
| | b) What is isoquant and isocost? How can one find the least-cost method of producing a given amount of output graphically? | 6 |
| 5. | a) What are the major concerns of macroeconomics? Briefly describe the components of macroeconomy. | 4 |
| | b) What are some of the problems in using fixed weights to compute real GDP and the GDP price index? | 3 |
| | c) Evaluate the following statements: Even if the prices of a large number of goods and services in the economy increase dramatically, the real GDP for the economy can still fall. | 3 |
| 6. | a) What do the CPI and the PPI measure? Why do we need both of these price indexes? | 5 |
| | b) On average, nations in X pay higher unemployment benefits for longer periods of time than does the Y. How do you suppose this would impact the unemployment rates in these nations? Explain which type of unemployment you think is most directly affected by the size and duration of unemployment benefits. | 5 |

7. You are given the following data concerning Freedonia, a legendary country:

- (i) Consumption function: $C = 200 + 0.8Y$
- (ii) Investment function: $I = 100$
- (iii) $AE \equiv C + I$
- (iv) $AE = Y$

- a) What is the marginal propensity to consume in Freedonia, and what is the marginal propensity to save? 2
- b) Graph equations (iii) and (iv) and solve for the equilibrium income. 3
- c) Suppose equation (ii) is changed to $I = 110$. What is the new equilibrium level of income? By how much does the tk. 10 increase in planned investment change equilibrium income? What is the value of the multiplier? 2
- d) Calculate the saving function for Ecodonia. Plot this saving function on a graph with equation (ii). Explain why the equilibrium income in this graph must be the same as in part b. 3

Begum Rokeya University, Rangpur
 Department of Computer Science and Engineering
 1st Year 2nd Semester Final Examination -2015
 Course: CHM 1224 (Chemistry)

Time: 3 hours

Full Marks: 50

N.B.

- a) Answer any **FIVE** of the following questions.
- b) The figures in the margin indicate full marks.
- c) All parts of each question must be answered consecutively.

- | | | |
|----|--|----|
| 1. | a) What do you mean by Voltaic cell? Discuss about the structure and reactions of any Voltaic cell. | 5 |
| | b) State and explain the Faraday's laws of electrolysis. | 5 |
| 2. | a) What do you mean by molecularity and order of a chemical reaction? Derive the rate equation of a first order reaction. | 5 |
| | b) What are K_c and K_p ? The value of K_p at $25^{\circ}C$ for the reaction $2NO(g) + Cl_2(g) \leftrightarrow 2NOCl(g)$ is $1.9 \times 10^3 \text{ atm}^{-1}$. Calculate the value of K_c at the same temperature. | 5 |
| 3. | a) Define adsorption, absorption with example. | 3 |
| | b) Write two differences between physical adsorption and chemical adsorption. | 2 |
| | c) What are colloids? How are they classified? | 5 |
| 4. | a) Discuss the Bohr's theory of atomic model. | 4 |
| | b) Write the electronic configuration of the following elements or ion:
$Cr, Cr^{3+}, Fe, Fe^{2+}, Cu, Cu^{+}$ | 3 |
| | c) On the basis of hybridization, deduce the shape of the following molecules and predict the bond angle in each case BF_3, H_2O . | 3 |
| 5. | a) What is covalent bond? Discuss the potential energy curve to form a covalent bond between two atoms A and B. | 5 |
| | b) Write the formula for each of the following complexes: | 5 |
| | i) Hexamminecobalt(III) chloride | |
| | ii) Sodium tetrachlorozincate (II) | |
| | iii) Potassium hexacyano ferrate (II) | |
| | iv) μ – dihydro tetrakis oxalato chromate (III) | |
| | v) tetraiodo mercurate (II) | |
| 6. | a) What is coordination bond? Explain that coordination bond is a special type of covalent bond. | 4 |
| | b) State and explain valence bond theory. | 4 |
| | c) Write down the general characteristics of transition element. | 2 |
| 7. | Write short notes on any three of the followings: | 10 |
| | a) Kohlrausch's law | |
| | b) Hydrogen bond | |
| | c) Transition state theory | |
| | d) VSEPR theory | |
| | e) Transport number | |

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

1st Year 2nd Semester Final Examination, 2015 (Session: 2014-15)

Course Title: Bangladesh Studied and Sociology; Course Code: SOC 2223

Time: 3.00 Hours

A

Full Marks: 50

Answer Any Five from the Given Questions

(Note: All questions carry equal marks.)

1. Define folk art. Discuss the social and cultural history of Bangladesh.
2. What do you mean by declaration of independence? Discuss operation searchlight.
3. Define development. Discuss educational development and rural development of Bangladesh.
4. What do you mean by status of women? Discuss the present socio economic condition of women in Bangladesh.
5. What do you mean by concept of Information Technology (IT)? Discuss the problems and prospects of IT industry in Bangladesh.
6. What is meant by globalization? What are the effects do you notice in Bangladesh society as a result of globalization? Explain.
7. Do you think population is a problem for Bangladesh? Discuss the interrelationship between population and environment?