

Ahsanullah University of Science and Technology

Department of Computer Science and Engineering

1st Year 1st Semester Final Examination (Spring 2011)

Course No: Math-115

Course Title: Mathematics-I

Full Marks: 70

Time: 3 Hours

There are 7 (Seven) questions. Answer 5 (Five) questions, taking 3 (three) from Group-A and 2 (two) from Group-B

The figures of the right margin indicate full marks for the respective questions

Group-A

1. (a) Define function, domain, co-domain and range. Find the domain and range of the following function [07]

$$f(x) = \frac{x^2+x+1}{x^2-6x+8}$$

- (b) Define continuous function. A function $f(x)$ is defined as follows [07]

$$f(x) = \begin{cases} \tan \frac{x}{2} & \text{when } 0 \leq x < \frac{\pi}{2} \\ 3 - \frac{\pi}{2} & \text{when } x = \frac{\pi}{2} \\ \frac{x^2 - \frac{\pi^2}{4}}{x - \frac{\pi}{2}} & \text{when } x > \frac{\pi}{2} \end{cases}$$

Discuss the continuity of $f(x)$ at $x = \frac{\pi}{2}$

2. (a) If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots}}} \rightarrow \infty$, show that $\frac{dy}{dx} = \frac{\cos x}{2y-1}$. [03]

- (b) If $f(x) = \left(\frac{a+x}{b+x}\right)^{a+b+2x}$, show that $f'(0) = [2\ln \frac{a}{b} + \frac{b^2-a^2}{ab}] \left(\frac{a}{b}\right)^{a+b}$ [05]

- (c) State Leibnitz's theorem. If $y = \sin \{a \ln(x+b)\}$ prove that, [06]

$$(i) (x+b)^2 y_2 + (x+b)y_1 + a^2 y = 0$$

$$(ii) (x+b)^2 y_{n+2} + (2n+1)(x+b)y_{n+1} + (n^2 + a^2)y_n = 0$$

3. (a) If $f(x)$, $g(x)$ and $h(x)$ are continuous in $[a, b]$ and differentiable in (a, b) then [05] show that

$$\begin{vmatrix} f'(c) & g'(c) & h'(c) \\ f(b) & g(b) & h(b) \\ f(a) & g(a) & h(a) \end{vmatrix} = 0$$

[05]

(b) If $a < x < b$ and $\psi''(x) \neq 0$ show that

$$\frac{\phi(b)-\phi(a)-(b-a)\phi'(a)}{\psi(b)-\psi(a)-(b-a)\psi'(a)} = \frac{\phi''(\xi)}{\psi''(\xi)} \text{ where } a < \xi < b$$

[04]

(c) Using second mean value theorem show that

$$(x+h)^{3/2} = x^{3/2} + \left(\frac{3}{2}\right)x^{\frac{1}{2}}h + \left(\frac{3}{2}\right)\left(\frac{1}{2}\right)\left(\frac{h^2}{2!}\right)\frac{1}{\sqrt{x+\theta h}}, 0 < \theta < 1$$

Also find θ , when $x=0$.

[07]

4. (a) Find the intervals where the function $f(x) = (x-2)^3(x+1)^2, -1 \leq x \leq 3$ is increasing or decreasing. Also find the absolute maximum and minimum values of the function and sketch the graph.

[07]

- (c) If $Pdx + Qdy + Rdz$ can be made perfect differential of some function of x, y, z on multiplication by a factor then show that

$$P\left(\frac{\partial Q}{\partial z} - \frac{\partial R}{\partial y}\right) + Q\left(\frac{\partial R}{\partial x} - \frac{\partial P}{\partial z}\right) + R\left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x}\right) = 0.$$

Group-B

5. (a) If by the rotation of rectangular axes through an angle θ about the origin, the equation $ax^2 + 2hxy + by^2 = 0$ transforms to $a'x^2 + 2h'xy + b'y^2 = 0$ then prove that $a+b = a'+b'$. If the equation transforms to $a'x^2 + b'y^2 = 0$ prove that

$$\tan 2\theta = \frac{2h}{a-b}.$$

[07]

- (b) Prove that the product of the perpendiculars drawn from the point (α, β) to the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ is $\frac{a\alpha^2 + 2ha\beta + b\beta^2}{\sqrt{(a-b)^2 + 4h^2}}$.

[07]

6. (a) If the angle between two straight line is θ and their direction cosines are $[l_1, m_1, n_1]$ and $[l_2, m_2, n_2]$ prove that,

$$(i) \cos \theta = l_1l_2 + m_1m_2 + n_1n_2.$$

$$(ii) \sin \theta = \pm \sqrt{(l_1m_2 - l_2m_1)^2 + (m_1n_2 - m_2n_1)^2 + (n_1l_2 - n_2l_1)^2}$$

- (b) If $P(x_1, y_1, z_1)$ and $Q(x_2, y_2, z_2)$ be two points then show that the direction cosines of PQ are $\frac{x_2-x_1}{PQ}, \frac{y_2-y_1}{PQ}, \frac{z_2-z_1}{PQ}$ where $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$.

7. (a) If θ be the angle between the planes represented by the equation $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy = 0$ show that [08]

$$\tan \theta = \frac{2\sqrt{f^2 + g^2 + h^2 - ab - bc - ca}}{a+b+c}.$$

Also prove that the planes will be

- (i) Parallel (coincident) if $f^2 + g^2 + h^2 - ab - bc - ca = 0$.
- (ii) Perpendicular if $a + b + c = 0$.

- (b) Find the shortest distance and equation of the line of shortest distance [06] between the lines

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} \text{ and } \frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}.$$

Ahsanullah University of Science and Technology
Department of Computer Science and Engineering
1st Year, 1st Semester, Final Examination (Spring, 2011)
Course No.: CSE-101, Course Title: Programming Language I
Time : 3 Hours Full Marks : 70

[Directions : There are 7(seven) questions. Answer any 5(five). Marks are shown in parentheses at the end of each part of question.]

(Understanding question is the part of examination)

1. a) Briefly describe basic data types in C. 3
- b) Briefly describe about five tokens (Keywords, Identifiers, Constants, Operators and Punctuators) in C. 5
- c) Mr. Karim is given a responsibility to find out the grade of the subject CSE 101. There are three types of marks for a student : attendance (0-10), quizzes (0-20) and final exam (0-70) and all of three have to add to find the grade. There are 4 types of grades only: A(marks≥80), B(80>marks≥60), C(60>marks≥40) and F(marks<40). Now, write down a C program for him that will calculate the grade of a student. Moreover, adopt necessary verifications so that no invalid number is possible to proceed. 6
2. a) Describe all rules of valid identifier in C with illustrative examples. 3
- b) Convert the following codes into if...else statement and also find out the output. 5

```
int a = 5, b = 8, p = 4, q = 7, c;
c = (b>a ? (p<q ? 3 : 9) : (a >= p ? 5 : 7));
printf("%d", c);
```
- c) Write a program which will input x from the user and find the sum of following series: 6
$$100 - [x/2! - x^3/4! + x^5/6! - x^7/8! + \dots - x^{19}/20!]$$
3. a) Define different loop statements in C with illustrative examples. 3
- b) Write a program which will display all five digit numbers with the following conditions: 5
 - a) the first digit (i.e. the most significant digit) is a multiple of 3.
 - b) the second digit is prime.
 - c) the third digit is ≥ 6 .
 - d) the fourth digit is ≤ 4 .
 - e) the last digit (i.e. the least significant digit) is odd.

3. c) Write a program that takes an integer, n as input from the user and constructs an right-aligned triangle of stars (*) with n rows. For example, when n = 5 the output will be : 6 01 01 01

```
*****  
*** * * * *  
** * * * *  
* * * *  
*
```

4. a) Illustrate call by value and call by reference with appropriate example. 3

- b) Find output from the following program segment:

```
void xy( int x ) {  
    if(x > 0) {  
        printf("%d\t",x);  
        xy(x-1);  
    }  
    printf("\nCall%d",x);  
}
```

Find output for xy(6);

- c) Write a function to find the greatest common divisor (GCD) of an array of integers. 6
Array size and array elements are inputs taken from keyboard.

Sample Input: Enter how many elements ? : 6

25 35 50 60 90 120

Sample Output: GCD = 5.

5. a) Describe array and pointer with examples. Assume that p is declared as a pointer to a double and contains the address 100. After p is incremented what will its value be? 3

- b) Suppose that we have a list of 5 elements given below. Use bubble sort algorithm to sort the given list in ascending order (also write down the algorithm). 5

25 15 20 10 5

- c) Find output from the following program segment: 6

```
int i, j, k, px[] = {-2,-2,-1,-1,1,1,2,2}, py[] = {-1,1,-2,2,-2,2,-1,1};  
int cox[4][4] = {{0}};  
for(i=0;i<4;i++) {  
    for(j=0;j<4;j++) {  
        for(k=0;k<8;k++) {  
            if(((i+px[k])>=0 && (i+px[k])<4) && ((j+py[k])>=0 && (j+py[k])<4))  
                cox[i][j]++;  
        }  
        printf("%d\t",cox[i][j]);  
    }  
    printf("\n\n");  
}
```

6. a) What is the difference between string and character array? Discuss the scope of local and global variable with example. 3

- b) Find output from the following program segment: 5

```
int printnum(int p, int *z) {
    printf("%d\n", *(z+p));
    z+=(p+3);
    *z=20;
    printf("%d\n", *(z+p+2)+4);
    return p-2;
}
int main () {
    int i=3,q;
    int num[10]={3,7,4,5,6,11,2,3,8,9};
    q=printnum(i,&num);
    printf("%d\n", *(num+q));
    printf("%d\n", *(num+q+2));
}
```

- c) An integer is entered through the keyboard. Write a program to determine the prime factors of this number. For example, prime factor of 24 are 2, 2, 2 and 3 whereas prime factor of 35 are 5 and 7. 6

7. a) Write a program describing the following C functions: 3

i) strcmp ii) strcpy iii) strcat

- b) Write a program/function that will take a text as input and display all the words (anything separated by spaces will be considered as a word) in separated lines and also count the number of words within the text. 5

Sample Input: Programming C is a mid-level language.

Sample Output:

Programming

C

is

a

mid-level

language.

Number of words = 6

- c) Write a program that takes two string inputs and merge them, that is, it joins the second string at the end of first string and then reverse the string. For example, for the input "AUSI is " and "the best" the program will generate "tseb eht si TSUA" as output without using any built-in library function of string.h 6

☺ Good Luck ☺

**Ahsanullah University of Science and Technology
Department of Computer Science and Engineering
1st Year 1st Semester Final Examination (spring 2011)**

Course No: Hum 105
Time : 3 hours

Course Title: English
Full Marks: 70

— There are 9(Nine) questions. Answer any 7(Seven) questions including question no. 1(One).

Marks allotted are indicated in the margin.

1. Read the passage carefully and answer the questions that follow;

Marie Curie was one of the most accomplished scientists in history. Together with her husband, Pierre, she discovered radium, an element widely used for treating cancer, and studied uranium and other radioactive substances. Pierre and Marie's amicable collaboration later helped to unlock the secrets of the atom.

Marie was born in 1867 in Warsaw, Poland, where her father was a professor of physics. At the early age, she displayed a brilliant mind and a blithe personality. Her great exuberance for learning prompted her to continue with her studies after high school. She became disgruntled, however, when she learned that the university in Warsaw was closed to women. Determined to receive a higher education, she defiantly left Poland and in 1891 entered the Sorbonne, a French university, where she earned her master's degree and doctorate in physics.

Marie was fortunate to have studied at the Sorbonne with some of the greatest scientists of her day, one of whom was Pierre Curie. Marie and Pierre were married in 1895 and spent many productive years working together in the physics laboratory. A short time after they discovered radium, Pierre was killed by a horse-drawn wagon in 1906. Marie was stunned by this horrible misfortune and endured heartbreaking anguish. Despondently she recalled their close relationship and the joy that they had shared in scientific research. The fact that she had two young daughters to raise by herself greatly increased her distress.

Curie's feeling of desolation finally began to fade when she was asked to succeed her husband as a physics professor at the Sorbonne. She was the first woman to be given a professorship at the world-famous university. In 1911 she received the Nobel Prize in chemistry for isolating radium. Although Marie Curie eventually suffered a fatal illness from her long exposure to radium, she never became disillusioned about her work. Regardless of the consequences, she had dedicated herself to science and to revealing the mysteries of the physical world.

Questions:

- ii) Give a title of the passage and justify it.
- iii) Who was Marie Curie and what did she discover?

10

- iv) Describe her struggle on getting higher education.
v) How did Marie's distress take a positive turn?
vi) "Marie had a devoted mind to science"-elucidate the statement.

2) Give the meanings of any 10(ten) of the following words:

mutilate, assassin, succumb, opaque, squaw, yelp, bizarre,
mishap, legendary, preposterous, litter, substitute

3) Make sentences using any 10(ten) of the following words:

flagellate, recuperate, domesticate, wander, sedate, palpitate, fascinate
painstakingly, intelligibly, geology, philologist, wreath

4) Write the phonetic spellings of any 10 (ten) of the following words:

cheer, vanish, finish, harden, business, payment, measure, doctor, alone,
coast, ago, spy

5) a) Fill the following conditional sentences taking care to the use of correct tense :

- i) I will participate in the competition.
- ii) If the police had come at the right time,
- iii) Srizani would think on it.
- iv) If the library is open,.....
- v) they would have agreed.

b) Recast and Correct the following sentences:

- i) While she comes, I quit the room.
- ii) When she reaches the station, I saw her.
- iii) The number of teachers who makes question are thoughtful.
- iv) He acted as though he is a professional.
- v) Plagiarism affect the quality of writing.

6) a) Make 2(two) sentences following each of the structures:

- i) Subject + must + perfective
- ii) Subject+ verb (present) + as if + subject+ verb
- iii) Subject+ prepositional phrase+ object
- iv) No + plural noun+ verb
- v) Subject + be + used to + verb

b) Supply the correct form of verb within parentheses:

- i) Terrorism and robbery (engrasp) the people of the locality.
- ii) Neither Nafisa nor her friends (enjoy) in the festival.
- iii) He as well as his brothers and sisters (join) the occasion.
- iv) The day after tomorrow Maliha (go) to Dhaka .
- v) There(be) a number of phone calls in my mobile.

7. a) Write a paragraph on any 1(one) of the following topics in around 150 words:

- i) Nature and its diversity
- ii) Illiteracy as a curse
- iii) Chemically preserved seasonal fruits

b) What is the importance of contextual congruity in paragraph writing?

8. a) Write a letter of application to 'The Manager' of 'X company' for the post of a computer engineer.

b) What is the importance of audience in report writing?

9. Answer the following questions:

- a) Who was Elizabeth Blackwell? What were her achievement?
- b) What was the first name deciphered from the Rosetta Stone? What were the three languages inscribed on the Rosetta Stone?
- c) Why did the Panama Canal take too much time in its establishment? Why is it a beneficial project?
- d) What is an Olympiad? Why did the Greeks arrange competitive sports like Olympi Games?
- e) What did the Aztecs believe? Why did they sacrifice their lives?

Ahsanullah University of Science and Technology**Bachelor of Science in Computer Science & Engineering****1st year 1st semester Final Examination (Spring-2011)****Course No: Phy-115****Time: 3 Hours****Course Title: Physics****Full marks: 70****There are eight questions. Answer any five taking at least one from each group.****Use answer script-A for Group A & answer script-B for Group B & C.****(Marks allotted are indicated in the margin)****GROUP-A**

- 1 (a) Discuss in brief different theories of light. (4)
 (b) What is fringe width? Derive an expression for the width of a fringe in terms of the wave length of light, the distance between the two coherent sources and the distance of the screen from sources. (7)
 (c) Light of wave length 5893\AA from a narrow slit is incident on a double slit. The overall separation of 4 fringes on a screen 2m away is 1 cm. Calculate i) the slit separation and ii) the fringe width. (3)
- 2 (a) What do you understand by diffraction of light? Distinguish between the Fresnel and Fraunhofer diffraction. (6)
 (b) Show that, in single slit diffraction, the width of the central maximum is inversely proportional to the width of the slit. (5)
 (c) A screen is placed 2 m away from a narrow slit which is illuminated with light of wavelength 6000 \AA . If the first minimum lies 5 mm on either side of the central maximum, calculate the slit width. (3)

GROUP-B

- 3 (a) What do you mean by stationary wave? Write down its properties. (5)
 (b) In the case of stationary wave, prove that the distance between any two consecutive nodes or any two consecutive antinodes is equal to half the wavelength of the wave. (7)
 (c) Two aeroplanes A & B are approaching each other and their velocities are 108 km/hr and 144 km/hr, respectively. The frequency of a note emitted by A as heard by the passengers in B is 1170 Hz. Calculate the frequency of the note heard by the passengers in A. The velocity of sound is 350 m/s. (2)
- 4 (a) Define simple harmonic motion (SHM). For a particle vibrating simple harmonically, show that the force acting on the particle is directly proportional to the displacement of the particle from its equilibrium position but always tends to bring the particle back to its equilibrium position. (4)

- (b) Deduce an expression for the resultant displacement of a particle which is being simultaneously acted upon by two simple harmonic vibrations at right angles to each other having same frequencies but differing in phases & amplitudes.

What happens if the two vibrations have

(i) same phase with different amplitudes,

(ii) phase difference $\frac{\pi}{2}$ with same amplitudes, and

(iii) phase difference $\frac{3\pi}{4}$ with different amplitudes?

GROUP-C

5. (a) State & explain Coulomb's law. Derive Coulomb's law from Gauss's law. (5)
 (b) Consider a charged ring of radius a containing q amount of positive charges. Derive the expression for the electric field strength at a point on the axis of this ring at a distance x from its center. Hence prove that at great enough distances the charged ring behaves like a point charge. (7)
 (c) In an ionized helium atom (a helium atom in which one of the two electrons has been removed), the electron & the nucleus are separated by a distance of 26.5 pm. What is the electric field due to the nucleus at the location of the electron? (2)
6. (a) Define electric dipole & electric dipole moment. (2)
 (b) Consider a circuit consisting of a resistor & a capacitor in series with a d.c. source. Deduce an expression for current when the switch is closed & show graphically the variation of current with time. Hence explain the physical significance of the capacitive time constant for the circuit. (8)
 (c) In an RC series circuit, $E=11.0V$, $R=1.42 M\Omega$ & $C=1.80 \mu F$. (a) Calculate the time constant. (b) Find the maximum charge that will appear on the capacitor during charging. (c) How long does it take for the charge to build up to $15.5 \mu C$? (4)
7. (a) State & explain Ampere's law. (5)
 (b) Using Ampere's law, derive the expression of the magnetic field at a point inside a wire of radius R & carrying a current I . Hence prove that the magnitude of the magnetic field is zero at the center of the wire. (7)
 (c) A solenoid is 1.0 m long & 3.0 cm in mean diameter. It has 5 layers of windings of 850 turns each & carries a current of 5.0 amp. What is the magnitude of the magnetic field at the center of the solenoid? (2)
8. (a) What do you mean by semiconductor? Write down its properties. (4)
 (b) Define intrinsic & extrinsic semiconductors. (2)
 (c) Explain the volt-ampere characteristic curve of a pn junction. (8)

AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
Department of Computer Science and Engineering
First year, First semester; Final Examination, Spring 2011

Course No. Chem. 115
 Time: 3 Hour

Course title: Chemistry
 Full Marks: 70

There are 7 (seven) questions, answer any 5 (five).
 (Marks are indicated in the margin)

1. (a) How was cathode rays produced and why was it so named ? How could it be shown that cathode rays consists of electrons? 4
- (b) State essential features of Heisenberg's uncertainty principle and show that this principle is significant only for very small particles like electrons. 4
- (c) Describe the solar system atom model and mention its limitations. 3
- (d) Show how energy of an electron can be calculated using Bohr's atom model. 3
 Calculate the energy of the electron in the Hydrogen atom in the M ($n = 3$) shell.
2. (a) What are inert gases and where are they mainly found? How are the inert gases directly isolated from liquid air? 4
- (b) What are understood from electronegativity and ionization potential? How does electronegativity vary within periods and groups in the periodic table? 6
- (c) Mention some limitations of the modern periodic table. 4
3. (a) Describe the formation of coordination bonds with the Lewis electronic theory and explain the bonding in $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ and $\text{NH}_3 \cdot \text{BF}_3$. 4
- (b) Discuss the formation of covalent bonds with the molecular orbital theory and explain the formation of N_2 and non formation of He_2 with this theory. 5
- (c) Discuss the essential points of VSEPR theory and explain the molecular geometry of H_2O , CO_2 and SO_2 with this theory. 5
4. (a) What is understood from liquid-liquid miscibility? Explain the miscibility behavior of phenol-water system with a solubility curve. 4
- (b) What is the boiling point of a liquid? Derive the relationship between elevation of boiling point and lowering of vapor pressure. How the molecular weight of a solute can be determined from the elevation of boiling point? 5
- (c) State the Henry's law for gas-liquid solubility and its limitations. 2
- (d) A solution containing 10 g of an unknown compound in 100 g water lowers the vapor pressure from 17.5 mm Hg to 17.41 mm Hg at 20°C . Calculate the molecular weight of the unknown compound. 3

5. (a) State the rate law and define order of a reaction in terms of rate law. Explain with example why is power to which the concentrations are raised in the rate law sometimes different from the coefficients of the reactants in the chemical equation. 3
- (b) Define half life of a reaction and show that the half life of a reaction of the second order is inversely proportional to the initial concentration of the reactant. How can order of a reaction be determined from half life? 6
- (c) In the reduction of nitric oxide, 50% of the reaction was completed in 108 seconds when the initial pressure was 336 mm Hg and in 147 seconds when the initial pressure was 288 mm Hg. Calculate the order of the reaction. 3
- (d) What is molecularity of reactions? Why are elementary reactions of molecularity more than 3 rare? 2
6. (a) Derive the thermodynamic expression for the law of chemical equilibrium. 6
How is the value of ΔG° related to the direction of the reaction?
- (b) What is a buffer solution? How can pH value of a buffer solution be determined? 3
- (c) Derive the relationship between pH and pOH. 2
- (d) What is meant by bond energy? 3
Calculate the bond energy of HCl, given: H-H bond energy 433 kJ/mole,
Cl-Cl bond energy 242 kJ/mole and ΔH_f for HCl -91 kJ/mole.
7. Write short notes on any four from the following: 4 x 3.5 = 14
- (a) Different types of heat of reaction
 - (b) Transport number and its determination
 - (c) Cannizaro reaction.
 - (d) Zero order and Pseudo order reactions
 - (e) Markovnikov and anti-Markovnikov's addition
 - (f) Uses of inert gases

Ahsanullah University of Science and Technology

Department of CSE

Programming language-I LAB Code: CSE 102

Spring 2011

Final Exam

Total Marks: 60

Time: 2 hours

Answer all of the following questions. Each question carries 5 marks.

Question 1. Write a program to input the sales made by a salesman and calculate the commission according to the following conditions:

<u>Sales</u>	<u>Commission</u>
1-100	4% of sales
101-200	5% of sales
201-300	6% of sales
>300	7% of sales

Sample input and output 1:

Enter sales: 150

Commission: 7.5 Taka

Sample input and output 2:

Enter sales: 400

Commission: 28 Taka

Question 2. Write a program to print the following series:

$(2) + (2+4) + (2+4+6) + (2+4+6+8) \dots \dots \dots$ up to n terms. n will be given as input.

Sample input and output 1:

Enter n: 4

$(2) + (2+4) + (2+4+6) + (2+4+6+8)$

Sample input and output 2:

Enter n: 5

$(2) + (2+4) + (2+4+6) + (2+4+6+8) + (2+4+6+8+10)$

Question 3. Write a program which will take 2 numbers as input and find out the sum of all the numbers which are between the two numbers and which are (a) even, (b) not divisible by 5, and (c) divisible by 3.

Sample input and output 1:

Enter first number: 4

Enter second number: 50

Output: $6 + 12 + 18 + 24 + 36 + 42 + 48 = 186$

Sample input and output 2:

Enter first number: 15

Enter second number: 50

Output: $18 + 24 + 36 + 42 + 48 = 168$

Question 4. Write a program to input two strings and print the string which has the highest number of vowels (a, e, i, o, u). If both of the strings have equal number of vowels, then print any of them.

Sample input and output 1:

Enter first string: this is a line.

Enter second string: this is a text.

Output: this is a line.

Sample input and output 2:

Enter first string: Rahim is a good boy.

Enter second string: He likes to play football.

Output: He likes to play football.

Question 5. Write a program to print the sums of the two diagonals of a square matrix (2D array).

Sample input and output 1:

Enter dimension: 3

Enter the matrix:

3	4	5
8	7	5
3	9	6

Sum of first diagonal: 16

Sum of second diagonal: 15

Sample input and output 2:

Enter dimension: 4

Enter the matrix:

3	4	50	7
2	3	5	1
1	0	21	10
4	2	9	0

Sum of first diagonal: 27

Sum of second diagonal: 16

Question 6. Write a function that returns the total number of digits of a number n (n is passed to the function as argument.). Then call the function from the main function.

Sample input and output 1:

Enter n: 234

Total number of digits: 3

Sample input and output 2:

Enter n: 3423

Total number of digits: 4

Question 7. What is the output of the following code segment?

234- (4)

1

```

void main()
{
    int i,j;
    for( i = 10; i < 15; i=i+5)
    {
        for(j = 5; j < 14; j=j+2)
        {
            printf("%d, %d\n", i , j );
        }

        if( i == j )
        {
            printf("I'm breaking down ... \n");
            break;
        }
    }
}

```

Question 8. What is the output of the following code segment?

```

void main()
{
    int i; . 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    int n[] = {2,34,56,10,8,9,12,3,68,10,22,13,5,5,2,11};

    int sum=0;

    for (i = 0; i <= 15; i = i + 3)
    {
        if(n[i]%2==0)
            printf (" %d\n", n[i]);

        if(n[i]%5!= 0)
            sum = sum + n[i];
    }
    printf("Total sum: %d", sum);
}

```

Question 9. What is the output of the following code segment? The two dimensional array $a[4][4]$ is given below.

	0	1	2	3
0	5	7	9	4
1	0	1	2	10
2	3	12	90	87
3	43	56	73	99

```

for(i=3; i>= 0; i--)
{
    for(j=0; j < 4; j++)
    {
        printf("%d", a[j][i]);
    }
    printf("\n")
}

```

Question 10. What is the output of the following code segment?

```

int F2()
{
    int k=10;
    k++;
    return k;
}

void F3(char ch)
{
    int r;
    printf("%c\n", ch);
    ch=ch+1;
    printf("%c\n", ch);
    r = F2();
}

void F1()
{
    float p=6.24;
    int q=p;

    printf("%f\n", p);
    printf("%d\n", q);

    F3('A');
}

void main ()
{
    int r;
    F1();
    r = F2();
    printf("%d", r);
}

```

)

Question 11. What is the output of the following code segment?

```
int i = 0;    1 2 3 4 5 6 7  
int a[] = {4, 3, 2, 6, 10, 3, 10, 18}  
do {  
    printf("%d", i*a[i]);  
    i++;  
} while (a[i] != 10);
```

Question 12. What is the output of the following code segment?

```
char str[] = "I study at AUST. AUST is located at Tejgaon."  
i = 0;  
while (str[i] != 'A' || i <= 12)  
{  
    printf("%c\n", str[i]);  
  
    i++;  
}
```

S-04

Ahsanullah University of Science and Technology

Lab examination, CSE 1-1, Group B2

Course No. Chem. 116, Chemistry Sessional

Date 16/07/2011, Spring 2011

Name of the experiment:

Standardization of Hydrochloric acid (HCl) solution with a standard solution of Sodium Carbonate (Na_2CO_3).

Preparation of standard Sodium Carbonate solution (100 ml):

Weigh out exactly 0.54 g of pure crystalline sodium carbonate (Na_2CO_3) in a 100 ml volumetric flask. Dissolve it with minimum volume of distilled water and fill it up to the mark. Calculate the molarity of the solution and show the calculation in your report.

Working Procedure:

- i). Take the supplied hydrochloric acid (precaution must be maintained) solution in the burette & note the initial reading.
- ii). Pipette out exactly 10ml of the prepared standard sodium carbonate solution into a conical flask by a volumetric pipette.
- iii). Add 1-2 drops of methyl orange as indicator.
- iv). Record the initial burette reading.
- v). Titrate the sodium carbonate solution with the hydrochloric acid solution until the first drop changes its color from yellow to orange.
- vi). Note the final burette reading.
- vii). Repeat the procedure (ii-vi) at least three times and take the average. This value is the volume of hydrochloric acid solution required to neutralize the Na_2CO_3 solution.

Calculation: Calculate the molarity of the hydrochloric acid solution.

Report should include:

1. Name of the experiment
2. Objective of the experiment
3. Theory of the experiment in short
4. Calculation involving preparation of standard solution
5. Table with title
6. Reaction
7. Calculation, use unitary method
8. Result