University of Asia Pacific

Department of CSE

Mid-Semester Examination Fall-2019

Program: CSE

Course Title: Structured Programming Course No. CSE 103 Credit: 3.00

Time: 1.00 Hour. Full Mark: 60

There are **Four** Questions. **Answer three questions including Q-1.**

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1. a. Given the following declaration: **[5]**

```
int sqr[9] = {1,2,3,4};
```

Calculate the size of the array in bytes. Assume that an integer takes 4 bytes of memory.

b. Given **[5]**

```
int a[ ] = {6, -8, 2, 5, 3};
i = 2;
```

What is the value of a[a[i * i]] + a[i]?

c. Write down a program to take 10 floating point numbers as input in an array. Assume that the elements can get repeated. Then find the minimum of all these 10 numbers and also print exactly in which location(s) within the array it appears. For example if the array is: **[10]**

{3.0, 5.5, 2.0, 6.1, 7.0, 8.0, 9.0, 2.0, 1.0, 4.0}

Then your program should print the followings:

The minimum is 1.0 and it appeared in location 8,

On the other hand if the array is as follows:

{3.0, 5.0, 2.0, 10.0, 7.0, 8.0, 9.0, 2.0, 10.0, 4.0}

Then your program should print the followings:

The minimum is 2 and it appeared in location 2, 7,

OR

1. a. Given the following declaration: **[5]**

```
int sqr[9] = {0};
```

Show the content of all elements of the array **sqr**.

b. Write a C program to count and print number of duplicate elements in an array that is sorted in descending order. The number of elements in the array and the array elements will be input to your program. For example if your array is: **[10]**

{10, 10, 10, 8, 7, 6, 4, 4, 3, 3}

Then your program should print the followings:

There are 4 duplicate elements

c. What will be the output of the following program segment? **[5]**

```
int a[5] = {5, 1, 2, 4, 3};
int b[5] = {10, 20, 30, 40, 50};
printf("%d", b[a[1]]);
```

2. a. Write down a C program where you take an English sentence as input and print the first vowel appearing in the sentence. **[10]**

Sample input:

Enter string: **GOOGLE**
Output: **First vowel is O**

b. What is the output of the following code segment? **[10]**

```
#include <stdio.h>
#include <string.h>
      int main(){
            char s[80] = "TOYOTA";
            int i,length, p, q;
            length = strlen(s);
            p = length/2-1;
            q = length/2+1;
            printf("%c %c %c %c",s[p-1], s[p], s[q], s[q+1];

      }
```

3. a. i) Using block diagrams explain how two functions communicate with each other. **[10]**
ii) What is the difference between argument and parameter of a function?

b. Write down a function with the following prototype: **[10]**

int isPrime(int n);

The function checks whether the number *n* passed as parameter is a prime number or not. If *n* is a prime number the function returns 1; otherwise it returns 0. Few sample calls and return values are given in the following table:

Function call	Return value
isPrime(16)	0
isPrime(13)	1
isPrime(1)	0
isPrime(31)	1

4. a. In the following code *a* is an integer. Rewrite the following code using *switch-case* block that produces the same output for all possible values of a. **[10]**

```
if (a == 1) printf ("1");
else if (a == 2) printf ("2");
else printf("X");
```

b. Write down a program that will find the summation of the following series, n will be input to your program: **[10]**

$$1^2-2^2+3^2-4^2 \ldots\ldots\ldots \text{up to } n^2$$

Sample Input/ Output 1:
Enter a number: 10
The sum is: -55

Sample Input/ Output 2:
Enter a number: 25
The sum is: 325

Department of Computer Science & Engineering
University of Asia Pacific (UAP)

Mid Examination | **Fall 2019** | **1st Year 2nd Semester**
Credits: 3.0 | **Discrete Mathematics** | **Course Code: CSE 105**
Duration: 1 Hour | **Full Marks: 60**

Instructions:

1. There are Four (4) Questions. Answer any Three (3). All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

1.	a) What is Binary computing? Relate binary logic to electronics.	10
	b) Perform the following number transformation: $(1011\ 1011)_4 - ((2)_{10} * (18)_{16}) + (12E21)_{17} = (?)_2$	10
2.	a) Prove the simplification theory. Perform the necessary logical operations with their names.	10
	b) What are the logics available in a computing system. Write down the truth table of AND as well as XOR logic.	10
3.	a) What is Boolean Theorem. Explain in brief.	10
	b) How does a computer compute arithmetic operations with Boolean logics? Explain briefly.	10
4.	a) Define Flow Chart and Algorithm.	10
	b) Write down the Structured English and Algorithm to perform ${}^nC_r$.	10

University of Asia Pacific
Department of Basic Sciences & Humanities
Mid-Semester Examination, Fall-2019
Program: B.Sc. Engineering (CSE)
1st Year /2nd Semester

Course Title: Math II: Linear Algebra Course No: MTH 103 Credit:3.00
Time: 1.00 Hour. Full Marks: 60

There are **Four** Questions. **Answer three questions including 1 and 2.** All questions are of equalvalue/Figures in the right margin indicate marks.

1. (a) (i) Let $\sigma = 24513$ and $\tau = 41352$ be permutations in S_5. Find $\tau \circ \sigma$ and σ^{-1}. **10**

(ii) Find the LU factorization of $A = \begin{bmatrix} 1 & -3 & 5 \\ 2 & -4 & 7 \\ -1 & -2 & 1 \end{bmatrix}$.

(b) Find the best quadratic least squares fit to the data **10**

x	0	1	2	3
y	3	2	4	4

2. (a) Solve the following system by Gaussian elimination **10**

$$x_1 + x_2 + 2x_3 = 9$$
$$2x_1 + 4x_2 - 3x_3 = 1$$
$$3x_1 + 6x_2 - 5x_3 = 0$$

(b) Find the Rank of $A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ **10**

3. (a) Find the inverse of $A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 9 \end{pmatrix}$. **10**

(b) For which of k will be the vector $\mu = (1, -2, k)$ in R^3 be a linear combination of the vectors $v = (3, 0, -2)$ and $w = (2, -1, -5)$ **10**

OR

4. (a) Let $u = (1, -3, 4)$ and $v = (3, 4, 7)$. Find the projection of u onto v and the distance between u and v. Also normalize the vector u. **10**

(b) Let S and T be the following subspaces of R^4: $S = \{(x, y, z, t) | y - 2z + t = 0\}$ and $T = \{(x, y, z, t) | x - t = 0, y - 2z = 0\}$. Find the basis and dimension of $S \cap T$. **10**

University of Asia Pacific
Department of Computer Science and Engineering
Mid – Semester Examination, Fall – 2019
Program: B.Sc. Engineering (1st Year, 2nd Semester)

Course Title: Electrical and Electronic Engineering I Course Code: EEE 121 Credit Hours: 3.00
Time: 1.00 Hour Full Marks: 60

[There are **four** questions. Answer any **three including Q-2**. Figures in the right margin indicate marks]

1 **a.** A cylindrical copper wire of length $10\ m$ and radius $1\ mm$ is connected to a voltage source of $20\ V$. The resistivity of copper is $1.59 \times 10^{-8}\ \Omega m$. Assume the cross sectional area of the wire to be a circle. From the given information, [10]

i) Calculate the resistance of the copper wire.
ii) Find its conductance.
iii) Find the current flowing through the copper wire.
iv) The power dissipated by the wire.
v) If the radius of the wire is halved and its length is doubled, what will be value of the current?

b. Calculate the equivalent resistance R_{eq} in figure 1, where all the resistors are $20\ \Omega$. [10]

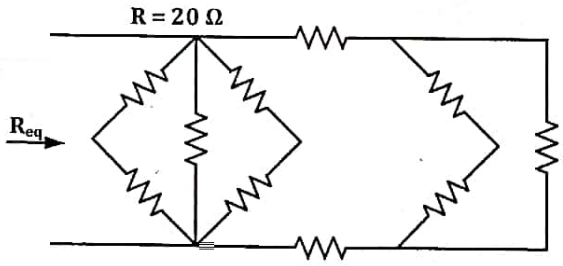

Figure 1

2 **a.** Using mesh analysis, find the mesh currents and I_O in figure 2. [10]

b. Using nodal analysis, find the node voltages and V_O in figure 3. [10]

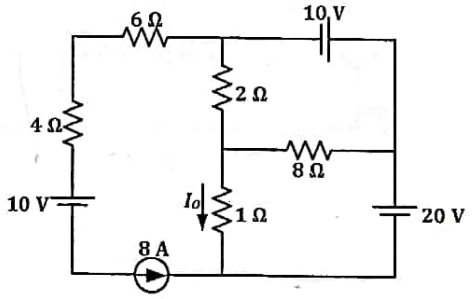

Figure 2

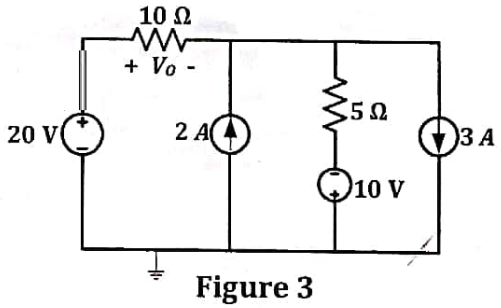

Figure 3

OR

2 **a.** Using mesh analysis, find the mesh currents and I_O in figure 4. [10]

b. Using nodal analysis, find the node voltages and V_O in figure 4. [10]

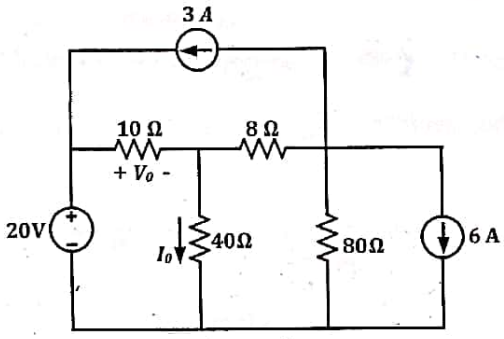

Figure 4

3. **a.** Using superposition theorem, find current, I_o in figure 5. [10]

b. For figure 6, find: [10]

i) Draw the Thevenin's equivalent circuit at the terminal marked a and b.

ii) Find the value of maximum power delivered to the circuit.

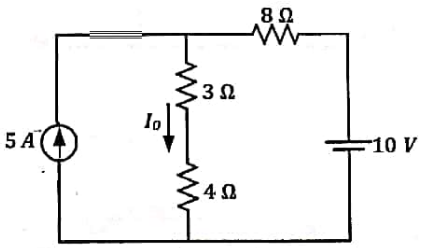

Figure 5

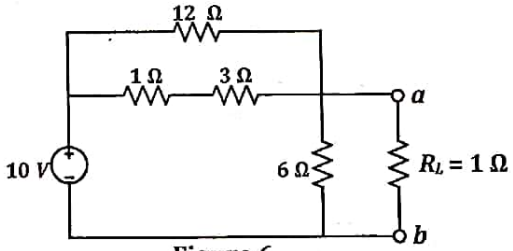

Figure 6

4. **a.** Find the value of equivalent capacitance C_{eq} in figure 7. [10]

b. For figure 8, [10]

i) Find the value of i_L and v_c.

ii) Calculate the energy stored in the inductor and capacitor.

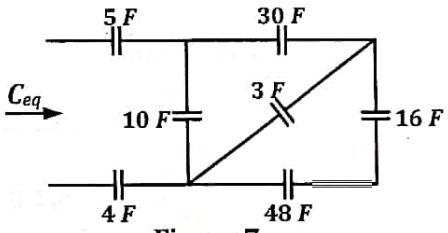

Figure 7

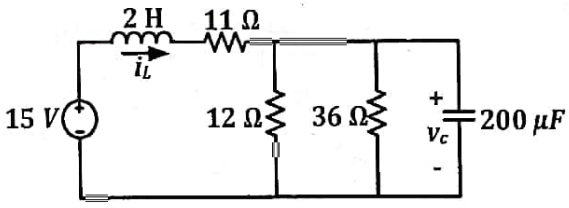

Figure 8

University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Fall -2019

Program: B. Sc Engineering (2019/Fall Semester)

Course Title: Chemistry Course No.: Chem111 Credit: 3.00

Time: 1.00 Hours. Full Mark: 60

Answer any three questions including question-1

1. a) How can you consider the stability of hydrogen atom from the concept of Bohr atomic model? 10

c) The geometry of CH_4 would be square planer, with the four H atoms at the corner of a square and the carbon at the center. Sketch the geometry and compare its' stability with that of a tetrahedral CH_4 molecule. 10

2. (a) Show the total number of orbitals for the principal quantum number n=4. 7

b) How the elements in the periodic table can be classified? 7

c) Calculate the wavelength a) of a tennis ball associated with a mass of 6.0×10^{-2} kg traveling at 68 m/s and b) an electron (9.1094×10^{-31} kg) moving at the same speed of the tennis ball. 6

3.a) Define lattice energy. Show that Born-Haber cycle can be applied for the determination of lattice energy. 3+8=11

b) Predict and draw the geometry of the followings: 9

i) PO_4^{3-} ii) I_3^- iii) SF_6

4. a) Arrange according to size with justification.

i) Cl and Cl^- ii) Mg^{2+}, Na^+ and Al^{3+} 10

b) Explain the concept of delocalization of bonding electrons. With the concept of delocalization of electrons explain the higher electrical conductivity of metals. 10