

University of Asia Pacific
Department of Basic Sciences & Humanities
Mid Semester Examination, Spring-2017
Program: B.Sc. Engineering (Computer Science)
1st Year /2nd Semester

Course Title: Mathematics II
 Time: 1 hour

Course Code: MTH 103

Course credit: 3.00
 Full Marks: 60

There are **Four** Questions. Answer any **Three**. Figures in the right margin indicate marks.

- ✓1. (a) Write the following system of linear equations in the form $AX = b$ and solve by Gauss-Jordan elimination method 10

$$x_1 + 2x_2 - x_3 = 2$$

$$2x_1 + x_2 + x_3 = 1$$

$$x_1 + 5x_2 - 4x_3 = 5$$

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- (b) Find the LU factorization of the matrices $\begin{bmatrix} 1 & 3 & -1 \\ 2 & 5 & 1 \\ 3 & 4 & 2 \end{bmatrix}$ 10

2. (a) Show that $A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & -1 & 3 \\ 4 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -11 & 2 & 2 \\ -4 & 0 & 1 \\ 6 & -1 & -1 \end{bmatrix}$ are inverses to each other. 8

- (b) Determine whether the matrix $A = \begin{bmatrix} 2 & 5 & 5 \\ -1 & -1 & 0 \\ 2 & 4 & 3 \end{bmatrix}$ is non singular. If so then find the inverse of the Matrix. 12

- ✓3. (a) Write $v = (1, 3, 2)$ as a linear combination of $u_1 = (1, 2, 1)$, $u_2 = (2, 6, 5)$ and $u_3 = (1, 7, 8)$. 10

- (b) Determine whether the vectors $(1, 2, -3, 1)$, $(3, 7, 1, -2)$ and $(1, 3, 7, -4)$ in R^4 are linearly dependent or independent. 10

- ✓4. (a) Let W be the subspace of R^4 spanned by the vectors $(1, -2, 5, -3)$, $(2, 3, 1, -4)$, $(3, 8, -3, -5)$. Find a basis and dimension of W . 10

- (b) Find the rank and basis of the row space of the following matrix 10

$$B = \begin{bmatrix} 1 & 3 & 1 & -2 & -3 \\ 1 & 4 & 3 & -1 & -4 \\ 2 & 3 & -4 & -7 & -3 \\ 3 & 8 & 1 & -7 & -8 \end{bmatrix}$$

University of Asia Pacific
Department of Computer Science & Engineering
Mid-Semester Examination Spring -2017
Program: B. Sc Engineering (1st Year/ 2nd Semester)

Course Title: Chemistry

Course No. Chem111

Credit: 3.00

Time: 1.00 Hours.

Full Mark: 60

There are **Four** Questions. Answer any **Three**. All questions are of equal value/Figures in the right margin indicate marks.

1. (a) In your own words, briefly describe photoelectric effect. [6]
(b) Using Bohr's atomic model calculate the wavelength of light emitted when the electron in a hydrogen atom undergoes a transition from energy level $n = 3$ to level $n = 2$? [7]
(c) State and explain de Broglie relation. Why this relation cannot be applied directly to an electron in an atom. [7]
2. (a) Draw Lewis structures and predict the geometries of the following molecules using VSEPR model: XeF_2 , SF_6 , PCl_3 , IF_3 [12]
(b) Which ones in each of the following pairs have higher net dipole moment? Explain your answer. (i) NF_3 and NH_3 , (ii) CO_2 and H_2O [8]
3. (a) What is wave function, Ψ ? What are the physical significances of Ψ^2 ? [6]
(b) Which of the following orbitals are NOT permissible? Explain.
 $3p$, $2d$, $3f$, $2s$ [6]
(c) Define ionization potential and electron affinity. How do they change in the periodic table? [4+4]
4. (a) What is lattice energy? Draw the Born-Haber cycle for the formation of ionic bond in LiF . [8]
(b) Applying VBT explain the bonding of NH_3 molecule. [6]
(c) What are σ bond and π bond? Draw the orbital pictures to show the formation of these bonds. [6]

University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Spring-2017

Program: B. Sc. Engineering (1st Year/ 2nd Semester)

Course Title: Structured Programming

Course No.: CSE 103

Credit: 3.00

Time: 1.00 Hour

Full Marks: 60

There are **Four** Questions. Answer any **Three**. All questions are of equal value/Figures in the right margin indicate marks.

1.	a)	Write the output of the following code segment: <pre>#include <stdio.h> #include <string.h> char str [150] = "ABC"; int main() { strcpy (str, "Text 1"); strcat (str, "\nText 2"); printf ("%s", str); return 0; }</pre>	10
	b)	Write a code to check the user given string is palindrome or not.	10
2.	a)	Describe the exact output that is produced by the following program segment. Use an underscore (_) to indicate blank spaces. Code Segment: <pre>#include <stdio.h> int main() { int k, max = 10; for(k=1; k <= max; k++) { if(k == 3) { continue; } if(k == 6) { break; } printf("k = %d", k); printf("\n"); } printf("All done sir! Thank You"); printf("\n"); }</pre>	10

	b)	Write a program to print first n Fibonacci numbers where n is input through keyboard. (First two Fibonacci numbers are 0 and 1) Sample Input - 1 : 7 Sample Output - 1 : 0 1 1 2 3 5 8 Sample Input - 2 : 2 Sample Output - 2 : 0 1	10
3.	a)	Declare a structure named student which will contain the following attributes: i. char name [50] ii. int roll iii. float marks	5
	b)	Consider the structure 'student' given at question 3(a), hence store 10 student information from user input and then display it in the console.	10
	c)	Write down the differences among structure, array and variable.	5
4.	a)	Write a C program to read name and marks of n number of students from user and store them in a file.	10
	b)	Write the output of the following code segment: #include <stdio.h> int main() { int *a, **b, ***c, p, q, r; p = 10; q = 18; r = 24; a = &p; b = &a; c = &b; printf("%d %d %d %d %d %d", p, q, *a, **b, r, ***c); return 0; }	5
	c)	Write the output of the following code segment: #include <stdio.h> void call(int *b, int *a, int *t) { *t = *b; *b = *a; *a = *t; } int main() { int a = 12, b = -90, t = 19; call(&a, &b, &t); printf("a=%d b=%d t=%d\n", a, b, t); return 0; }	5

University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Spring 2017

Program: B. Sc Engineering (1st Year/2nd Semester)

Course Title: Discrete Mathematics.

Course No.: CSE105.

Credit: 3.00

Time: 1.00 Hours.

Full Mark: 60

There are **Four** Questions. Answer any **Three**. Figures in the right margin indicate marks.

- 1) a. Let $A=\{1,2,3,9\}$; $B=\{2,4,6\}$; $C=\{5,7,9\}$; Universal set $U=\{1,2,\dots,9\}$. How many fundamental products of sets A, B and C are there? Find all of them. 10

- b. In a survey of 60 players, it was found that: 25 play football, 26 play cricket, 26 play hockey, 9 play both football & cricket, 11 play both football & hockey, 8 play both cricket & hockey, 3 play all three games. Draw the Venn diagram. Find the number of players who play a) at least two of three games b) exactly one game c) no games d) not more than two games. 10

- 2) a. Let $R=\{(x,y), (y,x), (y,z), (y,y)\}$ be a relation on set $A=\{x,y,z\}$. Draw the matrix representation of R and find (i) Reflexive (R), (ii) Symmetric (R), (iii) Transitive (R). 3+9

- b. Let $A=\{1,2,3\}$; $B=\{a,b,c\}$; $C=\{x,y,z\}$; Consider the relation R from A to B and S from B to C: $R=\{(1,b), (2,a), (2,c), (3,b)\}$; $S=\{(a,y), (c,z), (c,y), (b,x)\}$. Find:
(a) The composition relation RoS .
(b) The matrix M_{RoS} 8

- 3) a. Let x denotes a positive integer. Suppose a function f is recursively defined as follows:

$$f(x) = 0, \text{ if } x=1$$

$$f(x) = f(\lfloor x/2 \rfloor) + 1 \text{ if } x > 1.$$

Find $f(31)$. 5

- b. "The properties of a relation being symmetric and being antisymmetric are negatives of each other"- justify whether the statement is true or false. Give proper explanation and examples. 7

University of Asia Pacific
Department of Computer Science and Engineering
Mid Semester Examination, Spring-2017
Program: B. Sc. Engineering (1st Year / 2nd Semester)

Course Title : Electrical and Electronic Engineering I Course Code: EEE 121

Credits: 3.00

Time : 1.00 Hour

Full Marks: 60

[There are **Four** Questions. Answer any **Three**. Figure in the right margin indicate marks]

1. (a) State Ohm's Law. Define voltage, current, power and energy with necessary diagrams. [8]
 (b) Find voltage and current indicated in the Figure 1. [12]

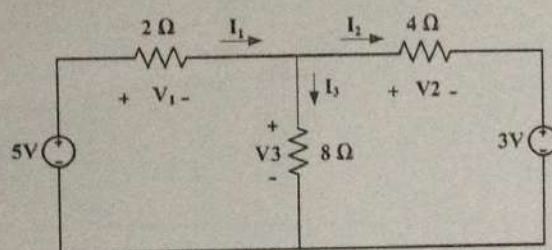


Figure 1

2. (a) State Kirchhoff's voltage and current laws with appropriate diagrams. [5]
 (b) Find equivalent resistance for the circuit in the Figure 2. [5]

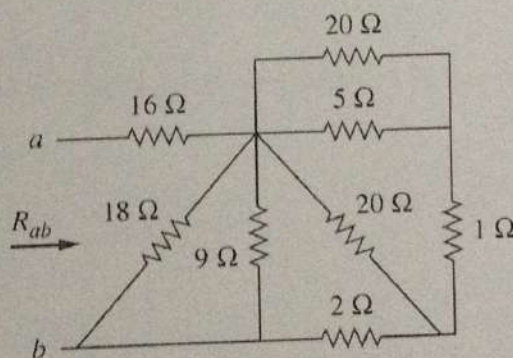


Figure 2

- (c) Find i_1 , i_2 and i_3 for circuit in the Figure 3 using mesh analysis. [10]

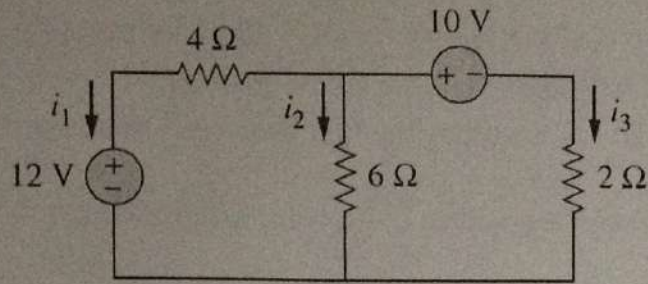


Figure 3

3. (a) Write short notes on inductor and capacitor. [5]
 (b) Find the value of R_L for the maximum power transfer in the circuit in Figure 4. Find maximum power. [15]

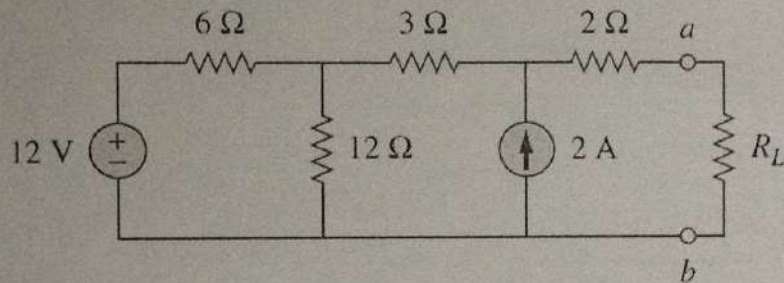


Figure 4

4. (a) What is phasor? Discuss phasor with appropriate diagram. [5]
 (b) Find the amplitude, phase, period and frequency of the following sinusoid voltage. [5]

$$V = 10 \cos(3\pi t - 50)$$

- (c) Assume, $V_1 = -10\sin(\omega t - 300)$ and $V_2 = 20\cos(\omega t + 450)$. Find $V = V_1 + V_2$. [10]