Name: _____

National University of Sciences and Technology
College of Electrical and Mechanical Engineering
Department of Mechatronics Engineering
Sessional 01 Exam, Fall 2018

Subject Code	: - _____	**Subject**	: - **OOPDS**
Date	: - Nov	**Timing**	: - ____ Hrs – ____ Hrs
Max Marks	: - 50	**Max Time**	: - 50 Minutes
Instructor	: - Dr. Waqar Shahid		

Please read all questions carefully before answering. **Understanding the questions is part of exam**. Do not write stories and write a definite and precise answer. Do mention your assumptions.

S.No	Questions	Marks

01	Analyze the code and write the answer of the program given below:
	2 marks each
	`#include<iostream>`
	`using namespace std;`
	
	`class Empty {};`
	
	`int main()`
	`{`
	`cout << sizeof(int);` 4
	`cout << sizeof(double*);` 8
	`cout << sizeof(float*);` 8
	`cout << sizeof(char);` 1
	`cout << sizeof(char*);` 8
	`cout << sizeof(Empty);` 1
	
	`return 0;`
	`}`
		12

02	How to create a dynamic array of pointers (to integers) of size 10 using new in C++? Hint: We can create a non-dynamic array using int *arr[10] • int *arr = new int *[10]; • int **arr = new int *[10]; ✓ • int *arr = new int [10]; • Not Possible	02

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3	Which of the following is true about new when compared with malloc. 1) new is an operator, malloc is a function 2) new calls constructor, malloc doesn't 3) new returns appropriate pointer, malloc returns void * and pointer needs to typecast to appropriate type • 1 and 3 • 1 and 2 • 1, 2 and 3 correct answer • 2 and 3	04

4	Analyze the code and what will be the output of the code given below:
	Answer is 5
	`#include <iostream>`
	`using namespace std;`
	`class Test`
	`{`
	`public:`
	`int x;`
	`Test() { x = 5;}`
	`};`
	`int main()`
	`{`
	`Test *t = new Test;`
	`cout << t->x;`
	`}`
		12

5	What happens when delete is used for a NULL pointer? It is OK to use
	`int *ptr = NULL;`
	`delete ptr;`
	Deleting a null pointer has no effect, so it is not necessary to check for a null pointer before calling delete.
		02

6	What is the return value of f(p, p) if the value of p is initialized to 5 before the call? Note that the first parameter is passed by reference, whereas the second parameter is passed by value.
	`int f(int &x, int c) {`
	`c = c - 1;`
	`if (c == 0) return 1;`
	`x = x + 1;`
	`return f(x, c) * x;`
	`}`
	Since c is passed by value and x is passed by reference, all functions will have same copy of x, but different copies of c. f(5, 5) = f(x, 4)*x = f(x, 3)*x*x = f(x, 2)*x*x*x = f(x, 1)*x*x*x*x = 1*x*x*x*x = x^4
	Since x is incremented in every function call, it becomes 9 after f(x, 2) call.
	So the value of expression x^4 becomes 9^4 which is 6561.
		08

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07	What will be the output of the following program? x = 20, ref = 30 ref is an alias of x, so if we change either of them, we can see the change in other as well.	10

```
#include<iostream>
using namespace std;

int main()
{
int x = 10;
int& ref = x;
ref = 20;
cout << "x = " << x << endl ;
x = 30;
cout << "ref = " << ref << endl;
return 0;
}
```