

كليات درجہ - لفظہ بغداد  
ترم ثانى 19

Faculty of Engineering at Mattaria	 HELWAN UNIVERSITY	2 <sup>nd</sup>	Semester Academic Year 2019/2020
Preparatory year			Date of Exam: May 2019
Course Name: Computers and Programming			Time Allowed: 2 Hours
Exam : Term Exam			Total Mark: 60

### PART 1

#### Question 1

[15 Mark]

Write a C program to read 100 integers into an array X, the program then prints:

- The array integers in the reverse order.
- The average of these integers.
- The maximum and minimum integers.
- The array integers that are greater than the calculated average

#### Question 2

[15 Mark]

a) What is the output of the following C program?

```
main()  
{  
    int number = 56987,s=0, y;  
    for (int i=0;i<=4;i++)  
    {  
        number = number / 10;  
        y=number%10;  
        cout<<y<<"\t";  
        s=s+y;  
    }  
    cout<<"\nSum= "<< s;  
}
```

b) Use nested loops that print the following pattern:

```
6  
65  
654  
6543  
65432  
654321
```

*With best wishes*

**Dr. Mahmoud Zaki**

Faculty of Engineering at Mataria	 HELWAN UNIVERSITY	2 <sup>nd</sup> Semester – Preparatory Year
Department: Physics & Eng. Maths		Academic Year 2018/2019
Course Name: Mathematics I(B)		Date of Exam: 26 <sup>th</sup> May 2019
Exam : Final Term		Time Allowed: 3 Hours
		Maximum Mark: 100

**NOTES:** For all questions: Idea (30)%, Steps (20)%, Calculations 40%, Final Result (10)% of the total mark.

**Part one (Integration)**

الجزء الأول (تكامل) - يتم إجابة هذا الجزء على يمين كراسة الإجابة

**Question I (25 marks)**

① Evaluate each of the following integrals (18 marks)

i.  $\int \frac{\sin^{-1} \sqrt{x}}{\sqrt{1-x}} dx$

ii.  $\int_{-\pi}^{\pi} e^{-|x|} \sin x dx$

iii.  $\int_{-1}^1 \frac{x^2}{(1+x^2)^2} dx$

iv.  $\int \frac{1}{x^4-1} dx$

v.  $\int_0^2 \left( \frac{d}{dx} \int_1^{\sqrt{x}} (t^5 + 3t) dt \right) dx$

vi.  $\int \frac{\sinh^2 x}{\operatorname{sech}^5 x} dx$

② Find a reduction formula for  $I_n = \int (x^2 + 1)^n dx$  where  $n \geq 1$  is any positive integer then use it to evaluate the integral  $\int (x^2 + 1)^4 dx$ . (7 marks)

**Question II (25 marks)**

① Derive the average value of a function  $f(x)$  continuous on  $[a, b]$  using the definite integral. Then use it to find the average value of  $f(x) = |x|$  on  $[-1, 1]$ . (6 marks)

② For the curve given by  $y = \cosh x$  where  $x \in [0, 1]$ , find: (8 marks)

i. the length of the curve

ii. the area of the surface generated by revolving the curve about the  $y'$ -axis.

③ Sketch the region bounded by  $y = x^2$ ,  $y = x + 2$ , and the  $y$ -axis then find: (7 marks)

i. the area of the region

ii. the volume of the solid generated by revolving the region about the  $y$ -axis.

④ Discuss the convergence of  $\int_0^1 \frac{1}{x^2 - 3x + 2} dx$  (4 marks)

With my best wishes:

Dr. Khaled M. Abdelgaber

P.T.O

