



Dept. of Computer Engineering
Second Exam , Summer Semester: 2015/2016

Course Title: Engineering Analysis II
Course No: (630262)

Date: 18/8/2016
Time Allowed: 50 minute

NOTES: - Round ALL your calculations to 4 significant digits
- Angles for trigonometric functions are in radian scale

Instructor: Dr. Mohamed Mahdi Eng. Sultan Al-Rushdan
Lecture Time: 8:00 9:20 11:30

Question 1: Consider the following data (5 points)

X	1.1	1.3	1.4	1.6	1.9
Y	0.5	0.3	0.2	0.15	0.1

Find the relation between x and y using nonlinear regression for a function of the form $y = Ce^{Dx}$

Question 2: a) For the following data, find $f(3)$ using third order Newton interpolating polynomial (4 points)

x	-1	1	4	6
f(x)	12	4	37	89

b) What is your conclusion?

Question 3: use composite trapezoidal rule to approximate the following integral with 4 intervals (5 points)

$$\int_4^8 x\sqrt{x-4} dx$$

If the true solution of the integration is $\frac{2}{5}\sqrt{(x-4)^5} + \frac{8}{3}\sqrt{(x-4)^3}$ find the relative error.

Question 4: chose the correct answer for the following questions. (6 points)

1) Using 2nd order Newton interpolation for the following data, the value of b_1 is:

x	5.2	7.5	9.3
y	3.5	5	7.8

a) 0.200 b) -1.636 c) **0.6522** d) 1.555

2) Using simple(ordinary) Simpson's rule the approximation of $\int_0^{\frac{\pi}{2}} \frac{\sin(x)}{2 - \cos^2 x} dx$ is:

a) 0.7224 b) **0.6246** c) 0.5625 d) 0.4856

3) Refer to the table below, the approximation of $\int_0^3 f(x) dx$ using composite trapezoidal with 4 sample points

x	0	1	2	3
f(x)	1.5	1.71	1.32	1.12

a) **4.340** b) 3.430 c) 2.430 d) 3.240

4) Using linear regression of $y = Ax + B$ if number of points $n = 9$ and $\sum x = 27.35$ and $\sum y = 103.5$ and $B = 3.25$ then the value of A is

a) 2.015 b) 2.215 c) 2.515 d) **2.715**