MENOUFIA UNIVERSITY

Menouf, Faculty of Electronic Eng.

Department of Phys. & Eng. Math.

Eng. Math 5, final exam

Second Year

جامعة المنوفية

كلية الهندسة الإلكترونية بمنوف

قسم الفيزيقا والرياضيات الهندسية

الرياضيات الهندسية ٥ (الاختبار النهائي)

الفرقة الثانية

Thursday 26/12/2019   Test time is 90 Minutes

Answer only _five_ questions

1. (a) If $X = 7/11$ and the exact decimal representation of X is $0.\overline{636}$ verify that if x is the is the approximate value of X correctly rounded to 4 decimal places then

$$|X - x| \le \tfrac{1}{2} \times 10^{-4}$$

   (b) Find the sum of the approximate numbers 0.337, 0.1604, 555.4, 332.7, 10.05, 0.0351, 0.0845, 0.000147 each correct to the indicated significant digits.

   (c) The number $x = 37.46235$ is rounded off to four significant figures. Compute the absolute error, relative error and the percentage error.

2. Find the least squares approximating polynomial of degree 2 for the function $f(x) = \cos x$ on the interval $[0, \pi]$.

3. Evaluate Padé approximant [2,2] for

$$f(t) = 1 - t + \frac{t^3}{3} - \frac{t^4}{6} + \frac{t^5}{30} + \cdots .$$

4. Use interpolation formulas to find the sales for the year 1965, given that

$Year$	1930	1940	1950	1960	1070	1980
$Sales\ (in\ lakhs)$	12	16	22	30	39	52

5. Find $\dfrac{dy}{dx}$ at $x = 0.6$ of the function $y = f(x)$, tabulated below

x	0.4	0.5	0.6	0.7	0.8
y	1.5837	1.7974	2.0442	2.3275	2.6511

6. Find the value $\displaystyle\int_0^{0.6} e^{\sin x}\,dx$ taking $n = 6$, correct to three significant figures by Simpson's one-third rule. Compare your result with the exact value of integration 0.81355.

Best wishes

Marks of questions

Question	1a	1b	1c	2	3	4	5	6
Marks	4	3	3	10	10	10	10	10