International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2018 | Program: B.Sc. Engg. (EEE)
Course Code: EEE-2305 | Course Title: Numerical Technique
Time: 2 hours 30 minutes | Full Marks: 50

Figures in the right margin indicate full marks.

Part A

[Answer any ***two*** questions from the followings]

1(a). Define curve fitting. Discuss the application of curve fitting in Engineering. **3**

1(b). Discuss the method of Least Squares for fitting a straight line through some given data points. **4**

1(c). Find the least square line $y = a_0 + a_1 x$ for the following data: **3**

x	1	2	3	4
y	0	1	1	2

2(a). What is polynomial regression? Derive the formulae for polynomial regression. **6**

2(b). Derive the formulae for Forward difference in numerical technique. **4**

3(a). Why we need numerical differentiation? **2**

3(b). Give a graphical illustration of central, forward and backward difference formula. Among these which formula can provide you the most accurate result? Explain. **4**

3(c). For the function, $f(x) = e^{-x}\sin(x)$, find numerical approximations to the derivative $f'(1)$ using h=0.01 by forward and central difference formula. **4**

Part B

[Answer any ***three*** questions from the followings.]

4(a). What do you know about trapezoidal rule? How numerical integration is performed using trapezoidal rule? **5**

4(b). Find the integration of x^2+1, in the interval of 1 and 2. Use composite trapezoidal rule for n=5. Where, n is the no of division. Also calculate the error. **5**

5(a). Derive the expression of Simpson's 1/3 Rule to find out the integral value of a function. **5**

5(b). Evaluate the integral of 1/(1+x) within limits 0 to 6 using Simpson's 3/8th rule. **5**

6(a). Explain the False-Position method for finding the solution of a nonlinear equation. **5**

6(b). Find the root of $f(x)=x^3-3$ using Flase-Position method starting with the interval of [1,2]. Continue the process until the error is less than 0.1. Compare the result with question number 5 (b). Which method requires fewer steps to converse? **5**

7(a). Explain the Newton-Raphson method for finding the solution of a nonlinear equation. **5**

7(b). Use Newton-Raphson method to estimate the root of $f(x)=3x-\cos(x)-1$, employing an initial guess of $x=0$. The tolerance is 10^{-7}. **5**