PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc., Winter 2019-20 Examination

Semester: 1   **Date: 04/12/2019**
Subject Code: 11206106   **Time: 10:30 am to 11:45 am**
Subject Name: MATLAB Programming   **Total Marks: 30**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Multiple choice questions.(Each of 01 mark)   **(04)**
    1) Which of the following has the highest precedence in MATLAB?
      (a) Plus(+)   (b) Exponential(^)
      (c) multiplication(*)   (d) Parentheses()

    2) Predominantly, what are the two kinds of errors in MATLAB programs?
      (a) Syntax and runtime   (b) Syntax and logic
      (c) Logic and runtime   (d) Syntax and algorithmic
    3) While solving a differential equation, MATLAB will show us the _____
      (a) General Solution   (b) Particular Solution
      (c) Complementary function   (d) Depends on the equation
    4) Errors have two basic origins _____ and _____.
      (a) Round off Errors and Truncation Error   (b) Round off Errors and Taylor's Method
      (c) Round off Errors and Iterative Method   (d) None of these

Q.1. B) Short Questions (Each of 02 mark)   **(04)**
    1) Write a syntax of a script M-file which calculates the average of points scored in three Exams.
    2) Write a script M-file to convert temperature in Celsius to temperature in Fahrenheit
      and vice-versa using the formula $f = \dfrac{9}{5}c + 32$.

Q.2. A) Short Questions. (Each of 01 mark)   **(04)**
    1) What is the difference between Direct method and Iterative method?
    2) Which error is used for stopping an iterative method?
    3) Which command in the command Window is used to compute the factorial ?
    4) Which window in MATLAB is used to View or execute previously run function?

Q.2. B) Short questions/Do as directed. (Each of 02 mark)   **(04)**
    1) Write a syntax of a script M-file to plot the following sine functions, $y_1 = 2\cos(x)$,
      $y_2 = \cos(x), and \ y_3 = 0.5*\cos(x)$ in the interval $0 \le x \le 2f$.

    2) Write a MATLAB program to calculate $\sqrt{2}$ starting with an initial guess and iteratively using
      the expression: $x^{(i+1)} = \dfrac{1}{2}\left(x^{(i)} + \dfrac{2}{x^{(i)}} \right)$

Q.3. Answer any two of the following question.(Each of 04 marks)   **(08)**
    1) Use Newton Raphson method to search for the minimum of $f(x) = 2\sin x - 0.1\ x^2$ with interval
      $x_0 = 2.5$.
    2) Write a MATLAB program to solve the ordinary differential equation $y' = -2ty$ with Initial
      value $y(0) = 1$ till $tEnd = 5$ problem using Explicit method.
    3) Differentiate between Truncation and round-off errors with example.

Q.4. Answer any one of the following questions.   **(06)**
    1) Minimise $f(x) = 17x^4 - 38x^3 + 27x^2 - 6x$ with the initial points -0.5, 0 and 0.5 using
      Powell's method.
    2) Write a MATLAB program to Solve the ordinary differential equation $y' = -2ty$ with Initial
      value $y(0) = 1$ till $tEnd = 5$, problem using RungeKutta-2 "Heun's Method".