Final Examination Question Pattern

- This document is meant to give you an idea of what you can expect in the final exam
- Text in red is for your information in this document. It will not be included in the final exam

Multiple Choice Questions (Type-1)

These questions have only one correct answer. Select accordingly.

1. Which of the following is true for central difference formula for $f'(x)$

a. It yields exact solution without any error

b. Error in the solution depends on function f only and not on step size

c. Is usually more accurate than forward difference formula for the same step size

d. Is usually less accurate than forward difference formula for the same step size

This is an MCQ. So, indicate only one correct answer, which is `c`. Choose the answer that best fits what you saw while writing your codes.

Multiple Choice Questions (Type-2)

These questions have more than one correct answer. Select accordingly.

2. Which of the following is true for central difference formula for $f'(x)$

a. It yields exact solution without any error

b. Error in the solution depends on function f only and not on step size

c. Is usually more accurate than forward difference formula for the same step size

d. Error in the solution depends on step size

This is an MSQ. So, indicate all the correct answers, which are `c` and `d`. Marks will be awarded only when the correct answer(s) and none of the wrong answers are selected.

Match the Following

Please match the applications on the left column with MATLAB command on the right. Please provide only one choice in the space given.

For example, if the application is "approximating e^x using Maclaurin series", then your response will be `h`.

3. Solving linear equations	a. `linearSolve` b. `cond` c. `inv` `< other options >` h. `None of the above`

Correct answer will be: `c`

In this type of problem, each item in the left column may match with either one item on the right. Please choose the correct answer to get full points.

Objective Numerical Questions

In all of the questions below, please report a numeric answer.

4. The command `cumsum(1:10)` results in a vector of length _____.

5. The fifth element of the above vector is _____.

The answers to above question are `10` and `15`, respectively.

MATLAB Codes

In the problems below, please restrict your response to a single command you will execute on command prompt. The use of `for/while` loops and `if` statements is not permitted.

6. Write a MATLAB code for computing factorial of a number n. Assume n is already defined. The code should return a scalar result in variable `factVal`.

The answer to the above question is: `factVal=prod(1:n)`

Note that this should be a single-line command. Do not use loops / if statement. Please do not use extra spaces in this problem.

Spot the Error Problems: Example-1

7. In the screen-shot of the code shown below:

```
1    x=1:10;
2    y=x^2;
```

indicate the line number where MATLAB is most likely to give an error. If there is no error, please enter 0.

Since x is a vector, we need to do element-wise power. This can be written as `y=x.^2`. Clearly, the error is in line 2.

Spot the Error Problems: Example-2

8. In the screen-shot below, which of the following errors is MATLAB likely to give:

```
1    x=1:10;
2    y=x^2;
```

a. Undefined variable or function `x`.

b. Unbalanced or unexpected parenthesis.

c. Error using power ^

d. There is no error in the code

The correct answer is c. The power symbol ^ is applicable for scalars or square matrices only. Else, one has to use element-wise computation: `y=x.^2`.