CS101: Program Language & Problem Solving
First Exam

Note that ‘a’=97, ‘A’=65, and ‘0’=48.

Part I. True or False. Circle one. (20 Points – 2 Each)

1. T or F: The command ‘clc’ removes all the variables from the Workspace.
2. T or F: The expression 1\5 returns 5.
3. T or F: If a=[1, 2, 3]' then the expression [a'; a'] cannot be used.
4. T or F: If a=[1, 2, 3]' then a'*a returns a scalar.
5. T or F: If a=[1, 2, 3] and b=[3; 2; 1] then b*a returns a scalar.
6. T or F: Use ['abc'; 'ef'; 'xyz'] can create a new string matrix.
7. T or F: 3i is the same as i3.
8. T or F: (2^3^4) returns the same value as (2^(3^4)).
9. T or F: If A is a squared matrix, then A*A’ = A'*A is always true.
10. T or F: If A and B are two matrices with different dimensions then size(length(A)) is equal to size(length(B)).

Part II. Multiple Choices. Circle one answer. (20 Points – 2 Each)

11. If A=[5, 9, 3, 7]', then size(A) returns:
   a. 2 2  c. 1 4
   b. 4 1  d. None of the above.

12. If A is a 4x4 matrix, then A*A^ (-1) returns:
   a. 1  c. eye(4)
   b. eye(4, 1)  d. eye(1, 4).

13. If the command window is under ‘format short e’, then value 12.345678 will be displayed as:
   a. 12.35  c. 1.2346e+001
   b. 12.3457  d. 12.3457e+000.

14. Which of the following is not an element-by-element operation?
   a. ‘/’  c. ‘.^’
   b. ‘*’  d. ‘.+’
15. In command window, the meta-character which can be used as a command separator is:
   a. ‘:’
   b. ‘,’
   c. ‘]’
   d. ‘,’

16. If str=['hello'; 'kitty'], then size(str) returns:
   a. 10 1
   b. 2 5
   c. 1 10
   d. 5 2.

17. If A=[10:-2:1], then A(4) returns:
   a. 8
   b. 6
   c. 4
   d. None of the above.

18. ('abc' – 'a') returns:
   a. 0 1 2
   b. 1 0 1
   c. -1 0 1
   d. None of the above.

19. If A=[2, 4; 3, 5; 1, 6], then size(A(:)) returns:
   a. 1 6
   b. 6 1
   c. 2 3
   d. 3 2.

20. If a='A' and b=1, then a+b returns:
   a. ‘B’
   b. 66
   c. 98
   d. None of the above.

Part III. Short Answers. (4 Point)
21. A is an m-by-n matrix with m>n>1. Circle all the legible expressions in the following list:

   \[
   \begin{align*}
   A & \ast A' \\
   A & . \ast A \\
   A & . + A \\
   A & ^ 2 \\
   A & / A' \\
   A & . / A \\
   A & . ^ 2
   \end{align*}
   \]

Part IV. Short Answers. (15 Point – 3 Each) Let A = [1:4; 5:8; 9:12]

22. A(:) = ________________________________.

23. A(:, end) = ________________________________.

24. length(A(:)) = ________________________________.

25. If we set A(:, 3)=[ ], then A = ________________________________.

26. If A(:)=12:-1:1, then A = ________________________________.

Part V. Short Answers. (6 Points – 3 Each)
27. If \(a=[1:5]\), then \(a(2)=[ ]\) returns ____________________________.

28. If \(a=[4, 2, -3]\) and \(b=[1, 2, 3]\), then \(a*b' = \) ____________________________.

**Part VI. Short Answers. (24 Points)**

29. (3 Each) According to the precedence of the operators, use parentheses to isolate them in their operating orders. For example: \(2-5^3*4\) will be presented as \((2-((5^3)*4))\).

   a) \(5^3+3^5/4*6-3^2\): ____________________________.

   b) \(2/4+5^3*sin(a*b^2/2)\): ____________________________.

30. (3 Each) If \(x\) is a m-by-n matrix, then transfer the following expressions into MATLAB statements.

   a) \(5x^2+3x-2x*sin(x) = \) ____________________________.

   b) \((x^2-3x)/(3x^2+7x-4) = \) ____________________________.

31. (3 Each) If \(x=6.345\) then \(ceil(x)=\) __________and \(round(x)=\) __________.

32. (3 Points) If \(a='value b='\) and \(b=123\), then write a statement that makes a new string as \(value b=123\).

   Specify the MATLAB statement: ____________________________.

33. (3 Points) If \(x=3.1415927\) then the MATLAB statement of

   - \(fprintf('var x = \%010.4f\n', x)\) returns: ____________________________.

**Part VIII. Short Answers. (11 Points)**

34. (4 Points) To create an array of 100 elements with \(n\)-th element valued as \(\frac{1}{\sqrt{2n^2}}\).
35. **(7 Points)** How to create the given matrix by using functions \texttt{ones()}, \texttt{zeros()}, \texttt{eye()} and arithmetic operators only.

\[
\begin{pmatrix}
3 & 0 & 0 & 4 & 4 & 0 \\
0 & 3 & 0 & 4 & 4 & 0 \\
1 & 1 & 3 & 4 & 4 & 0 \\
1 & 1 & 2 & 2 & 2 & 2
\end{pmatrix}
\]