MATH 2105– Linear Algebra
Class Test 1B, Spring Semester 2020
Computer Science and Engineering
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Answer all the following questions   **Total marks is 30.**

1. Write the standard form of an equation of the line that passes through the given point and has the given slope: $(6,-5)$, $m = \frac{1}{6}$.

2. Find the solution of the system of linear equation using augmented matrix.

$$x_1 + 2x_2 + 8x_3 - 7x_4 = -2$$
$$3x_1 + 2x_2 + 12x_3 - 5x_4 = 6$$
$$-x_1 + x_2 + x_3 - 5x_4 = 1$$

3. The augmented matrix of a linear system has been transformed by row operations into the form below. Determine if the system is consistent.

$$\begin{bmatrix} 1 & 5 & 2 & -6 \\ 0 & \cdot 4 & -7 & 2 \\ 0 & 0 & 5 & 0 \end{bmatrix}$$

4. Construct three different augmented matrices for linear systems whose solution set is:

$$x_1 = 3, x_2 = -2, x_3 = -1$$

5. Find the values of k for which the system of equations

$$x + ky = 1$$
$$kx + y = 1$$

   1. no solution
   2. exactly one solution:
   3. infinitely many solution
   4. when there is exactly one solution, what is the value of x and y

6. Multiple Choice Questions:

   1. A set of linear equations is represented by the matrix equation $Ax = b$. The necessary condition for the existence of a solution for this system is
   A. A must be invertible   B. b must be linearly depended on the columns of A C. b must be linearly independent of the columns of A D. None of the above

2. The system of linear equations has a solution · if $d = ?$

$$(4d - 1)x + y + z = 0$$
$$-y + z = 0$$
$$(4d - 1)z = 0$$

✗

A. $1/2$ B. $1/4$ C. $3/4$ D. 1

3. Let $S = 2 - x + 3x^2, \quad x + x^2, \quad 1 - 2x^2$ be subset of $P_2(R)$, then
   A. S is linearly independent   B. S is linearly dependent   C. $(2, -1, 3), (0, 1, 1) and (1, 0, -2)$ are
   linearly dependent   D. S is a basis of $P_2(R)$

$(4d - 1)! = 0$

$d ! = 1/4$