Name:____

$I \quad D$ $N \quad O$	:							0 1 8 0	0 2 7 0	0 3 10 0	0 4 11 0	0 5 9 0

$Time$ $120 Min$	$Seat$: $No.$:				$Marks$ 110	$Marks$: $Secured$:			

NOTE: 1. The questions are not in any order of difficulty at all. 2. Count that the exam has Twenty-Two Questions and Fourteen Pages. 3. Only the nonprogramable calculators are allowed. 4. All types of PAGERS, OR MOBILES ARE NOT ALLOWED to be with you during the examination. 5. Please check that the version of your question paper and the answer sheet enclosed with it matches correctly. 6. Use an HB 2 pencil and a good eraser instead the eraser attached to the pencil. 7. The test Code Number is already typed and bubbled in your answer sheet. 8. When bubbling, make sure that the bubbled space is fully covered. 9. When erasing a bubble, make sure that you do not leave any trace of penciling. 10. Please BUBBLE carefully only right answer letter $(A$ or B or C or D or $E)$ corresponding to the correct answer to each question in the enclosed computerized Omar Sheet, with pencil only. 10. Please do not leave any question unbubbled in the Answer Sheet.

==

Compound Interest Formulae: Future Value: $S = P\left(1+r\right)^n$, Present Value: $P = S\left(1+r\right)^{-n}$. Effective Interest Formula: $r_e = \left(1+\frac{r}{n}\right)^n - 1$.

Continuos Interest Formulae: Future value: $S = Pe^{rt}$, Present Value: $P = Ae^{-rt}$,

Effective Interest Formula: $r_e = e^r - 1$.

Ordinary Annuity Formulae (End): Future Value = $S = R.\left[\frac{(1+r)^n - 1}{r}\right]$.

Present Value = $A = R.\left[\frac{1-(1+r)^{-n}}{r}\right]$.

Annuity Due Formulae (Beginning): Future Value = $S = R.\left[\frac{(1+r)^{n+1} - 1}{r} - 1\right]$.

Present Value = $A = R.\left[1 + \frac{1-(1+r)^{-n+1}}{r}\right]$.

Permutations: $P(n,r) = ^n P_r = \frac{n!}{(n-r)!}$; Combinations: $C(n,r) = {}^nC_r = \begin{pmatrix} n \\ r \end{pmatrix} = \frac{n!}{r!\,(n-r)!}$;

$$\begin{pmatrix} & & & n & & & \\ n_1 & n_2 & n_3 & - & - & - & n_k \end{pmatrix} = \frac{n!}{(n_1!) \,.\, (n_2!) \,.\, (n_3!) \ldots (n_k!)};$$

$where\ n = n_1 + n_2 + n_3 + \ldots + n_k$.

$\#(A \cup B) = \#(A) + \#(B) - \#(A \cap B)$

Q1. Serial numbers for a product are to be made using 2 letters followed by 3 numbers. If the letters are to be taken from the first 25 letters of English alphabet withiout repetetions and the numbers are to be taken from the ten digits $(0$ to $9)$ without repetetions, then the number of possible serial numbers is equal to:

$A \longrightarrow$	600000
$B \longrightarrow$	625000

$C \longrightarrow$	432000
$D \longrightarrow$	450000
$E \longrightarrow$	468000

==

Q2. There are three patrol stations in your home town. You go to one of them every month. How many ways are there to arrange your patrol station visits of the next twelve months?

$A \longrightarrow$	220
$B \longrightarrow$	531441
$C \longrightarrow$	45327
$D \longrightarrow$	4657789
$E \longrightarrow$	1320

==

Q3. The five grades A, B, C, D and F have to be distributed among 14 students.

How many ways are there to distribute the grades if 3 students should get an A, another 3 ones should get a B, 4 students a C, 2 a D, and the remaining students an F?

$A \longrightarrow$	195545750400
$B \longrightarrow$	2345637
$C \longrightarrow$	34829802
$D \longrightarrow$	3487590000
$E \longrightarrow$	25225200

===

Q4. How many distinguishable permutations of the letters in the word HONOLULU are possible?

$A \longrightarrow$	3452
$B \longrightarrow$	6458900
$C \longrightarrow$	3253892
$D \longrightarrow$	5040
$E \longrightarrow$	34657

===

Q5. A chess player plays 10 games. In how many ways can the outcome of the game result in 5 wins, 3 losses and 2 ties?

$A \longrightarrow$	7839200
$B \longrightarrow$	1253

$C \longrightarrow$	235476
$D \longrightarrow$	3628800
$E \longrightarrow$	2520

==

Q6. A company has 7 senior and 5 junior officers. An ad hoc legislative committee is to be formed. In how many ways can a committee of four officers be formed so that it is composed of 3 senior officers and 1 junior officer?

$A \longrightarrow$	215
$B \longrightarrow$	495
$C \longrightarrow$	175
$D \longrightarrow$	1050
$E \longrightarrow$	40

==

Q7. How many years does it take to double an original principal if the effective rate is $7.18\ \%$?

$A \longrightarrow$	$9 \quad years$
$B \longrightarrow$	$10 \quad years$
$C \longrightarrow$	$11 \quad years$
$D \longrightarrow$	$12 \quad years$

$E \longrightarrow$	$13 \quad years$

===

Q8. If interest is compounded continuously, at what annual rate will a principal of P quadruple (become four times) in 30 years?

$A \longrightarrow$	$4.73\ \%$
$B \longrightarrow$	$4.62\ \%$
$C \longrightarrow$	$4.70\ \%$
$D \longrightarrow$	$4.80\ \%$
$E \longrightarrow$	$4.52\ \%$

===

Q9. A business man wants to invest his money and asks different banks for their conditions. Which of the following offers should he take:

$A \longrightarrow$	$6.03\ \%$ compounded semiannually.
$B \longrightarrow$	$6.01\ \%$ compounded monthly.
$C \longrightarrow$	$5.96\ \%$ compounded continuously.
$D \longrightarrow$	$5.98\ \%$ compounded daily.
$E \longrightarrow$	$6.02\ \%$ compounded quarterly.

===

Q10. Over a period of 10 Years, an original principal of $\$\ 2000$ accumulated to $\$\ 3000$ in an account in which interest was compounded quarterly. Which of the following was the nominal rate?

$A \longrightarrow$	1.019 %
$B \longrightarrow$	3.325 %
$C \longrightarrow$	4.075 %
$D \longrightarrow$	4.138 %
$E \longrightarrow$	5.226 %

==

Q11. Which of the following is the future value of an initial payment of \$ 6000 due in $6\frac{1}{2}$ years at 10% compounded quarterly?

$A \longrightarrow$	\$ 11457.64
$B \longrightarrow$	\$ 11443.20
$C \longrightarrow$	\$ 30101.36
$D \longrightarrow$	\$ 10932.54
$E \longrightarrow$	\$ 11401.76

==

Q12. A debt of \$ 1500 due in five years and \$ 1000 due in six years is to be repaid by a payment of \$ 1000 now and a second payment at the end of two years. If interest is at 8 % compounded semiannually, then the second payment in dollars will be in the interval:

$A \longrightarrow$	$(700, 760)$
$B \longrightarrow$	$(760, 820)$

$C \longrightarrow$	$(820, 860)$
$D \longrightarrow$	$(860, 900)$
$E \longrightarrow$	$(900, 1000)$

==

Q13. How long will it take for $\$ 100$ to amount to $\$ 239$ at an annual rate of $8\ \%$ compunded quarterly.

$A \longrightarrow$	$10 \quad years$
$B \longrightarrow$	$11\frac{3}{4} \quad years$
$C \longrightarrow$	$11 \quad years$
$D \longrightarrow$	$9 \quad years$
$E \longrightarrow$	$10\frac{1}{2} \quad years$

==

Q14. At the beginning of each quarter, $\$ 100$ is deposited into a saving account that pays $7\ \%$ compounded quarterly. Which of the following is the balance in the account at the end of five years?

$A \longrightarrow$	$\$ 2429.73$
$B \longrightarrow$	$\$ 1635.14$
$C \longrightarrow$	$\$ 633.59$
$D \longrightarrow$	$\$ 2478.33$
$E \longrightarrow$	$\$ 2526.50$

==

Q15. A store orders three items, A, B, and C. The following table summarizes information about the items:

Item	Cost	Selling Price	Storage Space Required	Weight
A	$ 20	$ 26	1 cu ft	8 lb
B	$ 25	$ 34	3 cu ft	10 lb
C	$ 15	$ 21	2 cu ft	15 lb

The purchasing agent has the following restrictions:

The order must provide at most 6600 items.

The total cost must not exceed $ 133000.

The total storage space available is 13600 cubic feet.

The total weight must not exceed 73000 pounds.

How many of each item should be ordered to maximize profit?

Let $x =$ number of items A, $y =$ number of items B, $z =$ number of items C.

Set up the initial simplex tableau without solution.

$$(A) \longrightarrow \begin{bmatrix} x & y & z & s & t & u & v & P & : & Cnst \\ 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & : & 6600 \\ 20 & 25 & 15 & 0 & 1 & 0 & 0 & 0 & : & 133000 \\ 1 & 3 & 2 & 0 & 0 & 1 & 0 & 0 & : & 13600 \\ 8 & 10 & 15 & 0 & 0 & 0 & 1 & 0 & : & 73000 \\ .. & .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ 6 & 9 & 6 & 0 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

==

$$(B) \longrightarrow \begin{bmatrix} x & y & z & s & t & u & v & P & : & Cnst \\ 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & : & 6600 \\ 20 & 25 & 15 & 0 & 1 & 0 & 0 & 0 & : & 133000 \\ -1 & -3 & -2 & 0 & 0 & 1 & 0 & 0 & : & 13600 \\ 8 & 10 & 15 & 0 & 0 & 0 & 1 & 0 & : & 73000 \\ .. & .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ -\ 6 & -\ 9 & -\ 6 & 0 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

==

$$(C) \longrightarrow \begin{bmatrix} x & y & z & s & t & u & v & P & : & Cnst \\ 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & : & 6600 \\ 20 & 25 & 15 & 0 & 1 & 0 & 0 & 0 & : & 133000 \\ 1 & 3 & 2 & 0 & 0 & 1 & 0 & 0 & : & 13600 \\ -8 & -10 & -15 & 0 & 0 & 0 & 1 & 0 & : & 73000 \\ .. & .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ -\ 6 & -\ 9 & -\ 6 & 0 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

==

$$(D) \longrightarrow \begin{bmatrix} x & y & z & s & t & u & v & P & : & Cnst \\ 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & : & 6600 \\ -20 & -25 & -15 & 0 & 1 & 0 & 0 & 0 & : & 133000 \\ 1 & 3 & 2 & 0 & 0 & 1 & 0 & 0 & : & 13600 \\ 8 & 10 & 15 & 0 & 0 & 0 & 1 & 0 & : & 73000 \\ .. & .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ -\ 6 & -\ 9 & -\ 6 & 0 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

==

$$(E) \longrightarrow \begin{bmatrix} x & y & z & s & t & u & v & P & : & Cnst \\ 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & : & 6600 \\ 20 & 25 & 15 & 0 & 1 & 0 & 0 & 0 & : & 133000 \\ 1 & 3 & 2 & 0 & 0 & 1 & 0 & 0 & : & 13600 \\ 8 & 10 & 15 & 0 & 0 & 0 & 1 & 0 & : & 73000 \\ .. & .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ -\ 6 & -\ 9 & -\ 6 & 0 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

==

Q16. The Initial Simplex Table to a Standard Maximum Linear Programing Problem is given as follows:

$$\begin{bmatrix} x_1 & x_2 & x_3 & x_4 & s_1 & s_2 & Z & : & Cnst \\ 1 & 2 & 1 & 1 & 1 & 0 & 0 & : & 50 \\ 3 & 1 & 2 & 1 & 0 & 1 & 0 & : & 100 \\ .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ -\ 1 & -\ 2 & -\ 1 & -5 & 0 & 0 & 1 & : & 0 \end{bmatrix}.$$

The Pivot is equal to $m_{14} = 1$ in the 1st row and 4th column.

Pivoting on $m_{14} = 1$ one obtains the following tableau:

$$A. \begin{bmatrix} x_1 & x_2 & x_3 & x_4 & s_1 & s_2 & Z & : & Cnst \\ 1 & 2 & 1 & 1 & 1 & 0 & 0 & : & 50 \\ 3 & -1 & 2 & 0 & 0 & -1 & 0 & : & 100 \\ .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ 4 & 8 & 4 & 0 & 5 & 0 & 1 & : & 250 \end{bmatrix}$$

$$B. \begin{bmatrix} x_1 & x_2 & x_3 & x_4 & s_1 & s_2 & Z & : & Cnst \\ 1 & 2 & 1 & 1 & 1 & 0 & 0 & : & 50 \\ 2 & 1 & 1 & 0 & 1 & 1 & 0 & : & 50 \\ .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ 4 & 8 & 4 & 0 & 5 & 0 & 1 & : & 250 \end{bmatrix}$$

$$C. \begin{bmatrix} x_1 & x_2 & x_3 & x_4 & s_1 & s_2 & Z & : & Cnst \\ 1 & 2 & 1 & 1 & 1 & 0 & 0 & : & 50 \\ 3 & 1 & 2 & 0 & 0 & 1 & 0 & : & 50 \\ .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ 1 & 2 & 1 & 0 & 0 & 0 & 1 & : & 250 \end{bmatrix}$$

$$D. \begin{bmatrix} x_1 & x_2 & x_3 & x_4 & s_1 & s_2 & Z & : & Cnst \\ 1 & 2 & 1 & 1 & 1 & 0 & 0 & : & 50 \\ 2 & -1 & 1 & 0 & 0 & 1 & 0 & : & 50 \\ .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ 4 & 8 & 4 & 0 & 0 & 0 & 1 & : & 250 \end{bmatrix}$$

$$E. \begin{bmatrix} x_1 & x_2 & x_3 & x_4 & s_1 & s_2 & Z & : & Cnst \\ 1 & 2 & 1 & 1 & 1 & 0 & 0 & : & 50 \\ 2 & -1 & 1 & 0 & -1 & 1 & 0 & : & 50 \\ .. & .. & .. & .. & .. & .. & .. & .. & ...... \\ 4 & 8 & 4 & 0 & 5 & 0 & 1 & : & 250 \end{bmatrix}$$

==

Q17. A school cafeteria serves three foods for lunch, A, B, and C. There is a pressure on the cafeteria director to reduce lunch costs. Help the director by finding the quantities of each food that will minimize costs and still maintain the desired nutritional level. The three foods have the following nutritional characteristics:

PER $UNIT$	$Food$ A	$Food$ B	$Food$ C
Protein $(grams)$	15	10	23
Carbohydrates (g)	20	30	11
Calories	500	400	200
Fat (grams)	8	3	6
Cost $(\$)$	1.40	1.65	1.95

A lunch must contain at least (minimum) 80 grams of protein,
at least (minimum) 95 grams of carbohydrates,
and at least (minimum) 1200 calories.
It must contain not more than 35 grams of fat.
How many units of each food should be served to minimize cost?
Let $x =$ Number of units of food A,
let $y =$ Number of units of food B,
and let $z =$Number of units of food C.
Set up the constraints in the form of a system of linear inequalities to Minimize the cost
$C = 1.40x + 1.65y + 1.95z$
for the above Linear Programing Problem without solution.

$$A.\begin{cases} 15x + 10y + 23z \geq 80 \\ 20x + 30y + 11z \geq 95 \\ 500x + 400y + 200z \geq 1200 \\ 6x + 3y + 8z \geq 35 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==============================

$$B.\begin{cases} 15x + 10y + 23z \geq 80 \\ 30x + 20y + 11z \geq 35 \\ 500x + 400y + 200z \geq 1200 \\ 8x + 3y + 6z \leq 95 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==============================

$$C.\begin{cases} 15x + 10y + 23z \leq 80 \\ 20x + 30y + 11z \leq 95 \\ 500x + 400y + 200z \leq 1200 \\ 8x + 3y + 6z \leq 35 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==============================

$$D.\begin{cases} 15x + 10y + 23z \geq 80 \\ 20x + 30y + 11z \geq 95 \\ 5x + 4y + 2z \geq 12 \\ 8x + 3y + 6z \geq 35 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==============================

$$E.\begin{cases} 15x + 10y + 23z \geq 80 \\ 20x + 30y + 11z \geq 95 \\ 500x + 400y + 200z \geq 1200 \\ 8x + 3y + 6z \leq 35 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==

Q18. Convert the augmented matrix

$$\left[\begin{array}{ccc|c} 1 & 2 & 4 & 6 \\ 0 & 1 & 2 & 3 \\ 1 & 1 & 2 & 1 \end{array}\right]$$

of the system of equations

$$\begin{array}{rcrcrcr} x & + & 2y & + & 4z & = & 6 \\ & & y & + & 2z & = & 3 \\ x & + & y & + & 2z & = & 1 \end{array}$$

to reduced row echelon form:

(A) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]$

==========

(B) $\left[\begin{array}{ccc|c} 1 & 0 & 3 & 0 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]$

==========

(C) $\left[\begin{array}{ccc|c} 1 & 2 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]$

==========

(D) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array}\right]$

==========

(E) $\left[\begin{array}{ccc|c} 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]$

==

Q19. An animal feed is to be made from corn, soybeans, and cottonseed. Determine how many units of each ingredient are needed to make a food that supplies 1800 units of fiber, 2800 units of fat, and 2200 units of protein, given that 1 unit of each ingredient provides the number of units shown in the table. The table states, for example, that a unit of corn provides 10 units of fiber, 30 units of fat, and 20 units of protein. Let x be the number of units of corn, let y be the number of units of soybeans and let z be the number of units of cottenseed. Set up the system of equation without solution.

	Corn	Soybeans	Cottonseed
Units of Fiber	10	20	30
Units of Fat	30	20	40
Units of Protein	20	40	25

$$(A).\quad \begin{array}{ccccccc} 10x & + & 30y & + & 20z & = & 1800 \\ 20x & + & 20y & + & 25z & = & 2800 \\ 30x & + & 40y & + & 40z & = & 2200 \end{array}$$

$$(B).\quad \begin{array}{ccccccc} 10x & + & 20y & + & 30z & = & 1800 \\ 30x & + & 40y & + & 20z & = & 2800 \\ 20x & + & 40y & + & 25z & = & 2200 \end{array}$$

$$(C).\quad \begin{array}{ccccccc} 30x & + & 20y & + & 25z & = & 1800 \\ 10x & + & 20y & + & 40z & = & 2800 \\ 20x & + & 40y & + & 30z & = & 2200 \end{array}$$

$$(D).\quad \begin{array}{ccccccc} 10x & + & 20y & + & 30z & = & 1800 \\ 30x & + & 20y & + & 40z & = & 2800 \\ 20x & + & 40y & + & 25z & = & 2200 \end{array}$$

$$(E).\quad \begin{array}{ccccccc} 10x & + & 30y & + & 20z & = & 2800 \\ 20x & + & 20y & + & 40z & = & 1800 \\ 30x & + & 40y & + & 25z & = & 2200 \end{array}$$

==

Q20. Find the DUAL of the following linear programing problem:

$Minimize : W = 3y_1 + 2y_2$

subject to the constraints

$$\left\{ \begin{array}{ccccc} y_1 & + & 2y_2 & \geq & 10 \\ y_1 & + & y_2 & \geq & 8 \\ 2y_1 & + & y_2 & \geq & 12 \\ y_1 & \geq & 0, & y_2 & \geq 0 \end{array} \right.$$

(A) $Maximize : Z = 10x_1 + 8x_2 + 12x_3$

subject to the constraints

$$\begin{cases} x_1 + 2x_2 + x_3 \leq 3 \\ x_1 + 2x_2 + x_3 \leq 2 \\ x_1 \geq 0, \quad x_2 \geq 0, \quad x_3 \geq 0 \end{cases}$$

===================

(B) $Maximize : Z = 10x_1 + 8x_2 + 12x_3$

subject to the constraints

$$\begin{cases} x_1 + x_2 + 2x_3 \leq 3 \\ 2x_1 + x_2 + x_3 \leq 2 \\ x_1 \geq 0, \quad x_2 \geq 0, \quad x_3 \geq 0 \end{cases}$$

===================

(C) $Maximize : Z = 10x_1 + 8x_2 + 12x_3$

subject to the constraints

$$\begin{cases} x_1 + x_2 + 2x_3 \leq 2 \\ 2x_1 + x_2 + x_3 \leq 3 \\ x_1 \geq 0, \quad x_2 \geq 0, \quad x_3 \geq 0 \end{cases}$$

===================

(D) $Maximize : Z = 12x_1 + 8x_2 + 10x_3$

subject to the constraints

$$\begin{cases} x_1 + x_2 + 2x_3 \leq 3 \\ x_1 + x_2 + 2x_3 \leq 2 \\ x_1 \geq 0, \quad x_2 \geq 0, \quad x_3 \geq 0 \end{cases}$$

===================

(E) $Maximize : Z = 10x_1 + 8x_2 + 12x_3$

subject to the constraints

$$\begin{cases} x_1 + x_2 + 2x_3 \geq 3 \\ 2x_1 + x_2 + x_3 \geq 2 \\ x_1 \geq 0, \quad x_2 \geq 0, \quad x_3 \geq 0 \end{cases}$$

==

Q21. A class has 10 boys and 8 girls. In how many ways can 9 students be selected and arranged in a row with 5 boys on the right side and four girls on the left side?

1	2	3	4	5	6	7	8	9
G	G	G	G	B	B	B	B	B

$A \longrightarrow$	2116800

$B \longrightarrow$	409600000
$C \longrightarrow$	423360
$D \longrightarrow$	50803200
$E \longrightarrow$	126

==

Q22. If

$$\begin{cases} x_1 - x_2 - 3x_3 - 4x_4 = 3 \\ 3x_1 + x_2 - x_3 + 4x_4 = 5 \end{cases},$$

then use Matrix Reducion Method to solve the above system of equations in oder to find solution(s):

(Hint: Use a parameter t for x_4 and s for x_3, if needed).

A	$\begin{cases} x_1 = 3 - 6t \\ x_2 = 4s - t \\ x_3 = -2 + 3t \\ x_4 = t \end{cases}$
B	$\begin{cases} x_1 = 3 - 6t \\ x_2 = 4s + t \\ x_3 = -2 + 3t \\ x_4 = t \end{cases}$
C	$\begin{cases} x_1 = -1 + t \\ x_2 = 3t \\ x_3 = 6s + 2t \\ x_4 = t \end{cases}$
D	$\begin{cases} x_1 = -1 + s - t \\ x_2 = 4 + 2s + t \\ x_3 = s \\ x_4 = t \end{cases}$
E	$\begin{cases} x_1 = 2 + s \\ x_2 = -1 - 2s - 4t \\ x_3 = s \\ x_4 = t \end{cases}$

==