MA101 Midsem online moodle

Question **1**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let $A = [a_{ij}]_{10\times 10}, a_{ij} = i + j$. Then A is row equivalent to identity matrix.

Select one:
- True ✖
- False

The correct answer is 'False'.

Question **2**
Incorrect
Mark 0.00 out of 1.00
Flag question

If V is the set of all functions $f : \mathbb{R} \to \mathbb{R}$. The vector addition in V is defined as $f(x) + g(x) = f(g(x))$ and scalar multiplication is defined as $(\alpha f)(x) = \alpha f(x),\ \ \alpha \in \mathbb{R}$. Then with this vector addition and scalar multiplication V is a vector space.

Select one:
- True ✖
- False

The correct answer is 'False'.

Question **3**
Incorrect
Mark 0.00 out of 1.00
Flag question

$H = \{(x, y) \in \mathbb{R}^2 | (x + y) * (2 + sin(x)) = 0\}$, is a subspace of $\mathbb{R}^2$?

Select one:
- True
- False ✖

The correct answer is 'True'.

Question **4**
Correct
Mark 1.00 out of 1.00
Flag question

Let A be an invertible 10×10 matrix. Then

- a. det(A)=product of all pivot entries in row echelon form of A.
- b. dimension of row space of $A = 10$ ✔
- c. dimension of null space of $A > 0$

The correct answer is:
dimension of row space of $A = 10$

Question **5**

Correct

Mark 1.00 out of 1.00

Flag question

If A and B are similar to identity matrices then $\begin{bmatrix} A & 0 \\ 0 & B \end{bmatrix}$ is also similar to identity matrix.

Select one:

- True ✔
- False

The correct answer is 'True'.

Question **6**

Correct

Mark 1.00 out of 1.00

Flag question

Let $A = \begin{bmatrix} 1 & 0 & 0 & 0 & i \\ 0 & 2 & i & i & 0 \\ 0 & 0 & 3 & i & 0 \\ i & 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$ be a matrix of size 4×4, where i is the last three digits of your student id.

Then det(A)=.....

(Write down your answer in digits only.)

Answer: 24 ✔

The correct answer is: 24

Question **7**

Incorrect

Mark 0.00 out of 1.00

Flag question

If the columns of a matrix B are linearly dependent then so are the columns of AB.

This statement is

- a. Not always true ✘
- b. Always false
- c. Some times true
- d. Always true

The correct answer is:
Always true

Question **8**

Incorrect

Mark 0.00 out of 1.00

Flag question

We have rank$(AB) \leq$ rank(B). Then which of the following is always true?

- a. rank$(BA) \leq$ rank(B) ✘
- b. rank$(B^TA^T) \leq$ rank(B^T)
- c. rank$(B^TA^T) \leq$ rank(A^T)
- d. rank$(A) \leq 1$

The correct answer is:
rank$(B^TA^T) \leq$ rank(A^T)

Question **9**

Correct

Mark 1.00 out of 1.00

Flag question

If the columns of $A_{n\times n}$ matrix span $\mathbb{R}^n$, then the columns are

- a. linearly dependent
- b. linearly independent ✔
- c. always form an identity matrix

The correct answer is:
linearly independent

Question **10**

Incorrect

Mark 0.00 out of 1.00

Flag question

There exists an onto linear transformation $T:\mathbb{R}^4\to\mathbb{R}^6$

- a. False
- b. can not say
- c. True ✖

The correct answer is:
False

Question **11**

Incorrect

Mark 0.00 out of 1.00

Flag question

Let $A=\begin{bmatrix}0&1&0&0&0&0&0&0\\1&0&0&0&0&0&0&0\\0&0&0&1&0&0&0&0\\0&0&1&0&0&0&0&0\\0&0&0&0&0&1&0&0\\0&0&0&0&1&0&0&0\\0&0&0&0&0&0&0&1\\0&0&0&0&0&0&1&0\end{bmatrix}$. Then det(A)=1.

Select one:

- True
- False ✖

The correct answer is 'True'.

Question **12**

Correct

Mark 1.00 out of 1.00

Flag question

Let H be a nonzero subspace of V, $T:V\to W$ a linear transformation and let $T(H)$ be the set of images of vectors in H. If T is a one-to-one, then $\dim(T(H))\ldots\ldots\dim(H)$. Fill in the blank.

- a. <
- b. T(H) need not be a subspace of W. Hence no relation.
- c. = ✔
- d. >

The correct answer is:
=

Question **13**
Correct
Mark 1.00 out of 1.00
Flag question

Let X, Y, Z, A, B, C be all $n \times n$ matrices, I be an $n \times n$ identity matrix. If $\begin{bmatrix} X & 0 \\ Y & Z \end{bmatrix}\begin{bmatrix} A & 0 \\ B & C \end{bmatrix} = \begin{bmatrix} I & 0 \\ 0 & I \end{bmatrix}$ Then

- a. $Y = -C^{-1}BA^{-1}$ ✔
- b. $Y = C^{-1}BA^{-1}$
- c. $Y = CB^{-1}A^{-1}$
- d. $Y = -CB^{-1}A^{-1}$

The correct answer is:
$Y = -C^{-1}BA^{-1}$

Question **14**
Correct
Mark 1.00 out of 1.00
Flag question

If $A = \begin{bmatrix} P & Q \\ R & S \end{bmatrix}$ in block form. Then $A^T = \begin{bmatrix} P^T & Q^T \\ R^T & S^T \end{bmatrix}$.

Select one:
- True
- False ✔

The correct answer is 'False'.

Question **15**
Correct
Mark 1.00 out of 1.00
Flag question

If $A_{m \times n}$ has r pivot columns, then A^T has how many pivot columns?

- a. $n - r$
- b. r ✔
- c. $m - r$

The correct answer is:
r

Question **16**
Correct
Mark 1.00 out of 1.00
Flag question

Which of the following is not a linear transformation?

- a. $F : \mathbb{R}^3 \longrightarrow \mathbb{R}^2$ such that $F[x \;\; y \;\; z]^T = [z \;\; x + y]^T$
- b. $F : \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ such that $F[x \;\; y]^T = [2x - y \;\; x]^T$
- c. $F : \mathbb{R}^3 \longrightarrow \mathbb{R}^2$ such that $F[x \;\; y \;\; z]^T = [x + 1 \;\; y. z]^T$ ✔
- d. $F : \mathbb{R} \longrightarrow \mathbb{R}^2$ such that $F([x]) = [2x \;\; 3x]^T$

The correct answer is:

$F : \mathbb{R}^3 \longrightarrow \mathbb{R}^2$ such that $F[x \;\; y \;\; z]^T = [x + 1 \;\; y. z]^T$

Question **17**
Correct
Mark 1.00 out of 1.00
Flag question

Let M be the plane $x + y + z = 0$ and N be the line $x = y = z$ of $\mathbb{R}^3$, where $M + N = \{u + v | u \in M, v \in N\}$

- a. $M + N = M$
- b. $M + N = \mathbb{R}^3$ ✔
- c. $M + N$ is a proper subspace of $\mathbb{R}^3$ of dimension 2.

The correct answer is:
$M + N = \mathbb{R}^3$

Question **18**

Correct

Mark 1.00 out of 1.00

Flag question

Let A be an $n \times n$ matrix with rank n. Then which of the following is false?

- a. Null space of A contains non zero vectors. ✔
- b. All columns of A are pivot columns.
- c. All variables are basic variables.
- d. There are no free variables.

The correct answer is:
Null space of A contains non zero vectors.

Question **19**

Incorrect

Mark 0.00 out of 1.00

Flag question

For every subspace V of $\mathbb{R}^3$, there exists a matrix $A_{3\times 3}$ such that $V = Col(A)$.

- a. False ✖
- b. True
- c. True except for trivial spaces

The correct answer is:
True

Question **20**

Correct

Mark 1.00 out of 1.00

Flag question

Consider $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 3 \\ 1 & 4 & 5 \end{bmatrix}$. The dimension of null space of A is

- a. 1
- b. 0 ✔
- c. 3
- d. 2

The correct answer is:
0

Question **21**

Incorrect

Mark 0.00 out of 1.00

Flag question

If B is the inverse of A^2, then $AB = BA$

Select one:

- True
- False ✖

The correct answer is 'True'.

Question **22**

Incorrect

Mark 0.00 out of 1.00

Flag question

Let V be a vector space. Let S_1 and S_2 be two subspaces of V. Then which of the following is false?

- a. $S_1 \cap S_2$ is a subspace of V ✖
- b. $S_1 \cup S_2$ is a subspace of V

The correct answer is:
$S_1 \cup S_2$ is a subspace of V

Question **23**

Incorrect

Mark 0.00 out of 1.00

Flag question

Which of the following sets of vectors in $\mathbb{R}^n$ is a subspace of $\mathbb{R}^n$?

- a. $S = \{X = (x_1, x_2, \ldots, x_n) \in \mathbb{R}^n : x_2 \text{ is rational}\}$ ✘
- b. $S = \{X = (x_1, x_2, \ldots, x_n) \in \mathbb{R}^n : x_1 x_2 = 0\}$
- c. $S = \{X = (x_1, x_2, \ldots, x_n) \in \mathbb{R}^n : x_2 = 0\}$
- d. $S = \{X = (x_1, x_2, \ldots, x_n) \in \mathbb{R}^n : x_1 \geq 0\}$

The correct answer is:
$S = \{X = (x_1, x_2, \ldots, x_n) \in \mathbb{R}^n : x_2 = 0\}$

Question **24**

Correct

Mark 1.00 out of 1.00

Flag question

A row interchange operation on A does not change the determinant of A.

- a. False ✔
- b. True

The correct answer is:
False

Question **25**

Correct

Mark 1.00 out of 1.00

Flag question

If A and B are singular (not invertible) matrices then

- a. AB is always nonsingular
- b. AB is always singular ✔
- c. $A + B$ is always nonsingular
- d. $A + B$ is always singular

The correct answer is:
AB is always singular

Question **26**

Partially correct

Mark 0.67 out of 1.00

Flag question

Let $Ax = b$ be a linear system with $Au = b, Av = b$ where $u \neq v$. Then which one of the following statements is/are false?

- ☑ a. There are exactly two solutions to linear system $AX = b$. ✘
- ☑ b. A must have two identical rows. ✔
- ☐ c. There is a vector $x \neq 0$ such that $Ax = 0$.
- ☐ d. There are infinite number of solutions to the system $Ax = b$

The correct answer is:
A must have two identical rows.

Question **27**

Incorrect

Mark 0.00 out of 1.00

Flag question

For what value of s, the matrix $A = \begin{bmatrix} 6 & 4 & 2 \\ -3 & -2 & -1 \\ 9 & 6 & s \end{bmatrix}$ has rank 1?

- a. 3
- b. 2
- c. 1
- d. 0 ✖

The correct answer is:
3

Question **28**

Not answered

Marked out of 1.00

Flag question

Let $T : \mathbb{R}_i[X] \to \mathbb{R}_i[X]$ be a function such that $T(f(x)) = Xf'(X)$, that is, X times the derivative of $f(x)$. Then T is .....

$\mathbb{R}_i[X]$ is the set of all of polynomials of degree less or equal to i and i is last two digits of your student id+5.

- a. not a linear transformation.
- b. both one-one and onto linear transformation.
- c. onto linear transformation.
- d. one-one linear transformation.
- e. neither one-one nor onto linear transformation.

The correct answer is:
onto linear transformation.

Question **29**

Incorrect

Mark 0.00 out of 1.00

Flag question

The only non trivial subspaces of $\mathbb{R}^3$ are

- a. All the lines passing through origin ✖
- b. All the lines and planes
- c. All the planes passing through origin
- d. All the lines and all the planes passing through origin

The correct answer is:
All the lines and all the planes passing through origin

Question **30**

Incorrect

Mark 0.00 out of 1.00

Flag question

Volume of the parallelepiped formed by the vectors is $\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}, \begin{bmatrix} -2 \\ 3 \\ 2 \end{bmatrix}, \begin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix}$ is

- a. 30
- b. 0
- c. -30
- d. 1
- e. none of these ✖

The correct answer is:
30

Question **31**

Incorrect

Mark 0.00 out of 1.00

Flag question

If the matrix $A = CD$ is invertible (C and D are square matrices). Then which of the following is true?

- a. D is invertible and $D^{-1} = CA^{-1}$ ✗
- b. C may not be invertible
- c. C is invertible and $C^{-1} = DA^{-1}$

The correct answer is:
C is invertible and $C^{-1} = DA^{-1}$

Question **32**

Incorrect

Mark 0.00 out of 1.00

Flag question

Let the augmented matrix of a system of linear equations is reduced as $[A \quad v] = \begin{bmatrix} 1 & 2 & 3 & a \\ 0 & 4 & 5 & b \\ 0 & 0 & d & c \end{bmatrix}$

Then which variables has no effect on the existence of solution?

- i. b and d
- ii. c and d ✗
- iii. a and c
- iv. a and b

The correct answer is:
a and b

Question **33**

Partially correct

Mark 0.50 out of 1.00

Flag question

Let $A = \begin{bmatrix} 2 & 2 & 2 & 2 \\ 2 & 2 & 2 & 2 \\ 2 & 2 & 2 & 2 \\ 2 & 2 & 2 & 2 \end{bmatrix}$. Then

- ☐ a. $Col(A) = \mathbb{R}^4$.
- ☑ b. $det(A) = 0$. ✔
- ☐ c. There exists $b \in \mathbb{R}^4$, such that the system $AX = b$ does not have a solution.
- ☐ d. for each $b \in \mathbb{R}^4$, the system $AX = b$ has a solution.

The correct answers are:
$det(A) = 0$.

,

There exists $b \in \mathbb{R}^4$, such that the system $AX = b$ does not have a solution.

Question **34**

Not answered

Marked out of 1.00

Flag question

The "cyclic" transformation T of $\mathbb{R}^3$ is defined by
$T([v_1\ v_2\ v_3]^T) = ([v_2\ v_3\ v_1]^T)$. What is $T^{58}([v_1\ v_2\ v_3]^T)$?
(Do not worry about writing subscripts, just write your answer in the parentheses with comma between each element and without any space, e.g. (1,2,3))

Answer: ✗

The correct answer is: (v2,v3,v1)

Question **35**
Correct
Mark 1.00 out of 1.00
Flag question

Let j be the last two digits of your student id and $u = \begin{bmatrix} j \\ j \\ j \end{bmatrix}, v = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$. Then $\{u, v\}$ is linearly independent set.

Select one:
- True ✔
- False

The correct answer is 'True'.

Question **36**
Correct
Mark 1.00 out of 1.00
Flag question

Let A be an $n \times n$ square matrix and A is invertible. Then which of the following is false ?

- a. A is row equivalent to $n \times n$ identity matrix
- b. The system $Ax = 0$ has non trivial solution ✔
- c. A has n pivot elements
- d. The columns of A span $\mathbb{R}^n$

The correct answer is:
The system $Ax = 0$ has non trivial solution

Question **37**
Incorrect
Mark 0.00 out of 1.00
Flag question

$(A+B)^2 = A^2 + 2AB + B^2$ where $A = \begin{bmatrix} -1 & 2 & 5 \\ -1 & 0 & 1 \\ 2 & 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 9 & 7 & 12 \\ 1 & -1 & -4 \\ 3 & 5 & 12 \end{bmatrix}$

- a. True ✖
- b. False

The correct answer is:
False

Question **38**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let $A = \begin{bmatrix} a & b \\ c & * \end{bmatrix}$ be a matrix with $a \neq 0$. For what values of $*$, A has rank 1.

- a. $* = a$
- b. $* = \frac{bc}{a}$
- c. $* = bc$ ✖
- d. $* = \frac{-bc}{a}$

The correct answer is:
$* = \frac{bc}{a}$

Question **39**
Correct
Mark 1.00 out of 1.00
Flag question

If the columns of a matrix A are linearly independent then so are the columns of matrix AB.

The statement is

- a. Always true
- b. Not always true ✔
- c. Always false

The correct answer is:
Not always true

Question **40**

Incorrect

Mark 0.00 out of 1.00

Flag question

Meena wishes to invest her inheritance of 100,000 so that her return on investment is maximized, but she also wishes to keep her risk level relatively low. She has decided to invest her money in any of three possible ways-CDs that pay a guaranteed 8 percent, stocks that have an expected return of 12 percent, and a money market mutual fund that is expected to return 10 percent. She has decided that the total 100,000 will be invested, but any part (or all) of it may be put in any of the three alternatives. Thus, she may have some money invested in all three alternatives. In formulating this as a linear programming problem, define the variables as follows:

C = dollars invested in CDs

S = dollars invested in stocks

M = dollars invested in money market mutual fund

Which of the following would be the most appropriate constraint in the linear programming problem?

- a. $0.08C + 0.12S + 0.10M \leq 100000$ ✖
- b. $C + S + M \geq 100000.$
- c. $C + S + M = 100000.$
- d. $0.08C + 0.12S + 0.10M \geq 100000$

The correct answer is:

$C + S + M = 100000.$

Question **41**

Incorrect

Mark 0.00 out of 1.00

Flag question

Let V be the vector space of all 2×2 real matrices. Then the subset $\left\{ \begin{bmatrix} x & -x \\ y & z \end{bmatrix} : x, y, z \in \mathbb{R} \right\}$ is not a subspace of V.

Select one:

- True ✖
- False

The correct answer is 'False'.

Question **42**

Incorrect

Mark 0.00 out of 1.00

Flag question

For which real numbers λ, the following set of vectors is linearly dependent?

$v_1 = \begin{bmatrix} \lambda \\ -1 \\ -1 \end{bmatrix}, v_2 = \begin{bmatrix} -1 \\ \lambda \\ -1 \end{bmatrix}, v_3 = \begin{bmatrix} -1 \\ -1 \\ \lambda \end{bmatrix}$

- a. $\lambda_1 = -2$ and $\lambda_2 = 1$
- b. $\lambda_1 = 2$ and $\lambda_2 = -1$
- c. $\lambda_1 = 0$ and $\lambda_2 = -1$ ✖
- d. $\lambda_1 = -2$ and $\lambda_2 = -1$

The correct answer is:
$\lambda_1 = 2$ and $\lambda_2 = -1$

Question **43**

Correct

Mark 1.00 out of 1.00

Flag question

Can there be a 2×2 matrix A, whose null space is equal to its column space?

- a. No
- b. Yes ✔

The correct answer is:
Yes

Question **44**
Incorrect
Mark 0.00 out of 1.00
Flag question

Consider the following matrix $A = \begin{bmatrix} 1 & a & bc \\ 1 & b & ac \\ 1 & c & ab \end{bmatrix}$ Then det(A) is a multiple of

- a. a+b+c
- b. a+b
- c. a-b
- d. abc ✖

The correct answer is:
a-b

Question **45**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let V be the vector space of all 2×2 matrices with real entries. Then the dimension of V is

- a. 4
- b. 2 ✖
- c. 1
- d. 3

The correct answer is:
4

Question **46**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let A be a 3×3 with determinant zero. Then $AX = 0$ does not have non-trivial solution.

- a. True
- b. depends on entries of A. ✖
- c. False

The correct answer is:
False

Question **47**
Correct
Mark 1.00 out of 1.00
Flag question

If A^T is not invertible then A is not invertible.

Select one:
- True ✔
- False

The correct answer is 'True'.

Question **48**
Correct
Mark 1.00 out of 1.00
Flag question

Let $A = \begin{pmatrix} 0 & -2 \\ 2 & 0 \end{pmatrix}$. Which of the following is the correct geometric interpretation of the associated linear transformation?

- a. rotates clockwise through 90 degrees and doubles the length.
- b. rotates clockwise through 90 degrees and halves the length.
- c. rotates counterclockwise through 90 degrees and halves the length.
- d. rotates counterclockwise through 90 degrees and doubles the length. ✔

The correct answer is:
rotates counterclockwise through 90 degrees and doubles the length.

Question **49**
Correct
Mark 1.00 out of 1.00
Flag question

Which of the following is true always?

- a. An $m \times n\ (m > n)$ matrix has always more than n basic variables.
- b. A square matrix has no free variables.
- c. An invertible matrix has no basic variables.
- d. An invertible matrix has no free variables. ✔

The correct answer is:
An invertible matrix has no free variables.

Question **50**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let V be a set of all $n \times n$ matrices with real entries. Then which of the following is true?

- a. The set of all $n \times n$ singular matrices ($\det A = 0$) is a subspace of V
- b. The set of all $n \times n$ unsymmetric matrices ($A \neq A^T$) is a subspace of V
- c. The set of all $n \times n$ symmetric matrices ($A = A^T$) is a subspace of V
- d. The set of all invertible $n \times n$ matrices is a subspace of V ✖

The correct answer is:
The set of all $n \times n$ symmetric matrices ($A = A^T$) is a subspace of V

Question **51**
Correct
Mark 1.00 out of 1.00
Flag question

Let A, b be given. Then $AX = b$ has infinitely many solutions if and only if $AX = 0$ has infinitely many solutions.

Select one:
- True
- False ✔

The correct answer is 'False'.

Question **52**
Correct
Mark 1.00 out of 1.00
Flag question

The system $X + 2Y + 3Z = 4$ has .....

- a. no solution
- b. unique solution
- c. infinitely many solution. ✔

The correct answer is:
infinitely many solution.

Question **53**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let $S = \{(x, y, z) \in \mathbb{R}^3 : x + 2y + 3z = 0\}$. Then dimension of S is

- a. 0
- b. 1 ✖
- c. 3
- d. 2

The correct answer is:
2

Question **54**
Correct
Mark 1.00 out of 1.00
Flag question

The set of solutions of following system of linear equations:
$5x_1 - x_2 + 4x_3 = 7$
$-2x_1 + 6x_2 + 4x_3 = 14$
$-7x_1 + 5x_2 - 2x_3 = 1$ is a subspace $\mathbb{R}^3$ of dimension 1.

Select one:
- True
- False ✔

The correct answer is 'False'.

Question **55**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let $A = \begin{bmatrix} 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 3 & 5 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 0 & 0 & 2 \end{bmatrix}$. Then det(A) is .....

- a. 30
- b. None of these
- c. 6
- d. -30
- e. 0 ✖
- f. 1

The correct answer is:
30

Question **56**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let V be the vector space of all real valued functions f from $\mathbb{R}$ into $\mathbb{R}$. Which of the following set is a subspace of V?

- a. $S = \{f \in V : f(x^2) = (f(x))^2\}$ ✖
- b. $S = \{f \in V : f(0) = f(1)\}$
- c. $S = \{f \in V : f(-1) = 1\}$

The correct answer is:
$S = \{f \in V : f(0) = f(1)\}$

Question **57**
Incorrect
Mark 0.00 out of 1.00
Flag question

If a matrix A has column space same as row space then it is a symmetric matrix.

Select one:
- True ✖
- False

The correct answer is 'False'.

Question **58**
Correct
Mark 1.00 out of 1.00
Flag question

Let I be the identity linear transformation of the finite dimensional vector space V, then the nullity of I is

- a. 0 ✔
- b. V
- c. $\{0\}$
- d. dim(V)

The correct answer is:
0

Question **59**
Correct
Mark 1.00 out of 1.00
Flag question

How many rows does matrix B have if BA is a 2×6 matrix?

- a. 2 ✔
- b. 6
- c. 4
- d. any number

The correct answer is:
2

Question **60**
Incorrect
Mark 0.00 out of 1.00
Flag question

If the dimension of null space of a 5×6 matrix A is 4, then the dimension of row space of A is

- a. 2
- b. 4
- c. 1 ✖
- d. 3

The correct answer is:
2

Question **61**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let u, v be two vectors in $\mathbb{R}^2$. Then $\{u, v\}$ is linearly independent if and only if $\{u+v, u-v\}$ is linearly independent.

Select one:
- True
- False ✖

The correct answer is 'True'.

Question **62**
Incorrect
Mark 0.00 out of 1.00
Flag question

If $S: V \to V, T: V \to V$ are linear transformations. Then their composition SoT is not a linear transformation.

Select one:
- True ✖
- False

The correct answer is 'False'.

Question **63**
Correct
Mark 1.00 out of 1.00
Flag question

The set $B = \{(1,0,-1),(1,2,1),(0,-3,2)\}$ forms a basis of $\mathbb{R}^3$.

Select one:
- True ✔
- False

The correct answer is 'True'.

Question **64**

Correct

Mark 1.00 out of 1.00

Flag question

Let $A_{4\times4}$ be a matrix with $\det(A)=0$. Then which of the following always true?

- a. Dimension of column space of A is equal to 4
- b. Dimension of column space of A is <4 ✔
- c. Dimension of column space of A is equal to 0
- d. Dimension of column space of A is ≤ 4

The correct answer is:
Dimension of column space of A is <4

Question **65**

Incorrect

Mark 0.00 out of 1.00

Flag question

Let $T:\mathbb{R}^9\to\mathbb{R}^9$ be a one-to-one linear transformation. $U=\{v=[x_1\ x_2\cdots\ x_9]^T\in\mathbb{R}^9|3x_1-2x_3+x_8+11x_9=0\}$. Then dimension of $T(U)$ is

- a. 0
- b. 4
- c. can not say ✖
- d. 8
- e. 1
- f. 9

The correct answer is:
8

Question **66**

Correct

Mark 1.00 out of 1.00

Flag question

If A is a 6×8 matrix, what is the smallest possible dimension of null space A?

- a. 0
- b. 3
- c. 1
- d. 2 ✔

The correct answer is:
2

Question **67**

Correct

Mark 1.00 out of 1.00

Flag question

Let A be a 9×12 matrix with real entries. If the system $Ax=b$ has solution for every b, then Column space of A is

- a. $\mathbb{R}_9$ ✔
- b. $\mathbb{R}_{11}$
- c. $\mathbb{R}_{12}$
- d. $\mathbb{R}_{21}$

The correct answer is:
$\mathbb{R}_9$

Question 68
Incorrect
Mark 0.00 out of 1.00
Flag question

Suppose a homogeneous linear system has no. of equations less than no. of variables then

- [x] a. it may not have a solution.
- [ ] b. it has infinitely many solutions.
- [ ] c. it has unique solution
- [ ] d. set of solutions is always a vector space.

The correct answers are:
it has infinitely many solutions.,
set of solutions is always a vector space.

Question 69
Correct
Mark 1.00 out of 1.00
Flag question

The matrix A and A^T have same null space.

Select one:
- True
- False ✔

The correct answer is 'False'.

Question 70
Correct
Mark 1.00 out of 1.00
Flag question

Column space of Zero 3×3 matrix (i.e., matrix with all entries 0) is $\{0\}$

Select one:
- True ✔
- False

The correct answer is 'True'.

Question 71
Correct
Mark 1.00 out of 1.00
Flag question

If a 4×4 is not invertible then its row echelon form will .....

- a. zero matrix
- b. have at least one row zero ✔
- c. identity matrix

The correct answer is:
have at least one row zero

Question 72
Incorrect
Mark 0.00 out of 1.00
Flag question

If $T: \mathbb{R}^2 \to \mathbb{R}^2$ defined by $T(x, y) = (|x + y|, x + y)$. Then

- a. T is linear and onto
- b. T is linear and one-one
- c. T is not a linear transformation
- d. T is a linear transformation ✘

The correct answer is:
T is not a linear transformation

Question **73**
Correct
Mark 1.00 out of 1.00
Flag question

If a linear transformation $T : \mathbb{R}^3 \longrightarrow \mathbb{R}^5$ is one-to-one with standard matrix A, then A has

- a. The rank is three and the nullity is two. ✔
- b. The rank is two and the nullity is three.
- c. we can not say anything about rank and nullity.
- d. The rank is five and the nullity is zero.

The correct answer is:
The rank is three and the nullity is two.

Question **74**
Incorrect
Mark 0.00 out of 1.00
Flag question

If $A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 3 & 1 & 0 & 0 \\ 1 & 0 & -1 & 0 \\ 0 & 1 & -3 & 1 \end{bmatrix}$ then

- a. $A^2 = 0$ ✖
- b. $A^2 = A$
- c. $A^4 = A^2 = I$
- d. $A^3 = I$

The correct answer is:
$A^4 = A^2 = I$

Question **75**
Incorrect
Mark 0.00 out of 1.00
Flag question

Suppose A is an 5×3 matrix with the property that for all $b \in \mathbb{R}^5$ the equation $Ax = b$ has at most one solution. Then the columns of A must be linearly independent.

Select one:
- True
- False ✖

The correct answer is 'True'.

Question **76**
Incorrect
Mark 0.00 out of 1.00
Flag question

Vector $b = (3, -1, 0, 1)$ belongs to $Span\{(2, -1, 3, 2), (-1, 1, 1, -3), (1, 1, 9, -5)\}$.

Select one:
- True ✖
- False

The correct answer is 'False'.

Question **77**
Correct
Mark 1.00 out of 1.00
Flag question

$T : \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ defined by $T(\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}) = \begin{bmatrix} x_1 + x_2 \\ x_1 - x_2 + 1 \end{bmatrix}$ is .....

- a. a one to one linear transformation.
- b. not a linear transformation. ✔
- c. a linear transformation.
- d. a bijective linear transformation.

The correct answer is:
not a linear transformation.

Question **78**
Not answered
Marked out of 1.00
Flag question

Let V be the vector space of all 3×3 matrices. Let S be the set of all 3×3 invertible matrices. Then

- a. S is not a subspace of V
- b. S is a subspace of V
- c. $S \cup I$ $(3 \times 3$ **identity matrix**$)$ is a subspace of V
- d. $S \cup 0$ $(3 \times 3$ **zero matrix**$)$ is a subspace of V

The correct answer is:
S is not a subspace of V

Question **79**

Not answered

Marked out of 1.00

Flag question

The dimension of the null space of the matrix $A = \begin{bmatrix} 1 & 5 & 7 \\ 0 & 0 & 9 \end{bmatrix}$ is

- a. 3
- b. 0
- c. 2
- d. 1

The correct answer is:
1

Question **80**

Not answered

Marked out of 1.00

Flag question

Suppose a consistent linear system has no. of equations more than no. of variables then

- a. it has unique solution
- b. it always has a solution.
- c. It has no solutions.
- d. it has infinitely many solutions.

The correct answer is:
it always has a solution.