UNIVERSITY OF SARDODHA

DEPARTMENT OF PHYSICS

Conduct of Online Mid Term Exam Assignment through zoom. The due date of submission of Mid Term Exam Assignment is 24-04-2020

Subject: Linear Algebra   **Teacher Name: Nida Ibrar**

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ASSIGNMENT

Student Name: Student ID:

Q1. What is means that unique solution of the linear system? Find the unique solution of the given linear system (free hand to choose). Describe in details your assignment material not less than 15 pages. **(10)** **Your presentation/Viva will held on 29-04-2020 at 8:00 am**

(M. usman (01))

Q2. Define Cramer's Rule, why this method to dealing linear system of equation? Also find a determinant of n – order matrix? Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 29-04-2020 at 8:00 am**

(M. Danial (02))

Q 3. Explain the given statement with the help of matrix. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 02-05-2020 at 11:00 am**

For all square matrices A and B of the same size, it is true that $(A + B)^2 = A^2 + 2AB + B^2$

a) If A and B are invertible matrices of the same size, then AB is invertible and $(AB)^{-1} = A^{-1}B^{-1}$
b) If A and B are matrices such that AB is defined, then it is true that $(AB)^T = A^T B^T$
c) If A and B are matrices of the same size and k is a constant, then $(KA + B)^T = KA^T B^T$

(Aqsa Bashir (02))

Q 4. Show a network with four nodes in which the flow rate and directions of flow in certain branches are known. Find the flow rates and directions of flow in the remaining branches. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 02-05-2020 at 11:00 am**

(Rubab (04))

Q 5. Describe a technique that uses determinants to construct lines, circles, and general conic sections through specified points in the plane. Describe in details your assignment material not less than 15 pages. **(10) Your presentation/Viva will held on 02-05-2020 at 11:00 am**

(Rabia Akthar (05))

Q 6. Define the properties of Determinants, using the properties of determinants, evaluate the given determinant. $\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix}$, Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 29-04-2020 at 9:00 am**

(M. Asif (07))

Q 7. Expand the determinant of square matrix $A = [a]_{3\times3}$ along the second row and the first column and show that you get the same value. $|A| = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$. And also show that given matrix is singular are not? Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 29-04-2020 at 9:30 am**

(Rafaqat Ali (08))

Q8. Consider a linear system in form of matrix is given by $\left[\left(\begin{array}{ccc|c} 1 & 2 & 1 & 1 \\ -1 & 4 & 3 & 2 \\ 2 & -2 & \alpha & 3 \end{array}\right)\right]$

a) For what value of α will the system have a unique solution?
b) For what value of α will the system have no solution?
c) Is there a value of α at which the system has infinitely many solutions? Given reason to support your answer and show your work. **(10) Your presentation/Viva will held 02-05-2020 at 11:00 am**

(Zainab Ashraf (26))

Q 9. Geometrical description of the possible solution sets for a 3×3 linear system? Given reason to support your answer and show your work. **(10) Your presentation/Viva will held on 30-04-2020 at 8:00 am**

(Hamza Arif (10))

Q 10. Let A be a 4 × 4 matrix. Suppose that A can be reduced to an upper triangular matrix U by a sequence of elementary row operation

$$U = \begin{bmatrix} 3 & 1 & 4 & 0 \\ 0 & 1 & 1 & -2 \\ 0 & 0 & 2 & -1 \\ 0 & 0 & 0 & 4 \end{bmatrix}$$

Given reason to support your answer and show your work. **(10) Your presentation/Viva will held on 30-04-2020 at 8:30 am**

(M .Muzamil (11))

Q11. Difference between the Laplacian Matrix and Hermitian Matrix write the General form also give example 2 x 2 and 3x 3 order matrix? Given reason to support your answer and show your work not less than 15 pages. **(10) Your presentation/Viva will held on 30-4-2020 at 9:00am**

(M. Ammar (14))

Q12. a) Define the Rectangular Matrix and describe all type of rectangular matrix?

   b) Define the all properties of Transpose matrix?

Given reason to support your answer and show your work not less than 15 pages. **Your presentation/Viva will held on 30-04-2020 at 9:30 am**

(M Rizwan Javeed (20))

Q13. Define the Elementary Matrix and write the notation and their operation why and when use this Matrix your assignment material not less than 15 pages. Given reason to support your answer and show your work **(10)** your **presentation/Viva will held on 02-05-2020 at 11:00 am**

(Iqra Farooq (21))

Q14. If x, y, z are different and $\begin{matrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{matrix} = 0$; show that xyz = -1. Your assignment material not less than 15 pages. Given reason to support your answer and show your work **(10)** **Your presentation/Viva will held on 02-05-2020 at 11:00 am**

(Nargees Parveen (22))

Q15. Expand the determinant of square matrix A $= [a]_{3\times3}$ along the second row and the first column and show that you get the same value. $|A| = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$. And also show that given matrix is singular are not? Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 30-04-2020 at 9:30 am**

(Umer Abdullah (25))

Q.16 Define the Determinants, you can find determinant many others ways write the all possible method to find the determinants of given matrix, your assignment material not less than 15 pages. **(10) Your presentation/Viva will held on 02-05-2020 at 11:00 am.**

Give matrices are

$$A = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix} \qquad B = \begin{bmatrix} 4 & 7 & 0 & 0 \\ 2 & 8 & 0 & 0 \\ 0 & 0 & 1 & 5 \\ 0 & 0 & -2 & 2 \end{bmatrix}$$

(Iqra Shazadi (27))

Q 17. Determinant of the Inverse by the Gauss–Jordan Method. Why we use this method? Describe in details your assignment material not less than 15 pages. **(10) Your presentation/Viva will held on 01-05-2020 at 08:00 am**

Give matrices is A $= \begin{pmatrix} -1 & 1 & 2 \\ 3 & -1 & -2 \\ -1 & 3 & 4 \end{pmatrix}$

(Sharafat Ali(28))

Q.18. Define the vector space? And show that R^n, C^n and 2×2 order ($matrix$) also perform a vector space if not write the reason? Describe in details your assignment material not less than 15 pages. **(10) Your presentation/Viva will held on 01-05-2020 at 8:30am**

(Asif Iqbal (29))

Q19. Define the Linear Combination? Suppose 6×1 column vectors and 6×6 order matrices, write the possible combination of the given matrix. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 01-05-2020 at 9:00am**

(**Afaq ul – Hassan (30)**)

Q20. Define the inverse of a product? Can you find the inverse of a product of $n \times n$ order Matrices? If yes find the inverse of a product of 5 order matrix. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 01-05-2020 at 9:30 am**

(**Mazhar Iqbal (34)**)

Q 21. Use elementary row operations to solve the linear system $\begin{pmatrix} -2x_1 + x_2 - 2x_3 = 2 \\ x_1 - 2x_2 + 2x_3 = -1 \\ x_1 - 5x_2 + 4x_3 = -1 \end{pmatrix}$, Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 29-04-2020 at 8:00 am**

(**Nouman Ali (36)**)

Q 22. Suppose A is a real n by n matrix. Describe the process of using the elementary row operation to determine if A is invertible and if it is, finding the inverse of A. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 02-05-2020 at 11:00 am**

(**Laraib Fayyaz (38)**)

Q 23. Use elementary row operation to find the inverse of the matrix $\begin{pmatrix} -1 & -2 & 0 \\ -1 & 2 & 0 \\ 1 & 0 & -2 \end{pmatrix}$, Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 02-05-2020 at 11:00 am**

(**Baseerat Manzar (E-34)**)

Q 24. State a rank theorem. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 02-05-2020 at 11:00 am**

(**Nishat ul sani (E-39)**)

Q 25. Suppose A is an n by n matrix. Given at least 10 Equivalent statement to A is invertible. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 29-04-2020 at 9:00 am**

(Hassan Abbas (E-005))

Q 26. Show that the system $\begin{pmatrix} -2x_1 + x_2 - 2x_3 = 2 \\ x_1 - 2x_2 + 2x_3 = -1 \\ x_1 - 5x_2 + 4x_3 = -1 \end{pmatrix}$ is inconsistent. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 02-05-2020 at 11:00 am**

(Nimra Safdar (E-004))

Q 27. Solve the following nonlinear system for unknown angle $0 \leq \alpha \leq 2\pi, \ 0 \leq \beta \leq 2\pi, \ 0 \leq \gamma \leq \pi$, given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 02-05-2020 at 11:00 am**

$$2 \sin\alpha - \cos\beta + 3 \tan\gamma = 3$$
$$4\sin\alpha + 2\cos\beta - 2\tan\gamma = 2$$
$$6\sin\alpha - 3\cos\beta + \tan\gamma = 9$$

(Saba Mushtaq (67))

Q 28. Use any method to solve the unique solution of linear system. Given reason to support your answer and show your work not less than 15 pages. **(10)Your presentation/Viva will held on 29-04 2020 at 9:30 am**

$$\alpha x_1 + x_2 = 5$$

$$4x_1 + \alpha x_2 = -1$$

(Waseem akram 53)