

American International University-Bangladesh

Faculty of Science and Technology

Department of Mathematics

MAT 2202: Matrices, Vectors and Fourier Analysis

Midterm Examination (Sample Question) Spring: 2022-23

Total Marks: 40 Time: 2 hours

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1. **Short Questions:**
2. Define the followings: matrix, Symmetric matrix, skew-symmetric matrix, singular matrix, unit matrix etc.
3. For which value(s) of matrix will be a singular matrix?
4. What is the cofactor of for the matrix ?
5. Is the matrix in Row Echelon form (REF) or Reduced Row Echelon form (RREF)?
6. Encode the message “….” by using matrix .
7. Does the system of linear equations is consistent? If consistent, what type of solution it has?
8. Consider the objective function subject to given constraints. Sketch the feasible region also.
9. Check whether the function is even function or odd function or neither.
10. Write the period of the following functions: (a) , (b) .
11. Find -point DFT for where the unit impulse function

**Part-B**

1. **Answer the followings:**
2. Test whether the system of linear equations is consistent. If consistent find the solutions of the system.
3. Solve the system of linear equations
4. Given system of linear equation:

Find the value(s) of for which the system has (i) no solution, (ii) a unique solution, (iii) many solutions.

1. **Answer the followings:**
2. Consider the encrypted code is “…………………”. Find the original message from the given code by using the matrix .
3. The network in the figure below shows the traffic flow (in vehicles per hour) over the several one-way streets. Find the general flow pattern of the given diagram.
4. Find the optimum value(s) of the objective function by graphical method. Where the objective function is , constraints are

non-negative conditions are

1. **Answer the followings:**
2. Consider the function
3. Sketch the above function in the interval.
4. Find the Fourier coefficients and hence write the Fourier series for the given function.
5. Sketch the odd/even extension of the function . Find the sine/cosine series of the function in the interval .
6. Find the Fourier integral of the function .
7. Find the Fourier sine/cosine integral of where .