CODE NO: RR 210101

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

II B.TECH. I SEMESTER REGULAR EXAMINATIONS
MATHAMATICS II
(INFORMATION TECHNOLOGY)

APRIL/MAY 2005

TIME: 3 HOURS
MARKS: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define the rank of the matrix and find the rank of the following matrix.
2664
2 1 3 5
4 2 1 3
8 4 7 13
8 4 -3 -1 3775
(b) Find whether the following equations are consistent, if so solve them. x+y+2z = 4 ; 2x-y+3z= 9 ; 3x-y-z=2

2. Verify Cayley-Hamilton theorem for A =2
4
1 2 3
2 4 5
3 5 6
35
hence deduce A-1

3. (a) Prove that the inverse of an orthogonal matrix is orthogonal and its transpose is also orthogonal.

(b) Reduce the quadratic form 3x21+3x22 +3x23 +2x1x2+2x1x3-2x2x3 into sum of
squares by an orthogonal transformation and give the matrix of transformation

4. (a) An alternating current after passing through rectifier has the form i = □ I0sinx, for 0 □ x □ □ 0, for □ □ x □ 2□ where I0 is the maximum current and the period is 2□. Express i as a Fourier series.

(b) Represent the following function by Fourier sine series
f (x) = □ 1, 0 < x < m
2 0, m 2 < x < m

5. (a) Form the partial differential equation by eliminating the arbitrary function from z = f(y) + -(x + y).

(b) Solve the partial differential equation p2z2sin2x + q2z2cos2y = 1

(c) Solve the partial differential equation q2y2 = z(z - px)

6. A square plate has its faces x = 0 and x = □ (0 < y < □) insulated . Its edges y

= 0 and y = □ are kept at temperatures 0 and f(x) respectively. Derive the formula for steady state temperature.

7. (a) Find the finite Fourier cosine transform of f(x) = □ x if 0 < x < □ /2

□ - x if □ /2 < x < □

(b) Find the Fourier cosine transforms of e-ax sin ax.

8. (a) State and prove final value theorem

(b) Using Z-transform solve 4un - un+2 = 0 given that u0 = 0, u1 = 2.