Unit – I

Short – questions

1. Solve (D2 – 2D + 4)2y = 0.
2. Find P.I .
3. Find P.I of ( D2 – 3D + 2 )y = cos 3x .
4. Solve ( D4 + 8D2 + 16 )y = 0.
5. Solve .
6. Solve (.
7. Solve (D2 – 2D + 4)y = ex cos x.
8. Solve .

Long – questions

1. Find particular integral of f(D)y = eax , where “a” is a constant.
2. a)Solve ( D3 + 1 )y = cos( 2x – 1 ) .

b)Solve .

1. a) Explain the general solutions of homogeneous linear differential equation.
2. Solve ( D2 + 1 )y = .
3. a) Solve ( D3 – 7 D2 + 14 D – 8 )y = .
4. Solve the differential equation ( D2 + 4 ) y = .
5. a) Solve .

b) Solve (

1. a) Solve by the method of variation of parameters .
2. Solve ( D3 – 4 D2 – D + 4 ) y =
3. a) Solve the differential equation .

b) Solve ( D3 – 4 D2 – D + 4 )y = e3x cos 2x .

1. a) Solve .

b) Solve .

Unit – II

Short – questions

1. Find Cartesian equation of r2 = 4rcos .
2. Let f(x , y) = xcosy + yex then find fx , fy and show that fxy  = fy x .
3. Find all polar coordinates of each point i) ( 2 , ) ii) (- 2 , ).
4. Let Z = f(x, y) and x = eu+ e-v and y = e-u- ev. Prove that .
5. If Z = .
6. If u = show that .
7. Find all the polar coordinates of the point P( 2, ).
8. Find the Cartesian equation of .

Long – questions

1. Divide 24 into three parts such that the continued product of the first , square of the second and cube Of the third is maximum then find the three numbers.
2. Find the point on the plane 3x + 2y + z – 12 = 0 that is closest to the origin.
3. a) If and then prove that .

b) If u = f( y – z, z – x, x – y,) then prove that .

1. Find the points on the sphere x2 + y2 + z2 = 4 that are closest and farthest from the point (3, 1, - 1 ).
2. a) If u = , show that .

b) If then find J(u, v).

1. Expand f(x, y ) = in power of (x – 1 ) and (y – 1 ) up to third – degree terms.

Hence compute f(1.1, 0.9) approximately.

1. a) Find the Length of one arch of the cycloid x = a(t – sin t), y = a(1 – cos t).

b) Find the perimeter of the loop of the curve 3ay2 = x(x – a )2.

1. a) Find the minimum and maximum values of x3 + 3xy2 – 15x2 – 15y2 + 72x.

b)Show that the rectangular solid of maximum volume that can be inscribed in a sphere is

cube.

Unit – III

Short – questions

1. Find the value of a0 in half – range cosine Fourier series of f(x) = xsinx in the interval 0< x < .
2. Expand f(x) = x as a Fourier series in ( - ) .
3. Find an in the Fourier series of f(x) = e-x in the interval ( -l, l ).
4. Obtain the half – range sine series for .
5. Express f(x) = x2 as a Fourier series in ( - ).
6. Find the value of bn in the Fourier series of the function f(x) = x2 where .

Long – questions

1. Find the Fourier series of x – x2 from x = - to x = .
2. Obtain the Fourier series of f(x) = k where k is constant.
3. Expand f(x) = as a Fourier series .
4. Find the Fourier series of the periodic function defined as f(x) = .

Hence deduce that .

1. Obtain the Fourier series in ( - ) for the function f(x) = .

Hence deduce that .

1. Expand as a Fourier series of the function f(x) = and deduce that the

Value of

1. Find the Fourier series for f(x) = in 0 < x < 2 and hence deduce that

.

1. Find the Fourier series of period 2 for the function f(x) = x2 – x in (- Hence deduce that

.

Unit – IV

Short – questions

1. Evaluate .
2. Evaluate over the area between y = x2 and y = x .
3. Evaluate .
4. Evaluate .
5. Evaluate by changing to polar coordinates.
6. Evaluate .
7. Evaluate .
8. Compute .

Long – questions

1. a) By changing into polar coordinate, evaluate over the annular region between

The circle .

b)Evaluate over the area bounded by the ellipse .

1. a) Using double integration determine the area of the region bounded by the curves y2 = 4ax

x + y = 3a and y = 0.

b) Evaluate taken over the volume bounded by the surfaces x2 + y2 = a2 ,

x2 + y2 = z and z = 0.

1. a) Evaluate taken over the volume bounded by the planes x = 0, y = 0, z = 0,

x + y + z = 1.

b)Find over the area bounded by the ellipse .

1. a) Find the volume bounded by the cylinder x2 + y2 = 4 and the plane y + z = 4 and z = 0.

b) Evaluate where R is the region in the first quadrant bounded by the lines x = y

y = 0, x = 8 and the curve xy = 16.

1. Find the volume of the ellipsoid . By treble integral.

Unit – V

Short – question

1. Solve the system of equations 
2. Find the Rank of .
3. Determine the values of when is orthogonal.
4. Show the equations x + y + z = 6, x + 2y + 3z = 14, x + 4y + 7z = 30 are consistence and Solve them.

Long – questions

1. a) Investigate the values of so that the equations

have i) no solution ii) a unique solution iii) an infinite number of solutions.

b) Find the Rank of the Matrix, by reducing it to the normal form .

1. a) If , show that the system of equations – 2x + y + z = a, x – 2y + z = b, x + y – 2z = c

Has no solution . If , show that it has infinitely many solutions .

b)Find the Rank of the matrix A = by reducing it to the normal form.

1. a) Determine whether the following equations will have a non – trivial solution if so solve them.

4x + 2y + z + 3w = 0, 6x +3y + 4z +7z = 0, 2x +y +w = 0.

b) Test for consistence and hence solve the system; x + y + z = 6, x – 2y +2z = 5, 3x + y + z = 8,

2x – 2y + 3z = 7.

1. a) Find the inverse of the matrix by Gauss – Jordan method .

b) Find the values of p and q so that the equations 2x + 3y + 5z = 9, 7x + 3y + 2z = 8,

2x + 3y + pz = q have (i) no solution (ii) unique solution , (iii) an infinite number of solutions.

Unit – VI

Short – questions

1. Show that Eigen values of triangular matrices ore its principal diagonal elements .
2. Find eigen values of .
3. Let A = then find Eigen values of 3A3 + 5 A2 – 6 A + 2I.
4. Show that Eigen values of idempotent matrix is 0, or 1.
5. Find the characteristic equation of .
6. If is an Eigen value of non – singular matrix A. Show that is an Eigen value of the Matrix *adj* A.

Long – questions

1. Show that Eigen vectors corresponding Eigen values of  are linearly independent .
2. If where A = then find . Hence find .
3. Find the Eigen values and the corresponding Eigen vectors of A = .
4. If A = verify Cayley – Hamilton theorem. Find by Cayley – Hamilton Theorem.
5. Using Cayley- Hamilton theorem find inverse and A4 of the matrix A = .
6. Find Eigen values and Eigen vectors of .
7. Find the Eigen values corresponding Eigen vectors of