**Chapter 1**

**Relations and Functions**

**1 mark**

**1. If  is defined by find Also evaluate .**

**2. Find the domain and range of the functions i)  ii) **

**3. Find the domain and range of the function **

**4. Find the domain and range of the function **

**5. Find the domain and range of the function **

**6. Find the domain and range of the function **

**7. Let f and g be real valued function, such that  ,Find**

**the functions f and g**

**8. If f: R  be given by f ( x) =  then find **

**4 marks**

**1. Let A= and R be a relation *“ is one-fifth of ”*on A. Write R**

**as a subset of and also find the domain and range of R**

**2. Let R be a relation from N to N defined by**

** Check whether its symmetric, reflexive**

**and transitive**

**3. Let R be the relation on the set R of Real numbers defined by**

** Show that the relation R is symmetric and**

**neither reflexive nor transitive.**

**4. Show that the Relation R on the set defined by (a,b)R(c,d) iff a+d=b+c**

**is an equivalence relation.**

**5. Show that the relation R on the set  defined by (a,b)R(c,d) iff**

**ad(b+c)=bc(a+d) is an equivalence relation.**

**6. Let .Let R be the equivalence relation on **

**defined by iff Find the equivalence classes of (1,3) and (4,1).**

**7. Let R be the equivalence relation on the set Z defined by iff xRy f**

**Show that the equivalent classes of 1 and 4 are equal.**

**8. Let Let R be the equivalence relation on A defined by**

**the congruence modulo 7. Find the partition defined by this relation.**

**9. Let A={1,2,3,………..,19,20}.Let R be the equivalence relation on R defined by**

**congruence modulo5. Find the distinct equivalence classes of R**

**10. In the following relations ,determine whether the following relations are**

**reflexive, symmetric or transitive:**

** for some **

**11) Let the functions f and g be real functions defined by**

**andFind the functions **

**12) Prove that the function is a one-one function **

**13) Check the function  is onto or not**

**14) Check the function  is onto or not**

**15) Define Signum function? Show that it is neither one-one nor onto**

**16) Show that the relation R in the set A of all the books in a library of a college, given by**

**R = {(x, y): x and y have same number of pages} is an equivalence relation**

**17) Show that the relation R in the set A = {1, 2, 3, 4, 5} given by R = {(a, b) : |a – b| is even},**

**is an equivalence relation.**

**18) Let f: R be defined by f(x) = 3x+2.Show that f is invertible. Also find f:RR**

**19) Let R be a relation on NN defined by (a, b)R (c, d) ad=bc, for all (a,b) and (c,d)N .**

**Show that R is an equivalence relation .**

**20) Let T be the set of all triangles in a plane with R as a relation in T given by**

**,Show that R is an equivalence relation.**

**21) Show that relation R defined in the set A of all triangles as R = {(T1,T2): T1 is similar to**

**T2}, is equivalence relation. Consider three right angle triangles T1 with sides 3, 4, 5, T2**

**with sides 5, 12, 13 and T3 with sides 6, 8, 10. which triangles among T1 , T2 and T3 are**

**related.**

**22) Show that the function f(x) = 4x +3 , x is a real number is invertible find its inverse?**

**CHAPTER 2**

**INVERSE TRIGONOMETRIC FUNCTIONS**

**1 Mark Questions**

1. **Find the principal value of **
2. **Evaluate **
3. **Evaluate: **
4. **If cos= 2  find **
5. **Find the principal value of **
6. **Find the principal value of **
7. **Find the principal value of **
8. **Find the value of **
9. **Show that sin**
10. **If **
11. **Evaluate **
12. **Write the simplest form :**

**2 Mark Questions**

1. **Prove that **
2. **Write in the simplest form **
3. **If ,prove that **
4. **Write in the simplest form : tan where **
5. **Evaluate **
6. **Prove that **
7. Express tan – 1 ,  < x <  in the simplest form
8. Show that Sin – 1  + cos – 1  + tan – 1  = π
9. Show that Sin – 1  − Sin – 1  = cos – 1 

**10. Solve for x: **

**11. Express  where  in simplest form**

**12.Prove that =+**

1. **Prove that **
2. **Prove that **
3. **Prove that **
4. Solve for x ****
5. Solve for x ****
6. Solve for x ****

**Chapter 3**

**Matrices**

**1 mark**

1. **Give that A,B are two symmetric matrices such that AB =BA .Is AB**

**symmetric?**

1. **Find the values of x,y and z if **
2. **Give an example of two non zero 2 × 2 matrices A and B such that  but**
3. **For what value of k the matrix  has no inverse?**
4. **,find the values of x and y**

**6. If A = , find x if A + A’ = I**

**7. If x  + y  = , find the values of x and y.**

8**. If x  + y  = , find the values of x and y**

**9. If A, B are symmetric matrices of same order, then AB – BA is a**

**(A) Skew symmetric matrix (B) Identity matrix (C) Zero matrix**

**(D) symmetric matrix**

**10. If A is square matrix such that A2 = A, then ( I + A )3 – 7 A is equal to**

**(A) A (B) I – A (C) I (D) 3A**

**11. If A =  and A + AT = I. Find the value of **

**12. Find the value of ‘x’ if **

**13. Find the constant ‘c’ if A =**

**14. Construct a 2 X 3 matrix whose ij th term is given by aij = = 2 i + 3 j**

**2**

**15.  find a, b**

**16.  if  is a singular matrix**

**17. Find the possible orders of the matrices with total number of elements 18**

**18. What is the number of possible 3 X 3 matrices with entries either 0 or 1**

**19. If A=diag[2, -5, 9], then write the matrix**

**20. If f(x) = x2 + 1 find f(A) where A = **

**4 marks**

**1. Using elementary transformations find the inverse of **

**If ,verify that , hence find **

**2. If A = , prove that An = , where n is any positive integer.**

**3. Prove that any square matrix can be splited into a sum of symmetric and skew**

**symmetric matrice.**

**4. Consider the matrices A =  B =  then prove the following**

**(A + B )’=A’ + B’, and (AB)’ = B’A’**

**5. Using elementary transformation, find the inverse of **

**6. If A and B are square matrices of the same order such that AB = BA, then prove by**

**induction that ABn = BnA.Further, prove that (AB)n = AnBn for all n**

**7. Find the matrix X such that 2A – B + X = 0, where  and **

**8. Find the matrix A such that **

**9. Show that inverse doesn’t exist for the matrix **

**6 marks**

**1. Using elementary transformations find the inverse of the matrix **

**2. If  and I is the identity matrix of order 2, show that**

**I + A=( I – A)**

**3. Using the elementary transformations find the inverse of **

**Chapter 4**

**Determinants**

**1 mark**

**1. If for matrix A,find where matrix A is of order **

**2. Find x, if** 

**3. Find Adjoint of **

**4. Find the value of p if the matrix  is singular**

**5. Find the value of **

**6. Find the inverse of **

**7. Find the solutions of the system 2x + 3y = 4 and 3x – y = 8, using matrix method**

**8. If find x**

**9. A is a square matrix of order 4, =3 then find **

**4 marks**

**1. Without expanding the determinant prove that is a factor of**

****

**2. Use the product to solve the system of equations**

**x - y + 2z = 1, 2y -3z = 1 , 3x -2y + 4z = 2**

**3. The sum of three numbers is 6.Twice the third number when added to the first number**

**gives 7.On adding the sum of the second and third numbers to thrice of the first number we**

**get 12.Find the numbers using inverse of a matrix.**

**4. If x , y, z are different and **

**5.** 

**6. Verify A(adjA) = (adjA)A =  for the matrix **

**7. For the matrix A =  show that hence find A-1**

**8. Prove that **

**9. Let A= verify that i) ii) (A=A**

**10. Prove that = 1**

**11. Prove that = 4a2b2c2**

**12. Show that **

**13. Show that  (a3 + b3 + c3 – 3abc) using properties of determints**

**14. Prove that **

**15. Prove that **

**16. Show that **

**17. Evaluate, where a,b,c are in AP**

**18\*. If A + B + C = , show that **

**19. Prove that **

**20. If a + b + c = 0 and  then show that x = 0 or x = **

**21. Show that **

**6 marks**

**1. Using matrices, solve the following system of equations:**

**x+ y + z =3; x – 2y + 3z = 2; 2x – y + z = 2**

**2. Use the product to solve the system of equations**

**x - y + 2z = 1, 2y -3z = 1 , 3x -2y + 4z = 2**

**3. The sum of three numbers is 6.Twice the third number when added to the first number**

**gives 7.On adding the sum of the second and third numbers to thrice of the first number we**

**get 12.Find the numbers using inverse of a matrix.**

**4**. **Given two matrices  and  verify that BA = 6I, Use**

**the result to solve the system x - y = 3; 2x + 3y + 4z =17; y + 2z = 7**

**5. Solve the following system of equations by matrix method, where x, y & z # 0**

**−  + = 10 ;  +  + = 10 ;  −  +  = 13.**