**DAV PUBLIC SCHOOL CHANDRASEKHARPUR, BBSR-21**

**POST SUMMER VACATION TEST (2023-24)**

**CLASS - XII**

**SUB: MATHEMATICS (Code– 041)**

**Time allowed: 1 ½ hrs Maximum Marks: 40**

 **General Instructions:**

1. This question paper contains two parts A and B. Each part is compulsory. Part A carries 11 marks and part B carries 29 marks.
2. Part A has objective type questions and Part B has descriptive type questions.

 **PART-A**

1. It consists of two sections A and B.
2. Section A comprises of 9 MCQs
3. Section B comprises of two assertion reasoning based questions.

 **PART-B**

1. It consists of four sections C, D, E and F.
2. Section –C comprises of 3 questions of 2 marks each.
3. Section –D comprises of 3 questions of 3 marks each.
4. Section – E comprises of 2 questions of 5 marks each.
5. Section – F comprises of 1 case based question of 4 marks.

 **PART-A**

 **Section-A**

Q1. Let Then, the number of reflexive relations on A containing is

1. 16 (b) 24 (c) 32 (d) 64

Q2. Let be defined by , Then *f* is

1. only one-one (b) only onto (c) bijective (d) none of these

Q3. If the set A contain 4 elements and the set B contains 5 elements, then the number of surjective mappings from A to B is

1. 720 (b) 120 (c) 0 (d) none of these

Q4. The value of is

1. (b) (c) (d)

Q5. If a square matrix of order 3 is formed by using 0 or 1 only, then the number of skew-symmetric matrices are formed within it is

1. 1 (b) 5 (c) 25 (d) none of these

Q6. The principal value branch of is:

1. (b) (c) (d) {0}

Q7. If A = {1, 2, 3}, then number of relations defined on A are both reflexive and symmetric is

(a) 8 (b) 16 (c) 32 (d) 64

Q8. If , , and (A + B) is , then is

(a) 40 (b) – 20 (c) – 10 (d) 12

Q9. For any two unequal square symmetric matrices A and B of same order (2A - 3B) will be

(a) Null matrix (b) symmetric matrix (c) skew symmetric matrix (d) none of these

 **Section-B**

**Assertion – Reasoning Type Questions**

For the following two questions respond as follows:

* 1. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
	2. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
	3. Assertion is true but Reason is false
	4. Assertion is false but Reason is true

Q10. **Assertion :** Let f : R → R be a function such that . Then *f* is one-one.

**Reason :** A function will be one – one if every element in A has unique image in B w.r.t. the function *f.*

Q11. **Assertion:** {(1,2), (2,3), (1,3) } is transitive.

 **Reason :** If x R y and y R z then R is transitive when z R x.

**PART-B**

 **Section-C**

Q12. Evaluate:

 +)

Q13. Show that the function , given by , is one-one but not onto.

Q14. Construct a 22 matrix A= whose elements aij given by

 aij =

 OR

 If = , find the value of .

 **Section-D**

Q15. If a function is function defined as , then find whether f(x) is invertible or not? If not then adjust the domain and codomain with reason to make it invertible. Hence plot the graph of in its principal domain.

Q16. Find a matrix A such that: , where B= and C=

Q17. Find whether the function: } given by f(x) = is bijective?

OR

Show that the function defined by , is neither one-one nor onto.

 **Section-E**

Q18. Show that the relation R defined by is an equivalence relation.

 OR

Let R be a relation on the set A of ordered pairs of non-zero integers defined by . Show that R is an equivalence relation.

Q19. If A= , show that A25A+7I2 = 0 , using this find .

 **Section – F**

Q20. Two farmers X and Y cultivate only three varieties of pulses namely Urad, Masoor and Mung. The sale (in Rs.) of these varieties of pulses by both the farmers in the month of September and October are given by the following matrices A and B.


 September Sales (in Rs.)

 Urad Masoor Mung

A =

 October Sales (in Rs.)

 Urad Masoor Mung

B =

 Using algebra of matrices, answer the following questions.

1. Find the combined sales of Mung in September and October, for farmer X. (1mark)

OR

 Find the combined sales of Urad and Masoor for the farmer Y in the month of September. (1mark)

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ii. Find the decrease in sales of Urad from September to October, for the farmer Y. (1mark)

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iii. If both farmers receive 5% profit on gross sales, compute the profit for each farmer and for each variety sold in October.(2marks)

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