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| **PT1/MAQP/1223/B 08-MAY-2023** | | | | | | | | |
| **PERIODIC TEST I (2023-24)** | | | | | | | | |
| **Subject: Mathematics**  **Grade: XII** | | | | | **Max. Marks:35**  **Time:1 Hr 15 Mins** | | | |
| **Name:** | | | | **Section:** | | | | **Roll No:** |
| **Instructions :** | | | | | | | | |
| **Section A(1 mark each )** | | | | | | | | |
|  | If A =  and | | | | | | | |
|  | **a.** | | 9 | | | **b.** | 1/9 | |
|  | **c.** | | 81 | | | **d.** | 0 | |
| **2.** |  | | | | | | | |
|  | **a.** | | R | | | **b.** |  | |
|  | **c.** | |  | | | **d.** |  | |
| **3.** | **cos-1  =** | | | | | | | |
|  | **a.** | |  | | | **b.** | 4π | |
|  | **c.** | |  | | | **d.** | π/6 | |
| **4.** | Assertion (A)- Function f : R → R given by f(x) = sin x is not a bijection.  Reason(R) - A function f : A → B is said to be bijection if it is one-one and onto. | | | | | | | |
|  | **a.** | | Both A and R are true and R is the correct explanation of A. | | | **b.** | Both A and R are true but R is not the correct explanation of A. | |
|  | **c.** | | A is true but R is false. | | | **d.** | A is false but R is true. | |
| **Section B(2marks)** | | | | | | | | |
| 5 | | Let R be the relation in the set A = {0,1,2, 3,4,5} given by  R=[(a, b) : 2divides (a-b)}. Verify R is reflexive ,symmetric and transitive also Write the equivalence class [0]. | | | | | | |
| 6 | | Simplify  sin-1 , - < x < | | | | | | |
| 7 | | Prove that.  sec2 (tan-1 2) + cosec2 (cot -1 3) = 15 | | | | | | |
| **Section C ( 3 marks )** | | | | | | | | |
| 8 | | Find the matrix A satisfying the matrix equation A = . | | | | | | |
| 9 | | Let A = and I be the identity matrix of order 2.  Show that I + A = (I - A) | | | | | | |
| 10 | | Determine the relation R defined on set of real numbers R as    is reflexive ,symmetric and transtive | | | | | | |
| 11 | | Show that f:NN defined by f(n) = is not one -one but an onto function | | | | | | |
| **Section D ( 4 Marks ) (case study)** | | | | | | | | |
| 12 | | A trust fund has ₹ 35000 that must be invested in two different types of bonds, say X and Y. The first bond pays 10% interest p.a. which will be given to an old age home and second one pays 8% interest p.a. which will be given to WWA (Women Welfare Association). Let A be a 1 × 2 matrix and B be a 2 × 1 matrix, representing the investment and interest rate on each bond respectively.   1. Represent the given information in matrix algebra. 2. If ₹15000 is invested in bond X, then find total amount of interest received on both bonds? 3. If the trust fund obtains an annual total interest of ₹ 3200, then find the investment in two bonds. 4. If the amount of interest given to old age home is ₹500, then find the amount of investment in bond Y | | | | | | |
| 13 | | 1. Show that the relations R on the set R of all real numbers, defined as   R = {(a, b): a b2} is neither reflexive nor symmetric nor transitive. Prove with the counter examples.   1. Prove that the greatest integer function f: R R, given by f (x) = [x], is neither one-one nor onto, where [x] denotes the greatest integer less than or equal to x. | | | | | | |
| **SectionE( 5 marks )** | | | | | | | | |
| 14 | Determine the product and use it to solve the system of equations:  x – y + z = 4, x – 2y – 2z = 9, 2x + y + 3z = 1.  \*\*\* | | | | | | | |