DAV PUBLIC SCHOOL POKHARIPUT, BHUBANESWAR-20

SET NO – 01

Roll No.

PSVT- 2021-22

- Check that this question paper contains 5 printed pages.
- Set number given on the right hand side of the question paper should be written on the title page of the answer book by the candidate.
- Check that this question paper contains 19 questions.
- Write down the Serial Number of the question in the left side of the margin before attempting it.

CLASS- XI

SUBJECT: MATHEMATICS

Time : $1\frac{1}{2}$ Hours   **Maximum Marks : 40**

General Instructions:

1. This question paper contains two parts A and B. Each part is compulsory. Part A carries 12marks and part B carries 28 marks.
2. Part A has objective type questions and Part B has descriptive type questions.
3. Both Part A and B have choices.

Part-A

1. It consists of two sections I and II.
2. Section I comprises of 8 very short answer type questions.
3. Section II comprises of one case study. Each case study comprises of 5 case based MCQs. An examinee is to attempt any 4 out of 5 MCQs.

Part-B
1. It consists of two sections III and IV.
2. Section –III comprises of 6 questions of 2 marks each.
3. Section –IV comprises of 2 questions of 3 marks each.
4. Section – V comprises of 2 questions of 5 marks each.
5. Internal choice is provided in 3 questions of section-III, 2 questions of Section-IV and 3 questions of Section-V . You have to attempt only one of the alternatives in

Part –A

Section-I

All questions are compulsory. In case of internal choices, attempt any one

1. Let R be a relation on N defined by x + 2y = 8, then find the domain of R.
2. Let A = {5,6} and B = {7,6} , find the number of relations from A to B.

OR

Find x and y if (x+3,5) = (6,2x+y)

3. If f(x) = $\begin{cases} 1-x & x \le 1 \\ x-1 & x > 1 \end{cases}$, evaluate f(0) + f(2).

4. Find the domain of the function $f(x) = \frac{1}{3x+2}$.

OR

Find the range of f(x) = 2 − |x|

5. If $f(x) = x^2 - \frac{1}{x^2}$, then find the value of $f(x) + f\left(\frac{1}{x}\right)$.

6. Let $P = \left\{\frac{1}{x} : x \in N, x < 7\right\}$ and $Q = \left\{\frac{1}{2x} : x \in N, x \le 4\right\}$, find P∩ Q.

OR

If A = {1,2,3,4,5,6} , B = {2,4,6,8} ,find A- B .

7. Write all subsets of set A = { Ø , 1 }

8. If n(A) = 115 , n(B) = 326 , n(A-B) = 47 , then find n(A∪B).

Section-II

The following case study is compulsory. Attempt any 4 sub parts from 5. Each question carries 1 mark.

9.

Of the members of three sports teams in a certain school, 21 are in the basketball team , 26 in the hockey team and 29 in the football team,14 play hockey and basketball, 15 play hockey and football,12 play football and basketball and 8 play in all the three games:

(i)   The number of members are in all is
 a)   43
 b)   42
 c)   29
 d)   26

(ii)   The number of members in only basketball team is
 a)   21
 b)   3
 c)   14
 d)   4

(iii) The number of members in exactly one of the team is
 a)   10
 b)   15
 c)   18
 d)   20

(iv)   The number of members in exactly two of the team is
 a)   5
 b)   6
 c)   10
 d)   17

(v)   The number of members in football and basketball team but not in hockey team
 a)   4
 b)   3
 c)   2

d) 6

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Part-B

Section-III

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10.   Let A, B two sets. If $A \cap X = B \cap X = \emptyset$ and $A \cup X = B \cup X$, for some set X ,
      Show that $A = B$

<div align="center">**OR**</div>

   If $P(A) = P(B)$,show that $A = B$.

11.   Using properties show that $(A \cap B) \cup (A-B) = A$.

12.   In a school there are 20 teachers who teach Mathematics or Physics. Of these 12
       teach mathematics and 4 teach both physics and mathematics. How many teach
       physics.

13.   Let $A = \{1,3,5\}$. Define a relation R from A to A as $R = \{(x, y): x + y > 6;$
       $x, y \in A\}$ .Write R in roster form. Write its domain and range.

14.   Find domain and range of the real function $f(x) = \sqrt{x - 1}$.

<div align="center">**OR**</div>

   If $f(x) = x^2$ and $g(x) = 2x+1$, find $(f+g)(x)$.

15.   Why the relation f defined by $f(x) = \begin{cases} x^2 & 0 \le x \le 2 \\ 3x & 2 \le x \le 10 \end{cases}$ is not a function.

<div align="center">**Section-IV**</div>

   All questions are compulsory. In case of internal choices attempt any one.

16.   (i) Find the domain of the function $f(x) = \frac{x^2+2x+1}{x^2-8x+12}$

   (ii) Let $f = \{ (1,1),(2,3),(0,-1),(-1,-3)\}$ be a function from Z to Z defined by $f(x) = ax$
   $+ b$, for some integers a and b .Find a and b   .

<div align="center">**OR**</div>

   A relation R is defined on $A = \{1,2,3,4,5\}$ as $R = \{(x,y): y = x + 1 , x , y \in$
   $A\}$.Write R in Roster form.Write its domain and range.Is R a function from A to
   A.Justify.

17.   If A and B are two sets such that : $n(A - B) = 14 + x$, $n(B - A) = 3x$ and $n(A \cap B) =$
      x , draw a venn-diagram to illustrate information and if $n(A) = n(B)$ then find the
      value of x .

<div align="center">**SectionV**</div>

   All questions are compulsory. In case of internal choices attempt any one.

18. R be a relation defined on A = {1,2,3,4,5,6} as R = $\left\{(x,y): y = x + \frac{6}{x}, x, y \in A\right\}$

    (i)Find the domain and range of R

    (ii)Draw an arrow diagram of the relation R

    (iii)Is R a function on A .Justify your answer

    OR

    If f(x) = $\frac{1+x}{1-x}$, show that $\frac{f(x).f(x^2)}{1+[f(x)]^2} = \frac{1}{2}$.

19. Find the domain and range of f(x) = $\sqrt{16 - x^2}$.

    OR

    Draw the graph of f(x) = $\begin{cases} 1 - x & x < 0 \\ 1 & x = 0 \\ 1 + x & x > 0 \end{cases}$. Hence find domain and range.

...........................BEST OF LUCK................