

Model Question Paper
Sets and Functions - Part V
10th Standard

Maths

Reg.No. :

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I. Answer all the questions.
II. Use Blue pen only.

Time : 01:00:00 Hrs

Total Marks : 70

Section-A

4 x 1 = 4

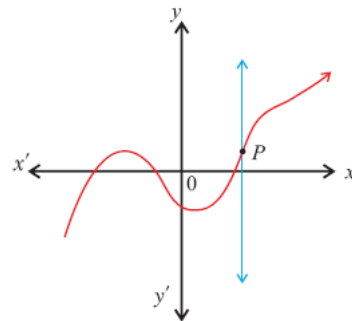
- 1) If $A = \{5, 6, 7\}$, $B = \{1, 2, 3, 4, 5\}$ and $f: A \rightarrow B$ is defined by $f(x) = x - 2$, then the range of f is
(a) $\{1, 4, 5\}$ (b) $\{1, 2, 3, 4, 5\}$ (c) $\{2, 3, 4\}$ (d) $\{3, 4, 5\}$
- 2) If $f(x) = x^2 + 5$, then $f(-4) =$
(a) 26 (b) 21 (c) 20 (d) -20
- 3) If the range of a function is a singleton set, then it is
(a) a constant function (b) an identity function (c) a bijective function (d) an one-one function
- 4) If $f: A \rightarrow B$ is a bijective function and if $n(A) = 5$, then $n(B)$ is equal to
(a) 10 (b) 4 (c) 5 (d) 25

Section-B

5 x 2 = 10

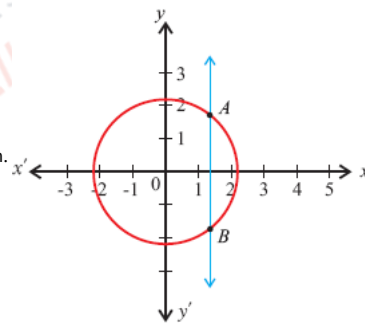
5)

Use the vertical line test to determine which of the following graphs represent a function.



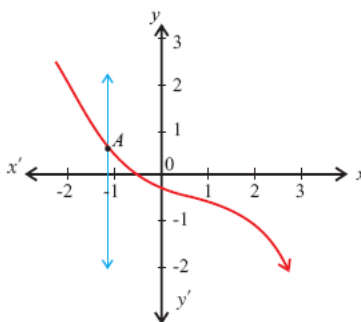
6)

Use the vertical line test to determine which of the following graphs represent a function.



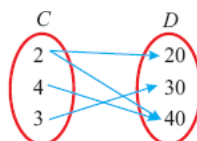
7)

Use the vertical line test to determine which of the following graphs represent a function.



8)

Does each of the following arrow diagrams represent a function? Explain.



- 9) If $X = \{1, 2, 3, 4, 5\}$, $Y = \{1, 3, 5, 7, 9\}$ determine which of the following relations from A to B are functions? Give reason for your answer. If it is a function, state its type. $R_2 = \{(1, 1), (2, 1), (3, 3), (4, 3), (5, 5)\}$

Section-C

11 x 5 = 55

- 10) A function $f: [-7, 6] \Rightarrow \mathbb{R}$ is defined as follows $f(x) = \begin{cases} x^2 + 2x + 1; & -7 \leq x < -5 \\ x + 5; & -5 \leq x < 2 \\ x - 1; & 2 \leq x \leq 6 \end{cases}$ Find $\frac{4f(-3) + 2f(4)}{f(-6) - 3f(1)}$

- 11) Given, $A = \{1, 2, 3, 4, 5\}$, $B = \{3, 4, 5, 6\}$ and $C = \{5, 6, 7, 8\}$, show that (ii) Verify $A \cup (B \cap C) = (A \cup B) \cap C$ using Venn diagram.

- 12) Let $A = \{a, b, c, d\}$, $B = \{a, c, e\}$ and $C = \{a, e\}$. (ii) Verify $A \cap (B \cap C) = (A \cap B) \cap C$ using Venn diagram.
- 13) Given $A = \{a, b, c, d, e\}$, $B = \{a, e, i, o, u\}$ and $C = \{c, d, e, u\}$. (ii) Verify $A \setminus (B \setminus C) \neq (A \setminus B) \setminus C$ using Venn diagram.
- 14) Let $\{0, 1, 2, 3, 4\}$, $A = B = \{1, -2, 3, 4, 5, 6\}$ and $C = \{2, 4, 6, 7\}$. (ii) Verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ using Venn diagram.
- 15) For $A = \{-3, -1, 0, 4, 6, 8, 10\}$, $B = \{-1, -2, 3, 4, 5, 6\}$ and $C = \{-1, 2, 3, 4, 5, 7\}$ show that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
- 16) For $A = \{-3, -1, 0, 4, 6, 8, 10\}$, $B = \{-1, -2, 3, 4, 5, 6\}$ and $C = \{-1, 2, 3, 4, 5, 7\}$ show that verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ using venn diagram
- 17) For $A = \{-3, -1, 0, 4, 6, 8, 10\}$, $B = \{-1, -2, 3, 4, 5, 6\}$ and $C = \{-1, 2, 3, 4, 5, 7\}$ show that verify $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ using venn diagram
- 18) Given that $U = \{a, b, c, d, e, f, g, h\}$, $A = \{a, b, f, g\}$ and $B = \{a, b, c\}$ verify De Morgan's law of complementation
- 19) Verify De Morgan's law's for set difference using the sets given below $A = \{1, 3, 5, 7, 9, 11, 13, 15\}$, $B = \{1, 2, 5, 7\}$ and $C = \{3, 9, 10, 12, 13\}$.
- 20) Verify $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$ for the sets given below:
 (i) $A = \{4, 5, 6\}$, $B = \{5, 6, 7, 8\}$ and $C = \{6, 7, 8, 9\}$ (ii) $A = \{a, b, c, d, e\}$, $B = \{x, y, z\}$ and $C = \{a, e, x\}$.

