SET - II

RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATIONS

MATRIC PRACTICE PAPER (2024)

(Mathematics)

Grade: X **Marks: 50 marks**
Chapter: Relations and Functions **Time: 90 minutes**

SECTION A (8x1=8)

Choose the correct option.

1. f(x) = $(x+1)^3 - (x-1)^3$ represents a function which is
(a) linear (b) cubic (c) reciprocal (d) quadratic

2. If n(AxB) = 6 and A = {1,3}, then n(B) is
(a) 1 (b) 2 (c) 3 (d) 6

3. The range of the relation R = {(x,x^2)| x is a prime number less than 13} is
(a) {2.3.5.7} (b) {2,3,5,7,11} (c) {4,9,25,49,121} (d) {1,4,9,25,49,121}

4. If {(a,8),(6,b)} represents an identity function, then the value of a and b are respectively
(a) (8,6) (b) (8,8) (c) (6,8) (d) (6,6)

5. Let f(x) = $\sqrt{1+x^2}$ then
(a) f(xy) = f(x).f(y) (b) f(xy) ≥ f(x).f(y)
(c) f(xy) ≤ f(x).f(y) (d) none of these

6. If f(x) = $2x^2$ and g(x) = $\frac{1}{3x}$, then f∘g is
(a) $\frac{3}{2x^2}$ (b) $\frac{2}{3x^2}$ (c) $\frac{2}{9x^2}$ (d) $\frac{1}{6x^2}$

7. If f : A→ B is a bijective function and if n(B) = 7, then n(A) is equal to
(a) 7 (b) 49 (c) 1 (d) 14

8. Relations are subsets of _____, functions are subsets of _____.

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SECTION B (6x2=12)

Answer **any 6** questions. Question No. **15** is **compulsory**.

9. If A = {5,6}, B = {4,5,6}, C = {5,6,7}, show that (AxA)=(BxB)∩(CxC).

10. Let A = {1,2,3,……..,45} and R be the relation defined as " is square of a number " on A. Write R as a subset of AxA. Also, find the domain and range of R.

11. Let f(x) = 2x+5. If x≠0, then find $\frac{f(x+2)-f(2)}{x}$.

12. Let f be a function f : N→N be defined by f(x) = 3x+2, x∈N
(i) Find the images of 1,2,3.
(ii) Find the pre-images of 29,53.
(iii) Identify the type of function.

13. Show that the function f : N→N defined by f(x) = 2x-2 is one-one but not onto.

14. Find x if gff(x) = fgg(x), given f(x) = 3x+1 and g(x) = x+3.

15. Write the domain of the following real functions
(i) f(x) = $\frac{2x+1}{x-9}$
(ii) g(x) = $\sqrt{x-2}$

SECTION C (6x5=30)

Answer **any 6** questions. Question No. **22** is **compulsory**.

16. Given, A = {1,2,3}, B = {4,5,6}, C = {3,4} and D = {1,3,5}, check if $(A\cap C)x(B\cap D) = (AxB)\cap(CxD)$.

17. A function f is defined by f(x) = 2x-3, find
(i) $\frac{f(0)+f(1)}{2}$.
(ii) x such that f(x) = 0.
(iii) x such that f(x) = 3.
(iv) x such that f(x) = f(1-x).

18. If f(x) = 2x+3, g(x) = 1-2x and h(x) = 3x. Prove that f∘(g∘h) = (f∘g)∘h.

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19. A function f : [-5,9]→ R is defined as follows:

$$f(x) = \begin{cases} 6x+1, & -5 \le x < 2 \\ 5x^2 - 1, & 2 \le x < 6 \\ 3x - 4, & 6 \le x < 9 \end{cases}$$

Find

(i) f(-3) + f(2) (ii) f(7) - f(1) (iii) 2f(4) + f(8) (iv) $\frac{2f(-2) - f(6)}{f(4)+f(-2)}$.

20. Represent the function f = {(1,2),(2,2),(3,2),(4,3),(5,4)} through

(i) An arrow diagram (ii) a table form (iii) a graph

21. Forensic scientists can determine the height (in cm) of a person based on the length of the thigh bone. They usually do so using the function h(b)=2.47b+54.10, where b is the length of the thigh bone.

(i) Verify the function h is one-one or not.

(ii) Also find the height of the person if the height of the thigh bone is 50cm.

(iii) Find the length of the thigh bone if the length of the person is 147.96cm.

22. Let f = {(x,y)|x,y∈N and y=2x} be a relation on N. Find the domain, co-domain and range. Is this relation a function?

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