14

I. Choose the correct answer: $10 \times 1 = 10$

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

2. 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)

3. Let $A = \{1,2,3,4\}$ and $B = \{4,8,9,10\}$. A function $f : A \rightarrow B$ given by
   $f = \{(1,4), (2,8), (3,9), (4,10)\}$ is a
   a) many-one function   b) identity function
   c) one-to-one function   d) into function

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

5. If $f : A \rightarrow B$ is a bijective function and if $n(B) = 7$ then $n(A) =$
   a) 7   b) 49   c) 1   d) 14

6. Euclid's division lemma states that for positive integer a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy
   a) $1 < r < b$ b) $0 < r < b$ c) $0 \leq r < b$ d) $0 < r \leq b$

7. $7^{4k} \equiv$ _____ (mod 100)
   a) 1   b) 2   c) 3   d) 4

8. A system of three linear equations in three variables is inconsistent if their planes
   a) intersect only at a point   b) intersect in a line
   c) concides with each other   d) do not intersect

9. $\dfrac{3y-3}{y} \div \dfrac{7y-7}{3y^2}$ is
   a) $\dfrac{9y}{7}$ b) $\dfrac{9y^3}{(21y-21)}$ c) $\dfrac{21y^2-42y+21}{3y^3}$ d) $\dfrac{7(y^2-2y+1)}{y^2}$

10. The square root of $\dfrac{256 x^8 y^4 z^{10}}{25 x^6 y^6 z^6}$ is equal to
    a) $\dfrac{16}{5}\left|\dfrac{x^2 z^4}{y^2}\right|$ b) $16\left|\dfrac{y^2}{x^2 z^4}\right|$ c) $\dfrac{16}{5}\left|\dfrac{y}{xz^2}\right|$ d) $\dfrac{16}{5}\left|\dfrac{xz^2}{y}\right|$

Part - B

II. Answer any 5 of the following questions: $5 \times 2 = 10$

11. Find $A \times B$ and $A \times A$
    $A = \{2,-2,3\}$ and $B = \{1,-4\}$

13. A Relation R is given by the set {(x,y)/y=x+3, x∈{0,1,2,3,4,5}}. Determine its domain and range.

14. Let A = {1,2,3,4} and B = N. Let f : A→B be defined by $f(x) = x^2$ then
   i) find the range of f   ii) identify the type of function

15. When the positive integer a,b and c are divided by 13, the respective remainders are 9,7 and 10. Show that a + b + c is divisible by 13.

16. Find the LCM of the following: $8x^4y^2$, $48x^2y^4$

17. Simplify: $\dfrac{5x^2y}{4z^2} \times \dfrac{6xz^2}{20y^2}$

Part - C

III. Answer any 5 questions: 5 x 5 = 25

18. Let A = {1,2,3,4} and B = {2,5,8,11,14} be two sets. Let f : A→B be a function given by f(x) = 3x - 1. Represent this function
   i) by arrow diagram   ii) in a table form
   iii) as a set of ordered pairs   iv) in a graphical form

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

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

   Find   i) f(-3) + f(2)   ii) $\dfrac{2f(-2)-f(6)}{f(4)+f(-2)}$

20. Consider the functions f(x), g(x), h(x) as given below. Show that (fog)oh = fo(goh)
   $f(x) = x - 1$, $g(x) = 3x + 1$ and $h(x) = x^2$

21. Find the HCF of 396, 504, 636

22. Solve the following system of linear equations in three variables.
   x + y + z = 5; 2x - y + z = 9; x - 2y + 3z = 16

23. Find the GCD of the polynomials $x^3 + x^2 - x + 2$ and $2x^3 - 5x^2 + 5x - 3$.

24. Find the square root of the following polynomials by division method:
   $x^4 - 12x^3 + 42x^2 - 36x + 9$

Part - D

IV. Answer the following questions: 1 x 5 = 5

25. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR (Scale factor $\frac{3}{5}$ <1)

(or)

26. Consturct a triangle similar to a given triangle PQR with its sides equal to $\frac{2}{3}$ of the corresponding sides of the triangle PQR (Scale factor $\frac{2}{3}$).