CO

COMMON FIRST MID-TERM TEST - 2019

Standard X

Reg.No. : | | | | | | |

Time: 1.15 hours.

MATHEMATICS

Marks: 50

Part - A

I. Choose the correct answer: 10 x 1 = 10

1. If n(A x 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→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 $g(x) = \frac{1}{3x}$, then fog is
   a) $\frac{3}{2x^2}$ b) $\frac{2}{3x^2}$ c) $\frac{2}{9x^2}$ d) $\frac{1}{6x^2}$
5. If f : A→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 ≤ r < b d) 0 < r ≤ 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. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is
   a) $\frac{9y}{7}$ b) $\frac{9y^3}{(21y-21)}$ c) $\frac{21y^2-42y+21}{3y^3}$ d) $\frac{7(y^2-2y+1)}{y^2}$
10. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to
    a) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$ b) $16\left|\frac{y^2}{x^2z^4}\right|$ c) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ d) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

Part - B

II. Answer any 5 of the following questions: 5 x 2 = 10

11. Find A x B and A x A
    A = {2,-2,3} and B = {1,-4}

13. A Relation R is given by the set $\{(x,y)/y=x+3, x\in\{0,1,2,3,4,5\}\}$. 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: $\frac{5x^2y}{4z^2} \times \frac{6xz^2}{20y^2}$

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) $\frac{2f(-2)-f(6)}{f(4)+f(-2)}$

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 $\frac{2}{3}$)