MODEL REVISION TEST QUESTION - 3 – JANUARY - 2022

STANARD : 10 **SUBJECT : MATHEMATICS**

TIME : 3 Hours **MARKS : 100**

PART – I

Note: (i) **Answer all the 14 questions.**

(ii) **Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer.** **(14 x 1 = 14)**

1) If $A = \{1,2\}$, $B = \{1,2,3,4\}$, $C = \{5,6\}$ and $D = \{5,6,7,8\}$ then state which of the following statement is true?

(A) $(A \text{ X } C) \subset (B \text{ X } D)$ (B) $(B \text{ X } D) \subset (A \text{ X } C)$

(C) $(A \text{ X } B) \subset (A \text{ X } D)$ (D) $(D \text{ X } A) \subset (B \text{ X } A)$

2) If $n(A \times B) = 20$ and $(A) = 5$, then $n(B)$ ______.

(A) 5 (B) 4 (C) 80 (D) 15

3) $A = \{a,b,p\}$, $B = \{2,3\}$, $C = \{p,q,r,s\}$ then, $n[(A \cup C) \text{ X } B]$ is

(A) 8 (B) 20 (C) 12 (D)16

4) If there are 1024 relations from a set $A = \{1,2,3,4,5\}$ to a set B, then the number of elements of B is

(A) 3 (B) 2 (C) 4 (D) 8

5) Euclid's division lemma states that for positive integers 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) $0 \le r < b$ (D) $0 < r \le b$

6) The remainder when the difference between 60002 and 601 is divided by 6 is

(A) 2 (B) 1 (C) 0 (D) 3

7) The next t $\frac{-1}{3}, 0, \frac{1}{3}, \frac{2}{3}, \ldots$ of the sequence is

(A) $\frac{-1}{3}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{-2}{3}$

8) An A.P. consists of 31 terms. If its 16$^{\text{th}}$ term is m, then the sum of all the terms of this A.P. is (A) 16m (B) 62m (C) 31m (D) $\frac{31}{2}m$

9) The L.C.M of : $6x^2y, 9x^2yz, 12x^2y^2z$ is

(A) $36xy^2z^2$ (B) $36x^2y^2z$ (C) $36x^2y^2z^2$ (D) $3x^2y$

10) $y^2 + \frac{1}{y^2}$ - is not equal to

(A) $\frac{y^4+1}{y^2}$ (B) $\left(y + \frac{1}{y}\right)^2$ (C) $\left(y - \frac{1}{y}\right)^2 + 2$ (D) $\left(y + \frac{1}{y}\right)^2 - 2$

11) Which of the following should be added to make $x^4 + 64$ a perfect square?

(A) $4x^2$ (B) $16x^2$ (C) $8x^2$ (D) $-8x^2$

12) The excluded value of the rational expression $\frac{x^3+8}{x^2-2x-8}$ is

(A) 8 (B) 2 (C) 4 (D) 1

13) The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square

(A) $100, 120$ (B) $10, 12$ (C) $-120, 100$ (D) $12, 10$

14) Graph of a linear equation is

(A) straight line (B) circle (C) parabola (D) hyperbola

PART – II

Note: (i) **Answer only 10 questions.**

(ii) **Question Number 28 is compulsory.** **(10 x 2 = 20)**

15) If $A = \{1,2\}$, $B = \{1,2,3,4\}, C = \{5,6\}$ and $D = \{5,6,7,8\}$ then check $A \text{ X } C$ is a subset of $B \text{ X } D$ or not.

16) If the ordered pairs $(x^2 - 3x, y^2 + 4y)$ and $(-2, 5)$ are equal, then find the value x and y.

17) A relation R is given by the set $\{(x,y) / \, y = x + 3, x \in \{0,1,2,3,4,5\}\}$ Determkine its domain and range.

18) Let $A = \{1,2,3,\ldots,100\}$ and R be the relation defined as "is a cube number" on A. Write R as a subset of $A \text{ X } A$. Also, find the domain and range of .

19) Find the 19$^{\text{th}}$ term of an A.P. $-11, -15, -19, \ldots$

20) Find the middle term(s) of an A.P $9, 15, 21, 27, \ldots \ldots, 183$.

21) Which term of the A.P $21, 18, 15, \ldots$ is -81? State with reason is there any term 0 in this A.P?

22) In a theatre, there are 20 seats in the front row and 30 seats were allotted. Each successive row contains two additional seats than its front row. How many seats are there in the last row?

23) Subtract: $\frac{4x}{x^2-1} - \frac{x+1}{x-1}$

24) Dividing the polynomial $p(x) = x^2 - 5x - 14$ by another polynomial $q(x)$ yields $\frac{x-7}{x+2}$ then find $q(x)$.

25) Find the square root of: $\frac{144\, a^8 b^{12} c^{16}}{81\, f^{12} g^4 h^{14}}$

26) Solve: $x^4 - 13x^2 + 42 = 0$.

27) Find the sum and product of the roots of the quadratic equation $8x^2 - 25 = 0$

28) If one root of the equation $px^2 + (\sqrt{3} - \sqrt{2})x - 1 = 0$ is $x = \frac{1}{\sqrt{3}}$ then find the value of p

PART – III

Note: (i) **Answer only 10 questions.**
(ii) **Question Number 28 is compulsory.** **(10 x 5 = 50)**

29) Let $A = \{x \in \mathbb{N} / 1 < x < 4\}$, $B = \{x \in \mathbb{W} / 0 \leq x < 2\}$ and $= \{x \in \mathbb{N} / x < 3\}$. Verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

30) Let $A = \{x \in \mathbb{W} / x < 2\}$, $B = \{x \in \mathbb{N} / 1 < x \leq 4\}$ and $C = \{3, 5$. Verify that $(A \cup B) \times C = (A \times C) \cup (B \times C)$.

31) Let $A =$ The set of all natural numbers less than 8, $B =$ The set of all prime numbers less than 8 , $C =$ The set of even prime number. Verify that $A \times (B - C) = (A \times B) - (A \times C)$

32) Represent the relation $\{(x, y) / x = 2y ,\ x \in \{2,3,4,5\}, y \in \{1,2,3,4\}$ by an **(i)** an arrow diagram **(ii)** a graph and **(iii)** a set in roster form.

33) In an A.P, sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers

34) Priya earned Rs.15,000 in the first month. Thereafter her salary increased by Rs.1500 per year. His expenses are Rs.13,000 during the first year and the expenses increases by Rs.900 per year. How long will it take for her to save Rs.20,000 per month?

35) Two A.P.'s have the same common difference. The first term of one A.P. is 2 and that of the other is 7. Show that the difference between their 10th terms is the same as the difference between their 21st terms, which is the same as the difference between any two corresponding terms.

36) **(i)** Find x, y and , given that the numbers $x, 10, y, 24, z$ are in A.P.
(ii) Find the number of terms in the A.P. $3, 6, 9, 12, \ldots, 111$

37) Vani, her father and her grandfather have an average age of 53. One half of her grandfather's age plue one-third of her father's age plus one-fourth of Vani's age is 65. Four years ago if Vani's grandfather was four times as old as Vani then how old are they all now?

38) If the L.C.M of the polynomials $(x^3 + y^3)$ and $(x^4 + x^2y^2 + y^4)$ is $(x^3 + y^3)\,(x^2 + xy + y^2$ then find the G.C.D.

39) Simplify: $\frac{a^2-16}{a^3-8} \times \frac{2a^2-3a-2}{2a^2+9a+4} \div \frac{3a^2-11a-4}{a^2+2a+4}$

40) Find the square root of : $(6x^2 + x - 1)(3x^2 + 2x - 1)(2x^2 + 3x + 1)$

41) Find the two positive integers whose sum of the squares is 365.

42) If α and $\beta$are the roots of the equation $x^2 + x - 4 = 0$ form the quadratic equation whose roots are α^2 and β^2.

PART – IV

Note: (i) **This section contains one question with two alternatives.**
(ii) **Answer the given question choosing either of the alternatives.** **(2 x 8 = 16)**

43) Discuss the nature of solutions of the quadratic equation $x^2 - 9 = 0$. **(OR)**
Discuss the nature of solutions of the quadratic equation $x^2 + x + 7 = 0$.

44) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$. **(OR)**
Draw the graph of $y = x^2 + 3x + 2$ and hence solve $x^2 + 2x + 1 = 0$.