MODEL REVISION TEST QUESTION - 1 – 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 $n(A \text{ X } B) = 6$ and $A = \{1, 3\}$ then, $n(B)$ is

(A) 1 (B) 2 (C) 3 (D) 6

2) If the ordered pairs $(a + 2, 4)$ and $(5, 2a + b)$ are equal then (a, b) is

(A) $(2, -2)$ (B) $(5, 1)$ (C) $(2, 3)$ (D) $(3, -2$

3) If R is a relation from A to , which of the following is correct?

(A) $R = A \cup B$ (B) $R = A \cap B$ (C) $R \subseteq A \text{ X } B$ (D) $R \subseteq B \text{ X } A$

4) Let $n(A) = m$ and $n(B) = n$ then the total number of relations that can be defined from A to B is

(A) p^q (B) q^p (C) $2^{pq} - 1$ (D) 2^{pq}

5) Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible reminders are

(A) 0, 1, 8 (B) 1, 4, 8 (C) 0, 1, 3 (D) 1, 3, 5

6) If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is

(A) 4 (B) 2 (C) 1 (D) 3

7) Given $F_1 = 1, F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is

(A) 3 (B) 5 (C) 8 (D) 11

8) If a, b, c are in A.P, then the value of $\frac{a-b}{b-c} =$

(A) $\frac{a}{b}$ (B) $\frac{b}{c}$ (C) $\frac{a}{c}$ (D) 1

9) The solution of the system $x + y - 3x = -6, -7y + 7z = 7, 3z = 9$ is

(A) $x = 1, y = 2, z = 3$ (B) $x = -1, y = 2, z = 3$

(C) $x = -1, y = -2, z = 3$ (D) $x = 1, y = 2, z = -3$

10) $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is

(A) $\frac{9y}{7}$ (B) $\frac{9y^3}{(21y-21)}$ (C) $\frac{21y^2-42y+21}{3y^3}$ (D) $\frac{7(y^2-2y+1)}{y^2}$

11) The quotient When $\frac{x^2-25}{x+3}$ divided by $\frac{x+5}{x^2-9}$ is

(A) $(x - 5)(x - 3)$ (B) $(x - 5)(x + 3)$

(C) $(x + 5)(x - 3)$ (D) $(x + 5)(x + 3)$

12) The square root of $\frac{256\,x^8y^4z^{10}}{25\,x^6y^6z^6}$ 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) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

13) The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X-axis is

(A) 0 (B) 1 (C) 0 or1 (D) 2

14) The nature of the roots of $x^2 - 25 = 0$ is

(A) no real roots (B) real and equal

(C) real and unequal (D) imaginary roots

PART – II

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

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

15) Find (i) A X B and (ii) A X A when $A = \{m, n\}$ and $B = \emptyset$.

16) If $B \text{ X } A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$, find A and B.

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

18) Let $A = \{3, 4, 7, 8\}$ and $B = \{1, 7, 10\}$. Which of the following sets are relations from A to B? (i) $R_1 = \{(3, 7), (4, 7), (7, 10), (8, 1)\}$

(ii) $R_2 = \{(3, 7), (4, 10), (7, 7), (7, 8), (8, 11), (8, 7), (8, 10)\}$

19) Find all positive integers, when divided by 3 leaves remainder s.

20) If $p_1^{x_1}$ x $p_2^{x_2}$ x $p_3^{x_3}$ x $p_4^{x_4} = 113400$ where p_1, p_2, p_3, p_4 are primes in ascending order and x_1, x_2, x_3, x_4 are integers, find the value of p_1, p_2, p_3, p_4 and x_1, x_2, x_3, x_4

21) Find the common difference of an A.P if $t_{18} - t_{14} = 32$.

22) If $3 + k, 18 - k, 5k + 1$ are in A.P, then find k.

23) If p and q are positive integers, then we write $p = a^2b^3$ and $q = a^3b$. If a, b are prime numbers, then verify that L.C.M of (p, q) x H.C.F of $(p, q) = pq$.

24) Pari needs 4 hours to complete a work. His friend Yuvan needs 6 hours to complete the same work. How long will it take to complete if they work together?

25) Find the square root of : $16x^2 + 9y^2 - 24xy + 24x - 18y + 9$

26) Solve by factorization method $2x^2 - 2\sqrt{6}x + 3 = 0$.

27) If the difference between a number and its reciprocal is $\frac{24}{5}$, find the number.

28) If α, β are the roots of the equation $7x^2 + ax + 2 = 0$ and if $\beta - \alpha = \frac{-13}{7}$, the find the value of a

PART – III

Note: **(i)** **Answer only 10 questions.**
(ii) **Question Number 42 is compulsory.** **(10 x 52 = 50)**

29) Given$A = \{1, 2, 3\}$, $B = \{2, 3, 5\}$, $C = \{3, 4\}$ and $D = \{1, 3, 5\}$check if, $(A \cap C)$ X $(B \cap D) = (A$ X $B) \cap (C$ X $D)$.

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 X $(B \cup C) = (A$ X $B) \cup (A$ X $C)$.

31) Let$A = \{x \in \mathbb{W} / 0 < x < 5\}$, $B = \{x \in \mathbb{W} / 0 \leq x \leq 2\}$ and $C = \{x \in \mathbb{W} / x < 3\}$ Verify that A X $(B \cap C) = (A$ X $B) \cap (A$ X $C)$.

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

33) Determine the general term of an A.P. whose 7^{th} term is -1 and 16^{th} term is 17.

34) A mother divides Rs.207 into three parts such that the amount are in A.P. and gives it to her three children. The product of the two least amounts that the children had Rs.4623. Find the amount received by each child.

35) In a winter season let us take the temperature of Ooty from Monday to Friday to be in A.P. The sum of temperatures from Monday to Wednesday is 0^oC and the sum of the temperature from Wednesday to Friday is 18^oC. Find the temperature on each of the five days.

36) If $(m + 1)^{th}$ term of an A.P. is twice the $(n + 1)^{th}$ term, then prove that $(3m + 1)^{th}$ is twice the $(m + n + 1)^{th}$ term.

37) Solve the system of linear equations in three variables: $x + y + z = 5, 2x - y + z = 9, x - 2y + 3z = 16$

38) Find the H.C.F of $x^4 + 3x^3 - x - 3$ and $x^3 + x^2 - 5x + 3$

39) If $4x^4 - 12x^3 + 37x^2 + bx + a$ is a perfect square then find the values of a and b.

40) A girl is twice as old as her sister. Five years hence, the product of their ages (in years) will be 375. Find their present ages.

41) The base of a triangle is 4 cm longer than its altitude. If the area of the triangle is 48 sq.cm, then find its base and altitude.

42) If α and β are the roots of the equation $2x^2 - x - 1 = 0$, then form the equation whose roots are $\alpha^2\beta$ and $\beta^2\alpha$.

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$x^2 + 2x + 5 = 0$.

(OR)

Discuss the nature of solutions of the quadratic equation $(2x - 3)(x + 2) = 0$.

44) Draw the graph of $y = x^2 + 3x - 4$ and hence solve $x^2 + 3x - 4 = 0$

(OR)

Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$