ACHIEVERS ACADEMY MATRIC HR SEC SCHOOL, HOSUR.

MODEL REVISION TEST QUESTION - 2 – 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 $A = \{a, b, c\}$, $B = \{2, 3\}$ and $C = \{a, b, c, d\}$, then, $n[(A \cap C)\ X\ B]$ is

(A) 4 (B) 8 (C) 6 (D) 12

2) {If the ordered pairs $(a, -1)$ and $(5, b)$ belong to $\{(x, y)/y = 2x + 3\}$ is, then the values of a and b are

(A) $-13, 2$ (B) $2, 13$ (C) $2, -13$ (D) $-2, 13$

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

(A) m^n (B) n^m (C) $2^{mn} - 1$ (D) 2^{mn}

5) The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

(A) 2025 (B) 5220 (C) 5025 (D) 2520

6) The sum of the exponents of the prime factors in the prime factorization of 1729 is

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

7) If 6 times of 6^{th} term of an A.P. is equal to 7 times the 7^{th}, then the 13^{th} term of the A.P. is

(A) 0 (B) 6 (C) 7 (D) 13

8) The first term of an arithmetic progression is unity and the common difference is 4 which of the following will be a term of this A.P?

(A) 4551 (B) 10091 (C) 7881 (D) 13531

9) 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) coincides with each other (D) do not intersect

10) If 'a' and 'b' are two positive integers where a>b and 'b' is a factor of 'a', then HCF of (a, b) is

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

11) If $(x - 6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is

(A) 3 (B) 5 (C) 6 (D) 8

12) $\frac{x}{x^2-25} - \frac{8}{x^2+6x+5}$ gives

(A) $\frac{x^2-7x+40}{(x-5)(x+5)}$ (B) $\frac{x^2+7x+40}{(x-5)(x+5)(x+1)}$ (C) $\frac{x^2-7x+40}{(x^2-25)(x+1)}$ (D) $\frac{x^2+10}{(x^2-25)(x+1)}$

13) If a polynomial is a perfect square then, its factors will be repeated ____ number of times.

(A) odd (B) zero (C) even (D) None of the above

14) The solution of $(2x - 1)^2 = 9$ is equal to

(A) -1 (B) 2 (C) $-1, 2$ (D) None of these

PART – II

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

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

15) Let $A = \{1, 2, 3\}$ and $B = \{x\ /\ x$ is a prime number lessthan 10 $\}$. Find A X B and B X A

16) If $A = \{1, 3, 5\}$ and $B = \{2, 3\}$ then (i) find A X B and B X A (ii) Is A X $B = B$ X A? If not why? (iii) Show that $n(A\ X\ B) = n(B\ X\ A) = n(A)$ x $n(B)$

17) Let $A = \{1, 2, 3, 4, \ldots, 45\}$ and R be the relation defined as "is square number" on A. Write R as a subset of A X A. Also, find the domain and range of .

18) Let $A = \{1, 2, 3, 7\}$ and $= \{3, 0, -1, 7\}$, which of the following are relation from A to B?

(i) $R_1 = \{(2, -1), (7, 7), (1, 3)\}$

(ii) $R_2 = \{(7, -1), (0, 3), (3, 3), (0, 7)\}$

19) A man has 532 flower pots. He wants to arrange them in rows such that each row contains 21 flower pots. Find the number of completed rows and how many flower pots are left over?

20) Is 7 x 5 x 3 x 2 + 3 a composite number? Justify your answer.

21) If the nth term of the sequence is defined by $a_n = -(n^2 - 4)$ the find a_4 and a_{11}

22) Find the 12th term of an A.P from the last term of $-2, -4, -6, \ldots, -100$

23) Simplify: $\frac{4x^2y}{2z^2}$ x $\frac{6xz^3}{20y^4}$

24) Which rational expression should be subtracted from $\frac{x^2+6x+8}{x^8+8}$ to get $\frac{3}{x^2-2x+4}$.

25) If $x = \frac{a^2+3a-4}{3a^2-3}$ and $y = \frac{a^2+2a-8}{2a^2-2a-4}$ then find the value of x^2y^{-2}

26) The product of Kumaran's age (in years) two years ago and his age four years from now is one more than twice his present age. What is his present age?

27) If one root of the equation $3x^2 + kx + 81 = 0$ (having real roots) is the square of the other, then find k.

28) Determine the quadratic equation, whose sum and product of roots are $\frac{-3}{2}$and -1.

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

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

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 $(A \cap B) \times C = (A \times C) \cap (B \times C)$.

32) Represent the relation $\{(x, y) / y = x + 3,\ x,\ y$ are natural numbers $< 10\}$ by an **(i)** an arrow diagram **(ii)** a graph and **(iii)** a set in roster form.

33) The ratio of 6th and 8th term of an A.P. is 7 : 9. Find the ratio of 9th term to 13th term.

34) The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.

35) If l[th], m[th] and n[th] terms of an A.P. are x, y and z respectively, then show that
(i) $x(m-n) + y(n-l) + z(l-m) = 0$ **(ii)** $(x-y)n + (y-z)l + (z-x)m = 0$

36) Solve: $\frac{1}{2x} + \frac{1}{4y} - \frac{1}{3z} = \frac{1}{4}$; $\frac{1}{x} = \frac{1}{3y}$; $\frac{1}{x} - \frac{1}{5y} + \frac{4}{z} = 2\frac{2}{15}$

37) Find the LCM of the polynomials $a^2 + 4a - 12, a^2 - 5a + 6$ whose GCD is $a - 2$.

38) If $9x^4 + 12x^3 + 28x^2 + ax + b$ is perfect square, find the value of $a$and b.

39) Solve the quadratic equation by completing the square method $\frac{5x+7}{x-1} = 3x + 2$.

40) The hypotenuse of a right triangle is 6 m more than twice of the shortest side. If the third side is 2 m less the hypotenuse, find the sides of the triangle.

41) If α and β are the roots of the equation $3x^2 + 7x - 2 = 0$, then find the values of **(i)** $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$
(ii) $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$

42) If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ are real and equal, prove that either $a = 0$or $a^3 + b^3 + c^3 = 3abc$.

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$x^2 - 4x + 4 = 0$.

(OR)

Discuss the nature of solutions of the quadratic equation$x^2 - 9x + 20 = 0$.

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

(OR)

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