CLASS : 10 **SECOND REVISION EXAMINATION, FEBRUARY-2023** Register Number 1 0 0 0 6 6

Time Allowed : 3.00 Hours] **MATHEMATICS** [Max. Marks : 100

PART – A

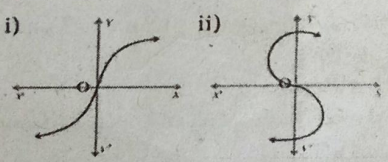
I. Choose the best answer of the following: 14x1=14

1. If there are 1024 relations from a set A = {1, 2, 3, 4, 5} to a set B, then the number of elements in B is
   (a) 3 (b) 3 c) 4 d) 8
2. If {(5, 1), (6, b)} represents an constant function, then the value of b is
   (a) 5 (b) 6 (c) 7 (d) 1
3. $7^{4k} \equiv$ (mod 100)
   (a) 1 (b) 2 (c) 3 (d) 4
4. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots\ldots\ldots$ is
   (a) $\frac{1}{24}$ (b) $\frac{1}{27}$ (c) $\frac{2}{3}$ (d) $\frac{1}{81}$
5. The system three of linear equation in three variables is inconsistent if their plane is
   (a) intersect only at a point (b) Intersect in a line
   (c) Coincide with each other (d) Do not intersect
6. Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$
   (a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$
7. The graph of the quadratic equation is always ---------
   (a) hyperbola (b) Straight line (c) Circle (d) Parabola
8. In ΔLMN, $\angle L = 60^\circ$, $\angle M = 50^\circ$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is
   (a) 40° (b) 70° (c) 30° (d) 110°
9. If slope of the line PQ is $1/\sqrt{3}$ then slope of the perpendicular bisector of PQ is
   (a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $1/\sqrt{3}$ (d) 0
10. $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
    (a) $\sec\theta$ (b) $\cot^2\theta$ (c) $\sin\theta$ (d) $\cot\theta$
11. The angle of elevation of a cloud from the a point h meters above a lake is β. The angle of depression of its reflection in the lake is 45°, the height of loaction of the cloud from the lake is
    (a) $\frac{h(1+\tan\beta)}{1-\tan\beta}$ (b) $\frac{h(1-\tan\beta)}{1+\tan\beta}$ (c) $h\tan(45^\circ - \beta)$ (d) none of these
12. If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of origanal cylinder is
    (a) 1:2 (b) 1:4 (c) 1:6 (d) 1:8
13. Variance of first 20 natural numbers is
    (a) 32.25 (b) 44.25 (c) 33.25 (d) 30
14. Probability of the sure event is
    (a) 1 (b) 0 (c) -1 (d) 2

PART - B

II. Answer any 10 questions. [Question No. 28 is compulsory]. 10x2=20

15. 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 = {(3,1), (4,12)}
16. Determine whether the graph given below represent functions. Give reason for your answers concerning each graph.



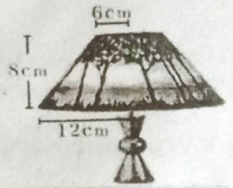
17. Find the greastest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.
18. If $1^3 + 2^3 + 3^3 + \ldots\ldots + k^3 = 44100$ then find $1 + 2 + 3 + \ldots\ldots + k$.

19. Find the LCM of $5x - 10$, $5x^2 - 20$.
20. If a matrix has 20 elements, what are the possible orders it can have? What if it has 8 elements.
21. A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point?
22. Show that the given points are collinear: (-3, -4), (7,2) and (12,5).
23. A kite is flying at a height of 75m above the ground. The string attached to the kite temporarily tied to apoint on the ground. The inclination of the string with the ground is 60 .Find the lenght of the string, assuming that there is no slck in the string.
24. Find the volume of a cylinder whose height is 2m and whose base area is 250 m^2.
25. If the total surface area of a cone of radius 7 cm is 704 cm^2, then find its slant height.
26. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.
27. A die is rolled and a coin is tossed simultaneously. FInd the probability that the die shows an odd number and the coin shows a head.
28. Find the intercepts made by the line $4x - 9y + 36=0$ on the coordinate axes.

PART - C

III. Answer any 10 questions only [Q.NO: 42 is compulsory] **10x5=50**

29. 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 $(A \cap B) \times C = (A \times C) \cap (B \times C)$
30. If $f(x) = 2x+3$, $g(x) = 1-2x$ and $h(x) = 3x$. Prove that $f \circ (g \circ h) = (f \circ g) \circ h$.
31. If $p_1^{x1} \times p_2^{x2} \times p_3^{x3} \times p_4^{x4} = 113400$ where p_1, p_2, p_3, p_1 aer 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.
32. The product of three consective terms of a Geometric Progression is 343 and their sum is $91/3$. Find the three terms.
33. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ show that $(AB)^T = B^T A^T$.
34. Find the GCD of the polynomials x^3+x^2-x+2 and $2x^3-5x^2+5x-3$.
35. If one root of the equation $3x^2 + kx + 81=0$ (having real roots) is the square of the other then find k.
36. State and prove Basic proportionality Theorem (Thales Theorem).
37. Show that the given points form a parallelogram.
    A(2.5, 3.5), B(10, -4), C(2.5, -2.5) and D(-5, 5)
38. A mobile phone is put to use when the battery power is 100%. The percent of battery power 'y' (in decimal) remaining after using the mobile phone for x hours is assumed as $y = -0.25x + 1$.
    i) Find the number of hours elapsed if the battery power is 100%.
    ii) How much time does it take so that the battery has no power.
39. Porve that $\left(\frac{1 + \sin\theta - \cos\theta}{1 + \sin\theta + \cos\theta}\right)^2 = \frac{1 - \cos\theta}{1 + \cos\theta}$
40. The frustum shaped outer portion of the table lamp has to be painted including the top part. Find the total cost of painting the lamp if the cost of painting 1 sq. cm is ₹2.



41. In a study about viral fever, the number of people affected in a town were noted as Find its standard deviation.

Age in years	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of people affected	3	5	16	18	12	7	4

42. A capsule is in the shape of a cylinder with two hemisphere stuck to each ~~not~~ its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold.

PART - D

IV. Answer the following questions. **2x8=16**

43. a) Draw the graph of $xy = 24$, x, $y > 0$. Using the graph find, (i) y when x=3 and (ii) x when y=6

    (OR)

    b) Draw the graph of $y=x^2+x-2$ and hence solve $x^2+x-2=0$.
44. a) Construct a triangle similar to given triangle PQR with its sides equal to $7/3$ of the corresponding sides of the triangle PQR(scale factor $7/3 > 1$)

    (OR)

    b) Construct a triangle ΔPQR Such that QR = 5 cm, $\angle P = 30^\circ$ and the altitude from P to QR is of length 4.2 cm.