

10th STD Time : 3.00 hrs	2nd REVISION EXAM - 2019-20 PART-III MATHS	Reg No <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> Marks : 100					

- Instruction: 1) Check the question paper for fairness of printing. If there is any lack of fairness inform the hall supervisor immediately.
- 2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

Note: This question paper contains four parts.

PART - I

Note: i) Answer all questions.

14x1=14

ii) Choose the correct answer from the given for alternatives and write the option code and the corresponding answer.

1. Let $n(A) = m$ and $n(B) = n$ then the total number of non-empty relations that can be defines from A to B is
 a) m^n b) n^m c) $2^{mn} - 1$ d) 2^{mn}
2. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
 a) Linear b) Cubic c) Reciprocal d) quadratic
3. The sum of the exponents of the prime factors in the prime factorization of 1729 is
 a) 1 b) 2 c) 3 d) 4
4. The sum to infinite number of terms in a G.P is
 a) na b) $\frac{a}{1-r}$ c) ar d) $\frac{a}{r}$
5. $y^2 + \frac{1}{y}$ is not equal to
 a) $\frac{y^3+1}{y}$ b) $(y + \frac{1}{y})^2$ c) $(y - \frac{1}{y})^2 + 2$ d) $(y + \frac{1}{y})^2 - 2$
6. If number of columns and rows are not equal in a matrix then it is said to be a
 a) Diagonal matrix b) Rectangular matrix
 c) Square matrix d) Identity matrix
7. A tangent is perpendicular to the radius at the
 a) Centre b) Point of contact c) Infinity d) Chord
8. If slope of the line PQ $\frac{1}{\sqrt{3}}$ is then slope of the perpendicular bisector of PQ is
 a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\frac{1}{\sqrt{3}}$ d) 0
9. (2,1) is the point of intersection of two lines
 a) $x - y - 3 = 0$; $3x - y - 7 = 0$ b) $x + y = 3$; $3x + y = 7$
 c) $3x + y = 3$; $x + y = 7$ d) $x + 3y - 3 = 0$; $x - y - 7 = 0$
10. If $5x = \sec \theta$ and $\frac{5}{x} = \tan \theta$, then $x^2 - \frac{1}{x^2}$ is equal to
 a) 25 b) $\frac{1}{25}$ c) 5 d) 1
11. The relationship between the height and radius of hemisphere is ____
 a) Not equal b) Equal c) Less than d) Greater than
12. The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_1:h_2 = 1:2$ then $r_1:r_2$ is
 a) 1:3 b) 1:2 c) 2:1 d) 3:1
13. If the standard deviation of x, y, z is p then the standard deviation of $3x+5, 3y+5, 3z+5$ is
 a) $3p+5$ b) $3p$ c) $p+5$ d) $9p+15$
14. Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of kamalam winning is $\frac{1}{9}$, Then the number of tickets bought by kamalam is
 a) 5 b) 10 c) 15 d) 20

PART - II

Note: Answer any ten questions. Q.No.28 is compulsory.

10x2=20

15. 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.
16. If $A = \{-2, -1, 0, 1, 2\}$ and $f: A \rightarrow B$ is an onto function defined by $f(x) = x^2 + x + 1$ then find B.
17. If $a_n = \frac{5n}{n-7}$ then find a_6 and a_{11} .
18. Find the number of terms in the A.P 3, 6, 9, 12, , 111.
19. Find the excluded values of $\frac{x+10}{8x}$.

20. Construct a 3x3 matrix whose elements are $a_{ij} = |i - 2|$.
21. In $\triangle ABC$, if $DE \parallel BC$, $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$ then find the lengths of the sides AB and AC .
22. Find the equation of a line whose intercepts on the x and y axes are 2, 3
23. $\tan 60^\circ \cos 60^\circ + \cot 60^\circ \sin 60^\circ$ is _____.
24. If the base area of a hemispherical solid is 1386 sq.meters, then find its total surface area?
25. If the ratio of radii of two spheres is 4:7, find the ratio of their volumes.
26. The mean of a data is 25.6 and its coefficient of variation is 18.75. Find the standard deviation.
27. If $P(A) = \frac{2}{3}$, $P(B) = \frac{3}{5}$, $P(A \cup B) = \frac{1}{5}$ then find $P(A \cap B)$.
28. Find the intercepts made by the line $4x - 9y + 36 = 0$ on the co-ordinate axes.

PART - III

Note: Answer any 10 questions. Q.No.42 is compulsory.

10x5=50

29. A function $f: [-5, 9] \rightarrow \mathbb{R}$ is defined as follows:

$$f(x) = \begin{cases} 6x + 1 & \text{if } -5 \leq x < 2 \\ 5x^2 - 1 & \text{if } 2 \leq x < 6 \\ 3x - 4 & \text{if } 6 \leq x \leq 9 \end{cases}$$

Find (i) $2f(4) + f(8)$ (ii) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

30. Let f be a function $f: \mathbb{N} \rightarrow \mathbb{N}$ be defined by $f(x) = 3x + 2$, $x \in \mathbb{N}$.

(i) Find the images of 1, 2, 3

(ii) Find the pre-images of 29, 53

(iii) Identify the type of function.

31. The sum of first n , $2n$ and $3n$ terms of an A.P are S_1 , S_2 and S_3 respectively.

Prove that $S_3 = 3(S_2 - S_1)$.

32. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm 24cm. How much area can be decorated with these colour papers?

33. Find the square root of $64x^4 - 16x^3 + 17x^2 - 2x + 1$.

34. Given $A = \begin{bmatrix} p & 11 \\ 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 11 & -q \\ 1 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix}$ and if $BA = C^2$, find p and q .

35. State and prove alternate segment theorem.

36. Find the equation of a straight line joining the point of intersection of $5x + 3y = 21$ and $2x - y = 4$ to the point of intersection of $x + 3y = 16$ and $2x - y = 14$.

37. Prove that $\tan^2 A - \tan^2 B = \frac{\sin^2 A - \sin^2 B}{\cos^2 A \cos^2 B}$

38. A container open at the top is in the form of a frustum of a cone of height 16cm with radii of its lower and upper ends are 8cm and 20cm respectively. Find the cost of milk which can completely fill a container at the rate of Rs.40 per litre.

39. A right circular cylindrical container of base radius 6cm and height 15cm is full of ice cream. The ice cream is to be filled in cones of height 9cm and base radius 3cm, having a hemispherical cap. Find the number of cones needed to empty the container.

40. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.

41. A wall clock strikes the bell once at 10'clock, 2 times at 20'clock, 3 times at 30'clock and so on. How many times will it strike in a particular day. Find the standard deviation of the number of strikes the bell make a day.

42. From the top of a tree of height 13m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree. ($\sqrt{3} = 1.732$).

PART - IV

Note: Answer both the questions choosing either of the alternatives.

2x8=16

43. a) Draw a circle of radius 4.5cm. Take a point on the circle. Draw the tangent at that point using the alternate segment theorem.

(or)

b) Draw a triangle ABC of base $BC = 8$ cm, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that $BD = 6$ cm

44. a) Draw the graph of $y = x^2 + 4x + 3$ and hence find the roots of $x^2 + x + 1 = 0$.

(or)

b) Draw the graph of $y = x^2 + 3x - 4$ and hence use it to solve $x^2 + 3x - 4 = 0$.