RISE OF NATION ACADEMY

"We Create the Impeccable Creature"

Test Paper

Standard – Xth

Subject – Mathematics

Date – 20/01/2019 **Time – 3 hrs.**
Max. Marks - 80 **Min. Marks – 40**

SECTION – A

Question numbers 1 to 6 carry 1 mark each.

1. Two cubes have their volumes in the ratio 1: 27. Find the ratio of their surface areas.

2.If one root of $5x^2 + 13x + k = 0$ is the reciprocal of the other root, then find value of k.

3. A(5, 1); B(1, 5) and C(–3, –1) are the vertices of · ABC. Find the length of median AD.

4. If x = a, y = b is the solution of the pair of equations x – y = 2 and x + y = 4, find the values of a and b.

5. If $\Delta ABC \sim \Delta QRP, \frac{ar(\Delta ABC)}{ar(\Delta QRP)} = \frac{9}{4}$ $and\ BC = 15cm. then\ find\ PR.$

6.Write whether $\frac{2\sqrt{45}+3\sqrt{20}}{2\sqrt{5}}$ **on simplification gives an irrational or a rational number.**

SECTION – B

Question numbers 7 to 12 carry 2 marks each.

7. A right circular cylinder and a cone have equal bases and equal heights. If their curved surface areas are in the ratio 8 : 5, show that the ratio between radius of their bases to their height is 3 : 4.

8. Find the linear relation between x and y such that P(x, y) is equidistant from the points A(1, 4) and

B(–1, 2).

9. X is a point on the side BC of ΔABC. XM and XN are drawn parallel to AB and AC respectively meeting AB in N and AC in M. MN produced meets CB produced at T. Prove that TX^2 = TB x TC

10. Given that $\sqrt{3}$ is an irrational number, prove that (2 + $\sqrt{3}$) is an irrational number.

11. ABC is a triangle in which ∠B = 90º, BC = 48 cm and AB = 14 cm. A circle is inscribed in the triangle, whose centre is O. Find radius r of in-circle.

12. A, B, C are interior angle of ΔABC. Prove that $cosec\ \frac{A+B}{2} = sec\frac{C}{2}$.

SECTION – C

Question numbers 13 to 22 carry 3 marks each.

13. Construct a triangle with sides 6 cm, 8 cm and 10 cm. Construct another triangle whose sides are $\frac{3}{5}$ of the corresponding sides of original triangle.

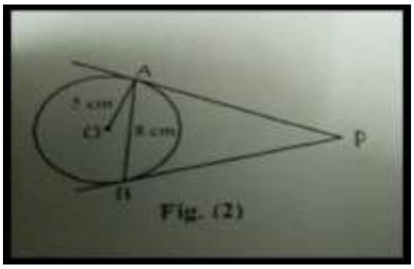
14. If

$\sin(A + 2B) = \frac{\sqrt{3}}{2}$ $and \cos(A + 4B) = 0, A > B\ and\ A + 4B \leq 90°, then\ find\ A\ and\ B.$

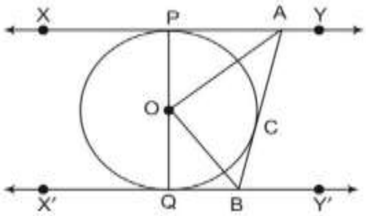
15. By changing the following frequency distribution 'to less than type' distribution, draw its ogive.

Classes	0-15	15-30	30-45	45-60	60-75
Frequency	6	8	10	6	4

16. In fig. (2) AB is a chord of length 8 cm of a circle of radius 5 cm. The tangents to the circle at A and B intersect at P. Find the length of AP.



Show in figure XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. prove that $\angle AOB = 90°$.



17. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is some integer.

18. The short and long hands of a clock are 4 cm and 6 cm long respectively. Find the sum of distances travelled by their tips in 48 hours.

OR

The side of a square is 10 cm. Find the area between inscribed and circumscribed circles of the square.

19. In an A.P if sum of its first n terms is $3n^2 + 5n$ and its k^{th} term is 164, find the value of k.

20. Divide 27 into two parts such that the sum of their reciprocals is $\frac{3}{20}$

21. Prove that,

$$\left(\frac{1 + tan^2 A}{1 + cot^2 A}\right) = \left(\frac{1 - tan A}{1 - \cot A}\right)^2 = tan^2 A$$

OR

Evaluate

$$\frac{cos58°}{sin32°}+\frac{sin22°}{cos68°}-\frac{cos38°cosec52°}{\sqrt{3}(tan18°tan35°tan60°tan72°tan55°)}$$

22. If coordinates of two adjacent vertices of a parallelogram are (3, 2), (1, 0) and diagonals bisect each other at (2, –5), find coordinates of the other two vertices.

OR

If the area of triangle with vertices (x, 3), (4, 4) and (3, 5) is 4 square units, find x.

SECTION – D

Question numbers 23 to 30 carry 4 marks each.

23. A faster train takes one hour less than a slower train for a journey of 200 km. If the speed of slower train is 10 km/hr less than that of faster train, find the speeds of two trains.

OR

Solve for x, $\frac{1}{a+b+c}=\frac{1}{a}+\frac{1}{b}+\frac{1}{x}, a \neq 0, b \neq 0, x \neq 0$

24. The angle of elevation of the top of a hill at the foot of a tower is 60º and the angle of depression from the top of tower to the foot of hill is 30º. If tower is 50-metre-high, find the height of the hill.

OR

Two poles of equal heights are standing opposite to each other on either side of the road which is 80 m wide. From a point in between them on the road, the angles of elevation of the top of poles are 60º and 30º respectively. Find the height of the poles and the distances of the point from the poles.

25. Obtain all zeroes of 3x4 – 15x3 + 13x2 + 25x – 30, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and -$\sqrt{\frac{5}{3}}$

26. A man donates 10 aluminium buckets to an orphanage. A bucket made of aluminium is of height 20 cm and has its upper and lowest ends of radius 36 cm and 21 cm respectively. Find the cost of preparing 10 buckets if the cost of aluminium sheet is 42 per 100 cm2. Write your comments on the act of the man.

27. Find the mean and mode for the following data:

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	4	8	10	12	10	4	2

28. For what values of m and n the following system of linear equations has infinitely many solutions.

$$3x + 4y = 12$$

$$(m + n)x + 2(m - n)y = 5m - 1.$$

29. A box contains cards numbered from 1 to 20. A card is drawn at random from the box. Find the probability that number on the drawn card is

(i) a prime number

(ii) a composite number

(iii) a number divisible by 3

OR

The King, Queen and Jack of clubs are removed from a pack of 52 cards and then the remaining cards are well shuffled. A card is selected from the remaining cards. Find the probability of getting a card

(i) of spade (ii) of black king (iii) of club (iv) of jacks

30. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.
