



# THE NANDYAL PUBLIC SCHOOL :: NANDYAL

Series TNPS/11/01

SET – 1

ROLL No.

Q.P Code 09/11/01

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Candidates must write the Q.P Code on the title page of the Answer book.



## General Instructions :

Read the following instructions carefully and follow them :

- This question paper contains **38** questions. **All** questions are **compulsory**.
- This question paper is divided into **five** Sections – **A, B, C, D** and **E**.
- In **Section A**, Question numbers **1** to **18** are multiple choice questions (MCQs) and question numbers **19** and **20** are Assertion – Reason based questions of **1** mark each.
- In **Section B**, Question numbers **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.
- In **Section C**, Question numbers **26** to **31** are short answer (SA) type questions, carrying **3** marks each.
- In **Section D**, Question numbers **32** to **35** are long answer (LA) type questions carrying **5** marks each.
- In **Section E**, Question numbers **36** to **38** are **case-study based integrated** questions carrying **4** marks each. Internal choice is provided in **2** marks question in each case-study.
- There is no overall choice. However, an internal choice has been provided in **2** questions in Section **B**, **2** questions in Section **C**, **2** questions in Section **D** and **3** questions of **2** marks in Section **E**.
- Draw neat diagrams wherever required. Take  $\pi = \frac{22}{7}$  wherever required, if not stated.
- Use of calculators is **NOT** allowed.



गणित (मानक)

MATHEMATICS (STANDARD)



निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

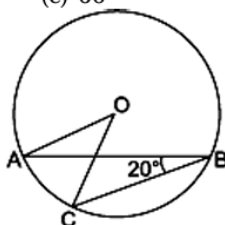
Maximum Marks : 80

## SECTION – A

Questions 1 to 20 carry 1 mark each.

1. Value of  $(256)^{0.16} \times (256)^{0.09}$  is  
(a) 4                      (b) 16                      (c) 64                      (d) 256.25
2. A rational number between  $\sqrt{2}$  and  $\sqrt{3}$  is  
(a) 1.1                      (b)  $\frac{\sqrt{2} \cdot \sqrt{3}}{2}$                       (c) 1.5                      (d) 1.8
3. On dividing  $6\sqrt{27}$  by  $2\sqrt{3}$ , we get  
(a)  $3\sqrt{9}$                       (b) 6                      (c) 9                      (d) none of these
4.  $\sqrt[3]{2} \times \sqrt[4]{3}$  is equal to  
(a) 648                      (b)  $72^{1/12}$                       (c)  $432^{1/12}$                       (d)  $216^{1/12}$
5. Factors of  $3x^2 - x - 4$  are  
(a)  $(x - 1)$  and  $(3x - 4)$                       (b)  $(x + 1)$  and  $(3x - 4)$   
(c)  $(x + 1)$  and  $(3x + 4)$                       (d)  $(x - 1)$  and  $(3x + 4)$
6. Zeros of the polynomial  $p(x) = (x - 2)^2 - (x + 2)^2$  are  
(a) 2, -2                      (b) 2x                      (c) 0, -2                      (d) 0
7. The point which lies on y-axis at a distance of 5 units in the negative direction of y-axis is  
(a) (0, 5)                      (b) (5, 0)                      (c) (0, -5)                      (d) (-5, 0)
8. The point (5, -4) lies  
(a) on the x-axis                      (b) on the y-axis                      (c) in the I quadrant                      (d) in the IV quadrant
9. How many linear equations in x and y can be satisfied by  $x = 1$  and  $y = 2$ ?  
(a) Only one                      (b) Two                      (c) Infinitely many                      (d) Three
10. The equation of x-axis is of the form  
(a)  $x = 0$                       (b)  $y = 0$                       (c)  $x + y = 0$                       (d)  $x = y$
11. The equation  $2x + 5y = 7$  has a unique solution, if x, y are  
(a) Natural numbers                      (b) Positive real numbers  
(c) Real numbers                      (d) Rational numbers
12. If two complementary angles are in the ratio 13 : 5, then the angles are  
(a)  $65^\circ$ ,  $35^\circ$                       (b)  $65^\circ$ ,  $25^\circ$                       (c)  $13x^\circ$ ,  $5x^\circ$                       (d)  $60^\circ$ ,  $30^\circ$
13. Angles of a triangle are in the ratio 2 : 4 : 3. The smallest angle of the triangle is  
(a)  $60^\circ$                       (b)  $40^\circ$                       (c)  $80^\circ$                       (d)  $20^\circ$
14. Which of the following is not a criterion for congruence of triangles?  
(a) SAS                      (b) ASA                      (c) SSA                      (d) SSS

15. In a parallelogram ABCD, AP and CQ are perpendicular drawn to the diagonal BD. On measuring it is found that  $\angle PAB = 65^\circ$  and  $\angle DAB = 75^\circ$ , then the measure of  $\angle QCD$  is  
 (a)  $90^\circ$  (b)  $75^\circ$  (c)  $65^\circ$  (d)  $10^\circ$
16. Given a circle of radius 5 cm and centre O. OM is drawn perpendicular to the chord XY. If OM = 3 cm, then length of chord XY is  
 (a) 4 cm (b) 6 cm (c) 8 cm (d) 10 cm
17. In figure, if  $\angle ABC = 20^\circ$ , then  $\angle AOC$  is equal to:  
 (a)  $20^\circ$  (b)  $40^\circ$  (c)  $60^\circ$  (d)  $10^\circ$



18. The area of an equilateral triangle with side  $4\sqrt{3}$  cm is  
 (a)  $20 \text{ cm}^2$  (b)  $20 \text{ cm}^2$  (c)  $18.784 \text{ cm}^2$  (d)  $20.784 \text{ cm}^2$

**DIRECTION:** In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option

19. **Assertion (A):** 0.271 is a terminating decimal and we can express this number as  $271/1000$  which is of the form  $p/q$ , where p and q are integers and  $q \neq 0$ .  
**Reason (R):** A terminating or non-terminating decimal expansion can be expressed as rational number.  
 (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).  
 (c) Assertion (A) is true but Reason (R) is false.  
 (d) Assertion (A) is false but Reason (R) is true.
20. **Assertion (A):** The angles of a quadrilateral are  $x^\circ$ ,  $(x - 10)^\circ$ ,  $(x + 30)^\circ$  and  $(2x)^\circ$ , the smallest angle is equal to  $58^\circ$ .  
**Reason (R):** Sum of the angles of a quadrilateral is  $360^\circ$ .  
 (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).  
 (c) Assertion (A) is true but Reason (R) is false.  
 (d) Assertion (A) is false but Reason (R) is true.

## **SECTION – B**

Questions 21 to 25 carry 2 marks each.

21. Simplify:  $\left[ 5 \left( 8^{\frac{1}{3}} + 27^{\frac{1}{3}} \right)^3 \right]^{\frac{1}{4}}$

**OR**

Simplify:  $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$

22. Without plotting the points indicate the quadrant in which they will lie, if

- (i) ordinate is 5 and abscissa is – 3
- (ii) abscissa is – 5 and ordinate is – 3
- (iii) abscissa is – 5 and ordinate is 3
- (iv) ordinate is 5 and abscissa is 3

23. If  $\angle 1 = \angle 2$ ,  $\angle 3 = \angle 4$  and  $\angle 2 = \angle 4$ , what is the relation between  $\angle 1$  and  $\angle 2$ . Give reasons for your answer.

24. How would you rewrite Euclid's fifth postulate so that it would be easier to understand?

25. The height and the slant height of a cone are 21 cm and 28 cm respectively. Find the volume of the cone.

**OR**

A hemispherical bowl has a radius of 3.5 cm. What would be the volume of water it would contain?

## **SECTION – C**

Questions 26 to 31 carry 3 marks each.

26. Simplify  $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} + \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$  by rationalizing the denominator.

27. Factorise  $x^3 - 23x^2 + 142x - 120$ .

28. Find the solution of the linear equation  $x + 2y = 8$  which represents a point on (i)  $x$ -axis (ii)  $y$ -axis

29. Prove that the quadrilateral formed by joining the mid-points of the sides of a quadrilateral, in order, is a parallelogram.

30. The following table gives the life times of 400 neon lamps:

Life time (in hours)	Number of Lamps
300 – 400	14
400 – 500	56
500 – 600	60
600 – 700	86
700 – 800	74
800 – 900	62
900 – 1000	48

Represent the given information with the help of a histogram.

31. A family with a monthly income of Rs 20,000 had planned the following expenditures per month under various heads: Draw a bar graph for the given below data.

Heads	Expenditure (in thousand rupees)
Grocery	4
Rent	5
Education of children	5
Medicine	2
Fuel	2
Entertainment	1
Miscellaneous	1

### **SECTION – D**

Questions 32 to 35 carry 5 marks each.

32. A gardener has to put double fence all around a triangular field with sides 120 m, 80 m and 60 m. In the middle of each of the sides, there is a gate of width 10 m.
- Find the length of wire needed for fencing.
  - Find the cost of fencing at the rate of ₹ 6 per metre.
  - Find the area of triangular field.
  - Find the cost of levelling the ground at the rate of ₹ 10 per m<sup>2</sup>.

**OR**

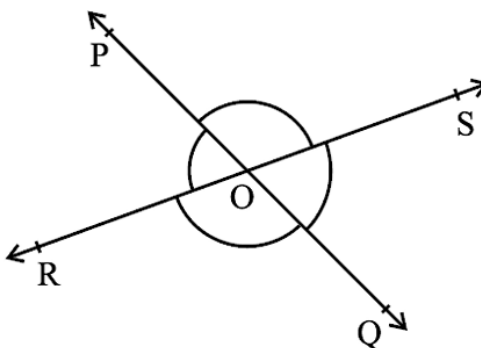
Anurag makes a kite using red and yellow piece of paper. Red piece of paper is cut in the shape of square with diagonal 30 cm. At one of the vertex of this square, a yellow paper with the shape of an equilateral triangle of side such that  $a^2 = 32\sqrt{3}$  is attached to give the shape of a kite. Find the total area of paper required to make the kite.

33. If  $x^3 + ax^2 + bx + 6$  has  $(x - 2)$  as a factor and leaves a remainder 3 when divided by  $(x - 3)$ , find the values of  $a$  and  $b$ .

**OR**

Without actual division, prove that  $2x^4 - 6x^3 + 3x^2 + 3x - 2$  is exactly divisible by  $x^2 - 3x + 2$ .

34. A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of Rs 498.96. If the cost of white-washing is Rs 2.00 per square metre, find the
- inside surface area of the dome,
  - volume of the air inside the dome.
35. Prove that "If two lines intersect each other, then the vertically opposite angles are equal."  
Using this theorem, find all the angles if  $\angle POR : \angle ROQ = 5 : 7$  in the below figure where lines PQ and RS intersect each other at point O.

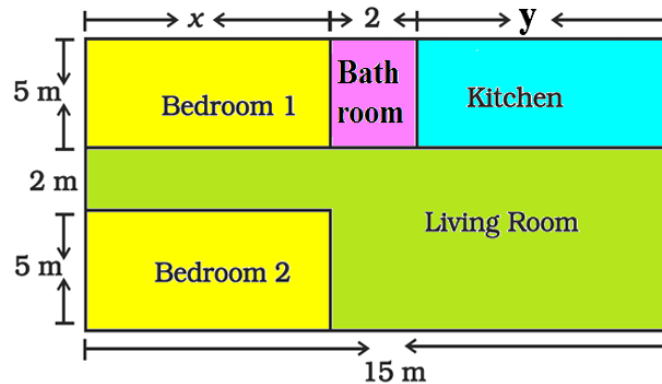


### SECTION – E(Case Study Based Questions)

Questions 36 to 38 carry 4 marks each.

#### 36. Case Study – 1

In the below given layout, the design and measurements has been made such that area of two bedrooms and Kitchen together is 95 sq. m.



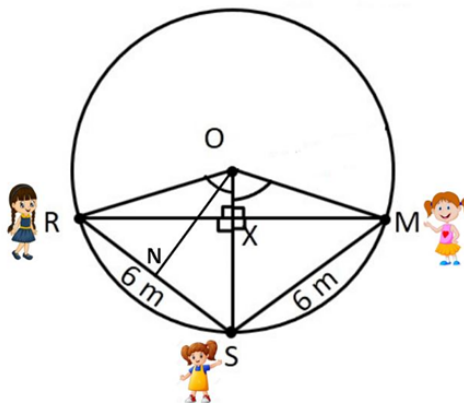
- (i) Form the pair of linear equation in two variables formed from the statements. [1]
- (ii) Find the length of the outer boundary of the layout. [1]
- (iii) Find the area of each bedroom. [2]

OR

- (iii) If the point (3, 4) lies on the graph of  $3y = ax + 7$ , then find the value of  $a$ .

#### 37. Case Study – 2

Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. The distance between Reshma and Salma and between Salma and Mandip is 6m each. In the given below figure Reshma's position is denoted by R, Salma's position is denoted by S and Mandip's position is denoted by M.



- (i) Find the area of triangle ORS. [2]
- (ii) What is the distance between Reshma and Mandip? [2]

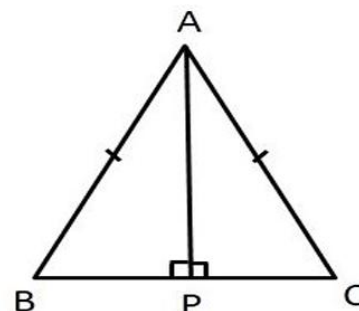
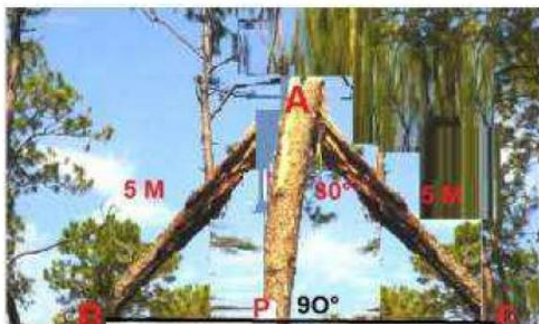
OR

- (ii) If BC is a diameter of a circle of centre O and OD is perpendicular to the chord AB of a circle, show that  $CA = 2OD$ . [2]

#### 38. Case Study – 3

In a forest, a big tree got broken due to heavy rain and wind. Due to this rain the big branches AB and AC with lengths 5m fell down on the ground. Branch AC makes an angle of  $30^\circ$  with

the main tree AP. The distance of Point B from P is 4 m. You can observe that  $\triangle ABP$  is congruent to  $\triangle ACP$ .



- (i) Show that  $\triangle ACP$  and  $\triangle ABP$  are congruent.
- (ii) Find the value of  $\angle ACP$ ?

OR

What is the total height of the tree?

- (iii) Find the value of  $\angle BAP$ ?

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