



THE NANDYAL PUBLIC SCHOOL :: NANDYAL

Series TNPS/11/02

SET – 2

ROLL No.

Q.P Code 09/11/02

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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

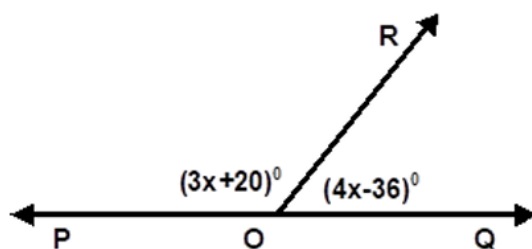
अधिकतम अंक : 80

Maximum Marks : 80

SECTION – A

Questions 1 to 20 carry 1 mark each.

1. The value of $64^{\frac{1}{2}}$ is :
(a) 8 (b) 4 (c) 16 (d) 32
2. On rationalizing the denominator of $\frac{1}{\sqrt{7}-2}$, we get
(a) $\sqrt{7}-2$ (b) $\sqrt{7}+2$ (c) $\frac{\sqrt{7}+2}{3}$ (d) $\frac{\sqrt{7}-2}{3}$
3. $\frac{3\sqrt{12}}{6\sqrt{27}}$ equals
(a) $\frac{1}{2}$ (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) $\frac{1}{3}$
4. $4\frac{1}{8}$ in decimal form is:
(a) 4.125 (b) $4.\overline{15}$ (c) $4.\overline{15}$ (d) $0.\overline{415}$
5. The factors of $2x^2 - 7x + 3$ are:
(a) $(x-3)(2x-1)$ (b) $(x+3)(2x+1)$
(c) $(x-3)(2x+1)$ (d) $(x+3)(2x-1)$
6. On dividing $x^3 + 3x^2 + 3x + 1$ by $x + \pi$ we get remainder:
(a) $-\pi^3 + 3\pi^2 - 3\pi + 1$ (b) $\pi^3 - 3\pi^2 + 3\pi + 1$
(c) $-\pi^3 - 3\pi^2 - 3\pi - 1$ (d) $-\pi^3 + 3\pi^2 - 3\pi - 1$
7. Signs of the abscissa and ordinate of a point in the second quadrant are respectively:
(a) +, + (b) -, + (c) +, - (d) -, -
8. If (2, 0) is a solution of the linear equation $2x + 3y = k$, then the value of k is
(a) 4 (b) 6 (c) 5 (d) 2
9. Any solution of the linear equation $2x + 0y + 9 = 0$ in two variables is of the form
(a) $(-\frac{9}{2}, m)$ (b) $(n, -\frac{9}{2})$ (c) $(0, -\frac{9}{2})$ (d) $(-9, 0)$
10. The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at the point
(a) (2, 0) (b) (0, 3) (c) (3, 0) (d) (0, 2)
11. In the adjoining figure the value of x is
(a) 25° (b) 28° (c) 30° (d) 60°



12. The angle which is five times its supplement is
(a) 150° (b) 180° (c) 90° (d) 360°
13. In parallelogram CARS, $m\angle C = 5x - 20$ and $m\angle A = 3x + 40$. Find the value of x.
(a) 15 (b) 20 (c) 30 (d) 130

14. The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O. If $\angle DAC = 32^\circ$ and $\angle AOB = 70^\circ$, then $\angle DBC$ is equal to
 (a) 24° (b) 86° (c) 38° (d) 32°
15. The length of a chord of circle of radius 10 cm is 12 cm. Determine the distance of the chord from the centre
 (a) 8 cm (b) 7 cm (c) 6 cm (d) 5 cm
16. If the area of an equilateral triangle is $81\sqrt{3} \text{ cm}^2$, then its height is
 (a) $9\sqrt{3}$ (b) $3\sqrt{3}$ (c) $12\sqrt{3}$ (d) none of these
17. The class marks of a frequency distribution are given as follows: 15, 20, 25, The class corresponding to the class mark 20 is
 (a) 12.5 – 17.5 (b) 17.5 – 22.5 (c) 22.5 – 27.5 (d) 27.5 – 32.5
18. In the class intervals 10 – 20, 20 – 30, the number 20 is included in.
 (a) 10 – 20 (b) 20 – 30 (c) both the interval (d) none of these intervals

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):** Rational number lying between two rational numbers x and y is $\frac{1}{2}(x + y)$.

Reason (R): There is one rational number lying between any two rational numbers.

- (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 point $(-2, 0)$ lies on y -axis and $(0, 4)$ on x -axis.

Reason (R): Every point on the x -axis has zero distance from x -axis and every point on the y -axis has zero distance from y -axis.

- (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

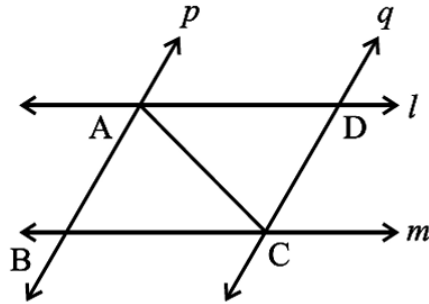
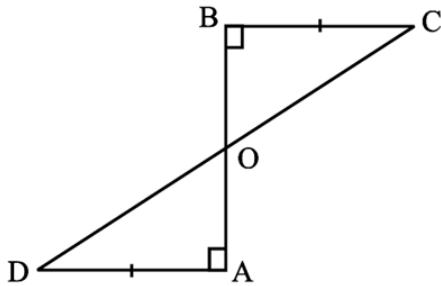
Questions 21 to 25 carry 2 marks each.

21. Show that $1.\overline{27}$ can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

OR

Simplify: $\frac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}}$

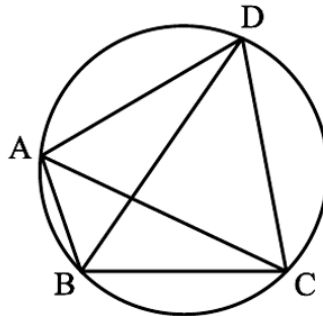
22. In which quadrant or on which axis do each of the points $(-2, 4)$, $(3, -1)$, $(-1, 0)$ and $(-3, -5)$ lie?
23. AD and BC are equal perpendiculars to a line segment AB (see below left figure). Show that CD bisects AB.



OR

l and m are two parallel lines intersected by another pair of parallel lines p and q (see above right sided figure). Show that $\triangle ABC \cong \triangle CDA$.

24. A conical tent is 10 m high and the radius of its base is 24 m. Find
(i) slant height of the tent.
(ii) cost of the canvas required to make the tent, if the cost of 1 m^2 canvas is Rs 70.
25. In the below figure, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If $\angle DBC = 55^\circ$ and $\angle BAC = 45^\circ$, find $\angle BCD$.



SECTION – C

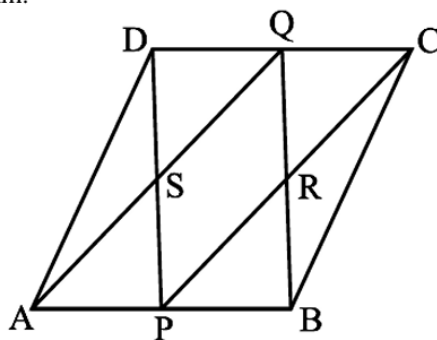
Questions 26 to 31 carry 3 marks each.

26. Find the value of $\frac{4}{(216)^{\frac{-2}{3}}} + \frac{1}{(256)^{\frac{-3}{4}}} + \frac{2}{(243)^{\frac{-1}{5}}}$

27. Factorise each of the following cubic expressions:

(i) $8x^3 - y^3 - 12x^2y + 6xy^2$ (ii) $8x^3 + 729 + 108x^2 + 486x$

28. Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa. If the point (3, 4) lies on the graph of $3y = ax + 7$, then find the value of a .
29. If a point C is called a mid-point of line segment AB. Using Euclid's axiom, prove that every line segment has one and only one mid-point.
30. ABCD is a parallelogram in which P and Q are mid-points of opposite sides AB and CD (see below figure). If AQ intersects DP at S and BQ intersects CP at R, show that
 (i) APCQ is a parallelogram.
 (ii) DPBQ is a parallelogram.
 (iii) PSQR is a parallelogram.



OR

ABCD is a rhombus. Show that diagonal AC bisects $\angle A$ as well as $\angle C$ and diagonal BD bisects $\angle B$ as well as $\angle D$.

31. ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If $\angle DBC = 70^\circ$, $\angle BAC$ is 30° , find $\angle BCD$. Further, if $AB = BC$, find $\angle ECD$.

OR

A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

SECTION – D

Questions 32 to 35 carry 5 marks each.

32. Find the values of a and b so that the polynomial $x^4 + ax^3 - 7x^2 + 8x + b$ is exactly divisible by $(x + 2)$ as well as $(x + 3)$.

OR

Without actual division, prove that $x^3 - 3x^2 - 13x + 15$ is exactly divisible by $x^2 + 2x - 3$.

33. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon? Find the ratio of their surface areas.

OR

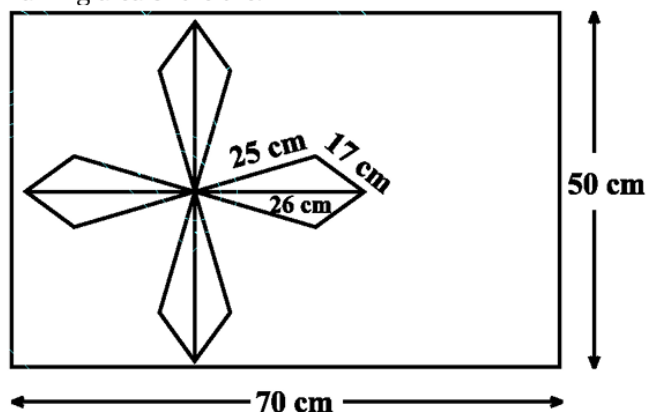
A cloth having an area of 165 m^2 is shaped into the form of a conical tent of radius 5 m

- (i) How many students can sit in the tent if a student, on an average, occupies $\frac{5}{7} \text{ m}^2$ on the ground?
 (ii) Find the volume of the cone.

34. Prove that "Angles opposite to equal sides of an isosceles triangle are equal."

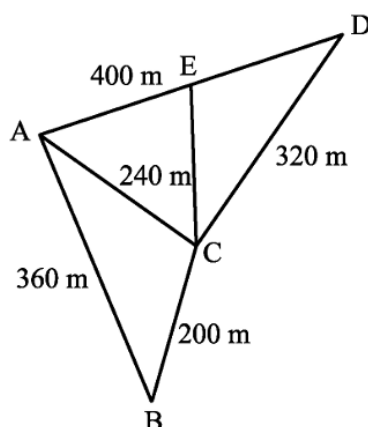
In an isosceles triangle ABC, with $AB = AC$, the bisectors of $\angle B$ and $\angle C$ intersect each other at O. Join A to O. Show that : (i) $OB = OC$ (ii) AO bisects $\angle A$

35. A design is made on a rectangular tile of dimensions $50\text{ cm} \times 70\text{ cm}$ as shown in below Figure. The design shows 8 triangles, each of sides 26 cm , 17 cm and 25 cm . Find the total area of the design and the remaining area of the tile.



OR

Kamla has a triangular field with sides 240 m , 200 m , 360 m , where she grew wheat. In another triangular field with sides 240 m , 320 m , 400 m adjacent to the previous field, she wanted to grow potatoes and onions. She divided the field in two parts by joining the mid-point of the longest side to the opposite vertex and grew potatoes in one part and onions in the other part. How much area (in hectares) has been used for wheat, potatoes and onions? (1 hectare = 10000 m^2).



SECTION – E(Case Study Based Questions)

Questions 36 to 38 carry 4 marks each.

36. Case Study – 1

Deepak bought 3 notebooks and 2 pens for Rs. 80. His friend Ram said that price of each notebook could be Rs. 25. Then three notebooks would cost Rs.75, the two pens would cost Rs.5 and each pen could be for Rs. 2.50. Another friend Ajay felt that Rs. 2.50 for one pen was too little. It should be at least Rs. 16. Then the price of each notebook would also be Rs.16.



Lohith also bought the same types of notebooks and pens as Aditya. He paid 110 for 4 notebooks and 3 pens. Later, Deepak guess the cost of one pen is Rs. 10 and Lohith guess the cost of one notebook is Rs. 30.



- (i) Form the pair of linear equations in two variables from this situation by taking cost of one notebook as Rs. x and cost of one pen as Rs. y .
- (ii) Find the solution satisfying both the equations formed in (i)?
- (iii) Find the cost of one pen?

OR

- (iii) Find the total cost if they will purchase the same type of 15 notebooks and 12 pens.

37. Case Study – 2

A group of students decided to make a project on Statistics. They are collecting the heights (in cm) of their 51 girls of Class IX-A, B and C of their school. After collecting the data, they arranged the data in the following frequency distribution table form:



Height (in cm)	Number of girls
135 – 140	4
140 – 145	7
145 – 150	18
150 – 155	11
155 – 160	6
160 – 165	5

Based on the information, answer the following questions :

- (i) What is the width of the class? [1]
- (ii) How many students of the height 150 cm and below are there? [1]
- (iii) How many students of the height 145 cm and above are there? [2]

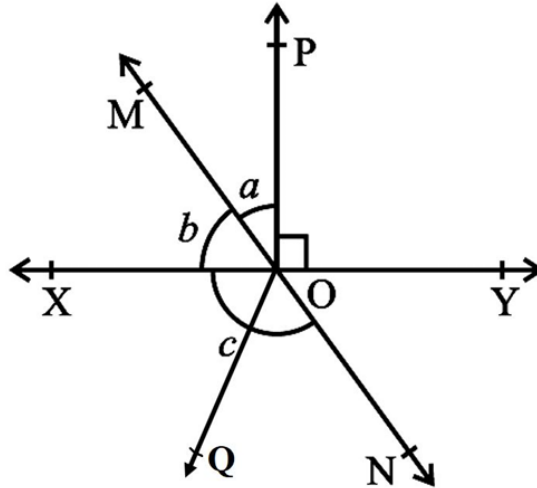
OR

- (iii) How many students of the height more than or equal to 145 cm but less than 155 are there? [2]

38. Case Study – 3

One day, Maths teacher draw a figure on the blackboard in which lines XY and MN intersect at O such $\angle POY = 90^\circ$ and $a : b = 2 : 3$.

He marked $\angle XON = c$ then he draws the bisector OQ of $\angle XON$.



Answer the following questions:

- (i) What is the value of a ? [1]
- (ii) What is the value of b and c ? [1]
- (iii) What is the value of $\angle QON$ and $\angle QOY$? [2]

OR

- (e) What is the value of Reflex $\angle c$ and Reflex $\angle QON$? [2]

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