Nayak's Tutorials

Way to Excellence

Date : 2024 - 25 | **Practice Paper 1** | **Marks : 80**

Std : X_CBSE | **Mathematics (Standard)** | **Duration: 3 Hrs**

(Subject Code: 241)

General Instructions:

Read the following instructions carefully and follow them :

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question no. 1-18 are multiple choice questions (MCQs) and questions no.19 and 20 are Assertion - Reason based questions of 1 mark each.
4. In Section B, Questions no. 21 - 25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26 - 31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32 - 35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36 - 38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take π = 22/7 wherever required if not stated.
11. Use of calculators is not allowed.

SECTION A

Section A consists of 20 questions of 1 mark each. **20**

1. If A (−1,0), B (5,−2) and C (8,2) are the vertices of a △ABC then its centroid is (1)

A) (6,0) B) (0,6) C) (4,0) D) (12,0)

2. In the given figure, if quadrilateral PQRS circumscribes a circle, then the measures of angles x and y are (1)

A) x=100°, y=85° B) x=100°, y=90°

C) x=95°, y=95° D) x=85°, y=100°

3. For the following frequency distribution: (1)

Class:	0–5	5–10	10–15	15–20	20–25
Frequency:	8	10	19	25	8

The upper limit of the median class is:

A) 15 B) 10 C) 20 D) 25

4. The point which lies on the perpendicular bisector of the line segment joining the points A (−2,−5) and B (2,5) is (1)

A) (2, 0) B) (−2, 0) C) (0, 2) D) (0, 0)

5. If a pair of linear equations is inconsistent then their graph lines will be (1)

A) always coincident B) parallel

C) always intersecting D) intersecting or coincident

6. The point on the x−axis which is equidistant from the points (2,−5) and (−2,9) is (1)

A) (0,−7) B) (−7,0) C) (0,7) D) (7,0)

7. A child's game has 8 triangles of which 5 are blue and rest are red and 10 squares of which 6 are blue and the rest are red. One piece is lost at random. The probability that it is a square of blue colour is (1)

A) $\frac{4}{9}$ B) $\frac{6}{10}$ C) $\frac{1}{3}$ D) $\frac{2}{3}$

8. A medicine capsule is in the shape of a cylinder of diameter 0.5 cm with two hemispheres stuck to each of its ends. The length of the entire capsule is 2cm. The capacity of the capsule is (1)

A) $0.33cm^3$ B) $0.34cm^3$ C) $0.36cm^3$ D) $0.35cm^3$

9. A bag contains 3 red balls, 5 white balls and 7 black balls. What is the probability that a ball drawn from the bag at random will be neither red nor black? (1)

A) $\frac{1}{3}$ B) $\frac{8}{15}$ C) $\frac{7}{15}$ D) $\frac{1}{5}$

10. The discriminant of the quadratic equation $2x^2-4x+3=0$ is : (1)

A) −8 B) 10 C) 8 D) $2\sqrt{2}$

11. If $(x+2)$ is a factor of $3x^3-x^2-px-4$, then the value of p is : (1)

A) 14 B) 12 C) 10 D) 16

12. 30th term of the A.P.:10, 7, 4,....., is : (1)

A) 97 B) 77 C) −77 D) −87

13. If p is a prime number, then $\sqrt{p}$ is (1)

A) Prime number B) Rational C) Integer D) Irrational

14. The point where the perpendicular bisector of the line segment joining the points A (2,5) and B (4,7) cuts is: (1)

A) (3,6) B) (0,0) C) (2,5) D) (6,3)

15. If a kite is flying at a height of $10\sqrt{3}$ m from the level ground attached to a string inclined at 60° to the horizontal then the length of the string is : (1)

A) 20 m B) $80\sqrt{3}$ m C) $40\sqrt{3}$ m D) $60\sqrt{3}$ m

16. The marks obtained by 9 students in Mathematics are 59, 46, 31, 23, 27, 40, 52, 35 and 29. The mean of the data is (1)

A) 30 B) 41 C) 23 D) 38

17. If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and LCM (a, b, c) $= 2^3 \times 3^2 \times 5$, then n = (1)

A) 1 B) 4 C) 3 D) 2

18. A system of two linear equations in two variables is dependent consistent, if their graphs (1)

A) do not intersect at any point B) cut the x−axis

C) intersect only at a point D) coincide with each other

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

A) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

B) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.

C) Assertion is correct but Reason is incorrect.

D) Assertion is incorrect but Reason is correct.

19. **Assertion (A)** : L.C.M. and H.C.F. of a and 20 are 100 and 10 respectively, then a=50.
Reason (R) : L.C.M $\times$ H.C.F. = First number $\times$ Second number (1)

20. **Assertion (A)** : Two right-angled triangles are always similar.
Reason (R) : By Pythagoras Theorem, $H^2 = (side1)^2 + (side2)^2$ (1)

SECTION B

Section B consists of 5 questions of 2 marks each

21. The integers from 1 to 30 inclusive are written on cards (one number on one card). These card once put in a box and well mixed. Joseph picked up one card. What is the probability that his card has
(i) number7 (ii) an even number (iii) a prime number (2)

22. Aditya is walking along the line joining points (1,4) and (0,6). Aditi is walking along the line joining points (3,4) and (1,0). Represent the graph and find the point where both cross each other. (2)

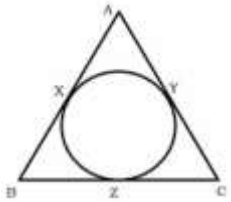
23. If α and β are the zeroes of the polynomial $f(x)=x^2-4x-5$, then find the value of $\alpha^2+\beta^2$. (2)

24. (A) Find the coordinates of the point which divides the line segment joining the points (4,−3) and (8,5) in the ratio 3:1 internally. (2)

OR

(B) The base PQ of two equilateral triangles PQR and PQR' with side '2a' lies along y-axis such that the mid-point of PQ is at the origin. Find the coordinates of the vertices R and R' of the triangles.

25. (A) ABC is an isosceles triangle in which AB=AC which is circumscribed about a circle as shown in the figure. Show that BC is bisected at the point of contact. (2)



OR

(B) Two concentric circles are of radii 6.5 cm and 2.5 cm. Find the length of the chord of the larger circle which touches the smaller circle.

SECTION C

Section C consists of 6 questions of 3 marks each

26. Find the value of the trigonometric ratios if $\tan\alpha = \frac{1}{12}$ (3)

27. 5 pencils and 7 pens together cost ₹ 195 while 7 pencils and 5 pens together cost ₹153. Find the cost of each one of the pencil and the pen. (3)

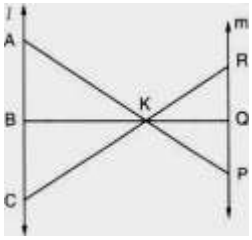
28. (A) Prove that $(3-\sqrt{5})$ is irrational. (3)

OR

(B) A shopkeeper has 120 litres of petrol, 180 litres of diesel and 240 litres of kerosene.

He wants to sell oil by filling the three kinds of oils in tins of equal capacity. What should be the greatest capacity of such a tin?

29. In given figure, line l || line m (3)



(i) Name three pairs of similar triangles with proper correspondence; write similarities.

(ii) Prove that $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{RQ}$.

30. (A) From an external point P, a tangent PT and a line segment PAB is drawn to a circle with centre O.ON is perpendicular on the chord AB. Prove that. (3)

(i) $PA.PB = PN^2 - AN^2$

(ii) $PN^2 - AN^2 = OP^2 - OT^2$

(iii) $PA.PB = PT^2$

OR

(B) In two concentric circles, prove that a chord of larger circle which is tangent to smaller circle is bisected at the point of contact.

31. A person observed the angle of elevation of the top of a tower is 30°. He walked 50 m towards the foot of the tower along level ground and found the angle of elevation of the top of the tower as 60°. Find the height of the tower. (3)

SECTION D

Section D consists of 4 questions of 5 marks each

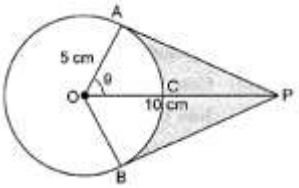
32. (A) Solve for x, $\frac{1}{a+b+c} = \frac{1}{a} + \frac{1}{b} + \frac{1}{c}$ where $a + b + x \neq 0$ and $a, b, x \neq 0$. (5)

OR

(B) A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If, the total cost of production on that day was ₹ 90, find the number of articles produced and the cost of each article.

33. ABCD is a quadrilateral. P,Q,R and S are the points of trisection of sides AB, BC, CD and DA respectively and are adjacent to A and C. Prove that PQRS is a parallelogram. (5)

34. (A) An elastic belt is placed round the rim of a pulley of radius 5cm. One point on the belt is pulled directly away from the centre O of the pulley until it is at P, 10 cm from O. Find the length of the belt that is in contact with the rim of the pulley. Also, find the shaded area. (5)



OR

(B) Find up to three places of decimal the radius of the circle whose area is the sum of the areas of two triangles whose sides are 35, 53, 66 and 33, 56, 65 measured in centimetres (Use $\pi = 22/7$).

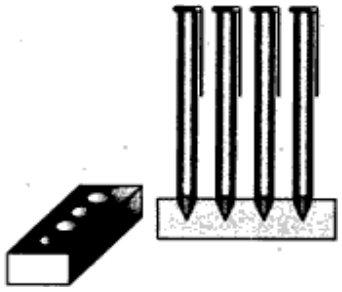
35. Find the median for the following frequency distribution : (5)

Height (in cm)	160 – 162	163 – 165	166 – 168	169 – 171	172 – 174
Frequency	15	117	136	118	14

SECTION E

Section E consists of 3 case study based questions of 4 marks each.

36. A carpenter in the small town of Bareilly used to make and sell different kinds of wood items like a rectangular box, cylindrical pen stand, and cuboidal pen stand. One day a student came to his shop and asked him to make a pen stand with the dimensions as follows:
A pen stand should be in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid should be 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm.



(i) The volume of the cuboidal part. (1)

(ii) (A) The volume of wood in the entire stand. (2)

OR

(B) If the cost of wood used is ₹ 10 per cm^3, then the total cost of making the pen stand.

(iii) Total volume of conical depression. (1)

37. **Read the text carefully and answer the questions:**
Suman is celebrating his birthday. He invited his friends. He bought a packet of toffees/candies which contains 360 candies. He arranges the candies such that in the first row there are 3 candies, in second there are 5 candies, in third there are 7 candies and soon.

(i) Find the total number of rows of candies. (1)

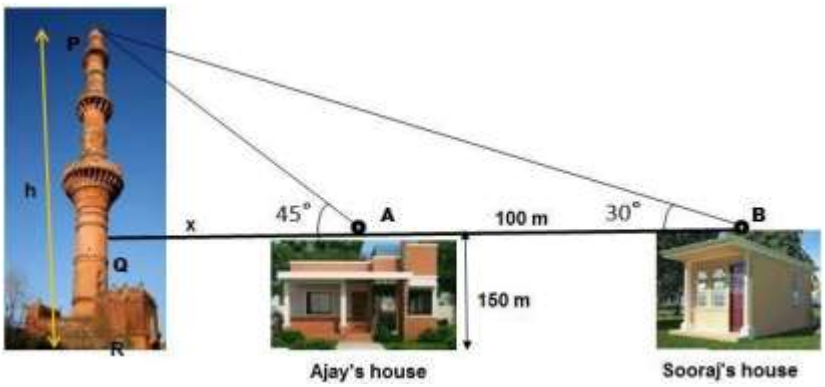
(ii) (A) If Aditya decides to make 15 rows, then how many total candies will be placed by him with the same arrangement? (2)

OR

(B) Find the number of candies in 12^{th} row.

(iii) How many candies are placed in last row? (1)

38. **Read the text carefully and answer the questions:**
The houses of Ajay and Sooraj are at 100 m distance and the height of their houses is the same as approx 150 m. One big tower was situated near their house. Once both friends decided to measure the height of the tower. They measure the angle of elevation of the top of the tower from the roof of their houses. The angle of elevation of ajay's house to the tower and sooraj's house to the tower are 45° and 30° respectively as shown in the figure.



(i) Find the height of the tower. (1)

(ii) (A) Find the distance between top of the tower and top of Sooraj's house? (2)

OR

(B) Find the distance between top of tower and top of Ajay's house?

(iii) What is the distance between the tower and the house of Sooraj? (1)