Nayak's Tutorials

Way to Excellence

Date : 2024 - 25	**Practice Paper 2**	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. The vertices of a quadrilateral are (1, 7), (4, 2), (−1,−1) and (−4,4). The quadrilateral is a   (1)
   A) rectangle   B) parallelogram   C) square   D) Rhombus

2. If PA and PB are tangents to the circle with centre O such that ∠APB = 50°,then ∠OAB is equal to   (1)
   A) 50°   B) 40°   C) 25°   D) 30°

3. The graph of y=4 x is a line   (1)
   A) Parallel to X axis   B) Parallel to Y axis
   C) Perpendicular to Y axis   D) Passing through origin

4. The ratio in which the x−axis divides the segment joining (3, 6) and (12, −3) is   (1)
   A) 1: −2   B) 2:1   C) 1:2   D) −2:1

5. If the system 6x-2y=3, kx-y=2 has a unique solution, then   (1)
   A) k = 3   B) k ≠ 4   C) k ≠ 3   D) k = 4

6. If three points (0, 0), $(3,\sqrt{3})$ and (3, λ) form an equilateral triangle, then λ =   (1)
   A) −4   B) −3   C) 2   D) None of these

7. Two coins are tossed together. The probability of getting at most one head is   (1)
   A) $\frac{2}{4}$ B) 1   C) $\frac{1}{4}$ D) $\frac{3}{4}$

8. The curved surface area of a right circular cylinder which just encloses a sphere of radius r is   (1)
   A) $2\pi r^2$ B) $4\pi r^2$ C) $8\pi r^2$ D) $6\pi r^2$

9. Two dice are thrown simultaneously. The probability that the sum of the numbers appearing on the dice is 1 is (1)

A) 3   B) 0   C) 2   D) 1

10. $3x^2 + 2x - 1 = 0$ have (1)

A) Real and Distinct roots   B) Real roots

C) real and equal root   D) No Real roots

11. The sum of two numbers is 17 and the sum of their reciprocals is $\frac{17}{62}$. The quadratic representation of the above situation (1)

A) $\frac{1}{x} + \frac{1}{x+17} = \frac{17}{62}$ B) $\frac{1}{x(17-x)} = \frac{17}{62}$

C) $\frac{1}{x} + \frac{1}{17-x} = \frac{17}{62}$ D) $\frac{1}{x} + \frac{1}{17-x} = \frac{17}{62}$

12. $\frac{\sec 30°}{\csc 60°} = ?$ (1)

A) $\frac{2}{\sqrt{3}}$ B) 1   C) $\frac{\sqrt{3}}{2}$ D) $\sqrt{3}$

13. $\sqrt{2}$ is (1)

A) a non-terminating repeating decimal   B) a rational number

C) a terminating decimal   D) an irrational number

14. In the fourth quadrant, (1)

A) x is +ve, y is −ve   B) x is −ve, y is −ve

C) x is +ve, y is +ve   D) x is −ve, y is +ve

15. In a right △ABC, AC is the hypotenuse of length 10 cm. If ∠A=30°, then the area of the triangle is (1)

A) $25\sqrt{3}\ cm^2$ B) 25 cm²   C) $\frac{25}{3}\sqrt{3}\ cm^2$ D) $\frac{25}{2}\sqrt{3}\ cm^2$

16. The wickets taken by a bowler in 10 cricket matches are 2, 6, 4, 5, 0, 2, 1, 3, 2, 3. The mode of the data is (1)

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

17. HCF of 144 and 198 is : (1)

A) 18   B) 12   C) 9   D) 6

18. $(x^2 + 1)^2 - x^2 = 0$ has (1)

A) Four real roots   B) Two real roots   C) No real roots   D) One real roots

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)** : If p is a prime number then H.C.F. of p, p^2 and p^3 is p.

Reason (R) : H.C.F. of 3 number is smallest number among them. (1)

20. **Assertion (A)** : D and E are points on the sides AB and AC respectively of a $\triangle ABC$ such that DE‖BC then the value of x is 11, when AD = 4cm, DB = (x – 4)cm, AE = 8 cm and EC = (3x – 19) cm.

Reason (R) : If a line divides any two sides of a triangle in the same ratio then it is parallel to the third side. (1)
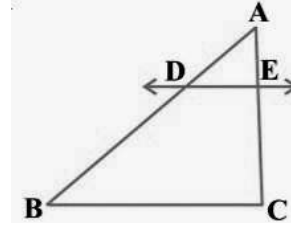
SECTION B

Section B consists of 5 questions of 2 marks each

21. Five cards–ten, jack, queen, king, and an ace of diamonds are shuffled face downwards. One card is picked at random.

   (i) What is the probability that the card is a queen ?

   (ii) If a king is drawn first and put a side, what is the probability that the second card picked up is the (a) ace ?   (b) king ? (2)

22. A two-digit number is 4 times the sum of its digits. If 18 is added to the number, the digits are reversed. Find the number. (2)

23. Find the zeroes of the quadratic polynomial $2x^2 – 25$. (2)

24. (A) Find the coordinates of the points of trisection of the line segment joining the points whose coordinates are given as (4, –1) and (–2, –3) (2)

   OR

   (B) In what ratio does the point P (2, −5) divide the line segment joining A(−3, 5) and B(4, −9) ?

25. (A) A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ =12 cm. Find the length PQ. (2)

   OR

   (B) Prove that the tangents drawn at the end points of a chord of a circle make equal angles with the chord.

SECTION C

Section C consists of 6 questions of 3 marks each

26. If $\tan \theta + \sec \theta = l$, the prove that $\sec \theta = \dfrac{l^2+1}{2l}$ (3)

27. Determine, graphically whether the system of equations $x−2y =2$, $4x−2y =5$ is consistent or in-consistent. (3)

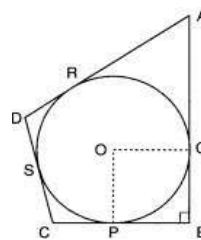28. (A) Prove that the following are irrationals. (3)

   (i) $7\sqrt{5}$ (ii) $6 + \sqrt{2}$

   OR

(B) Prove that $\sqrt{5} + \sqrt{3}$ is irrational.

29. Two △S ABC and DBC are on the same base BC and on the same side of BC in which ∠A =∠D = 90°. If CA and BD meet each other at E, show that AE × EC = BE × ED. (3)

30. (A) In the figure, a circle is inscribed in a
    quadrilateral ABCD in which ∠B=90°.
    If AD = 23 cm, AB=29 cm and DS=5 cm,
    find the radius(r) of the circle. (3)

OR

(B) AB is a diameter of a circle. P is a point on the semi-circle APB. AH and BK are perpendiculars from A and B respectively to the tangent at P. Prove that AH + BK = AB.

31. As observed from the top of a light-house, 100 m high above sea level, the angle of depression of a ship, sailing directly towards it, changes from 30° to 60°. Determine the distance travelled by the ship during the period of observation. (Use $\sqrt{3}$ = 1.732) (3)

SECTION D

Section D consists of 4 questions of 5 marks each

32. (A) The diagonal of a rectangular field is 60 metres more than the shorter side. If, the longer side is 30 metres more than the shorter side, find the sides of the field. (5)

OR

(B) Solve the quadratic equation by factorization : $\frac{3}{x+1} - \frac{1}{2} = \frac{2}{3x-1}, x \neq -1, \frac{1}{3}$.

33. (A) A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45°, how long will the car take to reach the observation tower from this point? (5)

OR

(B) The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is 30° and the angle of depression of its shadow from the same point in water of lake is 60°. Find the height of the cloud from the surface of water.

34. A round table cover has six equal
    designs as shown in figure. If the radius of the
    cover is 28cm, find the cost of making the
    designs at the rate of Rs.0.35 per cm². (5)
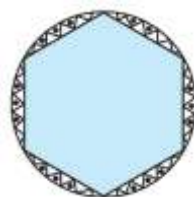
35. Find the value of f_1 from the following data, if its mode is 65 : (5)

Class	Frequency
0 – 20	6
20 – 40	8
40 – 60	f_1
60 – 80	12
80 – 100	6
100 – 120	5

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

36. **Read the text carefully and answer the questions :**

   An ice-cream seller used to sell different kinds and different shapes of ice-cream like rectangular shaped with one end hemispherical, cone-shaped and rectangular brick, etc. One day Sheetal and her brother came to his shop.

   Sheetal purchased an ice-cream which has the following shape: ice-cream cone as the union of a right circular cone and a hemisphere that has the same (circular) base as the cone. The height of the cone is 9 cm and the radius of its base is 2.5 cm her brother purchased rectangular brick shaped ice-cream with length 9 cm, width 4 cm and thickness 2 cm.

   (i) The volume of the ice-cream without hemispherical end. (1)

   (ii) (A) The volume of the ice-cream with a hemispherical end. (2)

   <div align="center">OR</div>

      (B) Whose quantity of ice-cream is more and by how much?

   (iii) Find the volume her brother ice-cream ? (1)

37. **Read the text carefully and answer the questions:**

   Elpis Technology is a TV manufacturer company. It produces smart TV sets not only for the Indian market but also exports them to many foreign countries. Their TV sets have been in demand every time but due to the Covid-19 pandemic, they are not getting sufficient spare parts, especially chips to accelerate the production. They have to work in a limited capacity due to the lack of raw materials.

   (i) They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find an increase in the production of TV every year. (1)

   (ii) (A) They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find the production in the 10th year. (2)

   <div align="center">OR</div>

      (B) They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find the total production in first 7years.

   (iii) They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find in which year production of TV is 1000. (1)

38. **Read the text carefully and answer the questions:**

   Mr. Vinod is a pilot in Air India. During the Covid-19 pandemic, many Indian passengers were stuck at Dubai Airport. The government of India sent special aircraft to take them. Mr. Vinod was leading this operation. He is flying from Dubai to New Delhi with these passengers. His airplane is approaching point A along a straight line and at a constant altitude h. At 10:00 am, the angle of elevation of the airplane is 30° and at 10:01 am, it is 60°.
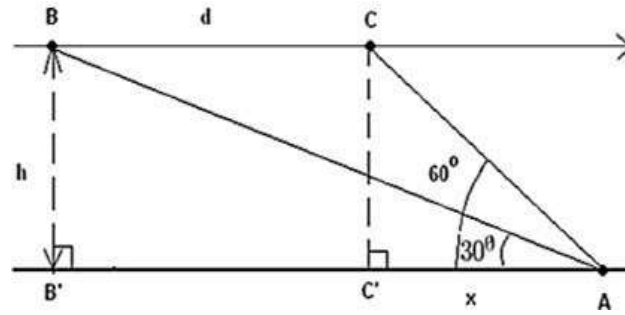
(i) What is the distance **d** is covered by the airplane from 10:00 am to 10:01 am if the speed of the airplane is constant and equal to 600 miles/hour? (1)

(ii) (A) Find the distance between passenger and airplane when the angle of elevation is $30°$. (2)

<div align="center">OR</div>

(B) Find the distance between passenger and airplane when the angle of elevation is $0°$.

(iii) What is the altitude **h** of the airplane ? (round answer to 2 decimal places) (1)