Directorate of Education, GNCT of Delhi
Practice Paper
Session: 2024-25
Class: X
Subject: Mathematics

Duration: 3 hours   **Maximum Marks: 80**

सामान्य निर्देश:

निम्नलिखित निर्देशों को ध्यानपूर्वक पढ़ें और उनका पालन करें:

1. इस प्रश्न पत्र में 38 प्रश्न हैं।

2. यह प्रश्न पत्र 5 खंडों 'अ', 'ब', 'स', 'द' और 'ई' में विभाजित है।

3. खंड 'अ' में प्रश्न संख्या 1-18 बहुविकल्पीय प्रश्न हैं और प्रश्न संख्या 19 और 20 प्रत्येक 1 अंक के अभिकथन-कारण आधारित प्रश्न हैं।

4. खंड 'ब' में, प्रश्न संख्या 21-25 अति लघु उत्तरीय प्रकार के प्रश्न हैं, प्रत्येक के लिए 02 अंक हैं।

5. खण्ड 'स' में प्रश्न संख्या. 26-31 लघु उत्तरीय प्रकार के प्रश्न हैं, प्रत्येक के लिए 03 अंक हैं।

6. खण्ड 'द' में प्रश्न संख्या. 32-35 दीर्घ उत्तरीय प्रकार के प्रश्न हैं, प्रत्येक के लिए 05 अंक हैं।

7. खण्ड 'ई' में प्रश्न संख्या. 36-38 केस-स्टडी आधारित प्रश्न हैं जिनमें से प्रत्येक में 4 अंक हैं और प्रत्येक के उप-भाग क्रमशः 1, 1 और 2 अंक हैं।

8. सभी प्रश्न अनिवार्य हैं। हालाँकि, खंड 'ब' के 2 प्रश्नों में, खंड 'स' के 2 प्रश्नों में तथा खंड 'द' के 2 प्रश्नों में एक आंतरिक विकल्प दिए गए हैं । अनुभाग 'ई' के सभी 2 अंक वाले प्रश्नों में एक आंतरिक विकल्प दिए गए हैं ।

9. जहां भी आवश्यकता हो साफ-सुथरी आकृतियां बनाएं।

10. यदि दिया न गया हो, तो जहां आवश्यक हो वहां π = 22/7 प्रयोग कीजिए।

11. कैलकुलेटर का प्रयोग वर्जित है ।

12. कृपया प्रश्न का उत्तर लिखने से पहले, प्रश्न का क्रमांक अवश्य लिखें।

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, Questions 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.
**12. Please do write down the serial number of the questions before attempting it.**

Q 1-20 are multiple choice questions. Select the most appropriate answer from the given options. Each question is of 1 mark.

1. If HCF (26, 169) = 13 then LCM (26, 169) is   1

    (A) 26   (B) 52

    (C) 338   (D) 13

2. The zeroes of the polynomial $x^2 - 3x - m(m + 3)$ are   1

    (A) m, m + 3   (B) –m, m + 3

    (C) m, – (m + 3)   (D) –m, – (m + 3)

3. The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal   1
    roots, is

    (A) 4   (B) ± 4

    (C) – 4   (D) 0

4. The value of c for which the pair of equation $cx - y = 2$ and $6x - 2y = 3$ will
    have infinitely many solutions is

    (A) 3   (B) –3   1

    (C) –12   (D) 1

5. If $P\left(\dfrac{m}{3}, 5\right)$ is the mid-point of the line segment joining the points A(– 6, 7)   1
    and B(–2, 3), then the value of m is

    (A) -12   (B) -4

    (C) 12   (D) -6

6. QA and PB are perpendicular on AB, if AO = 10 cm, BO = 6 cm   1
   and PB = 9 cm, then measure of AQ (see figure) is
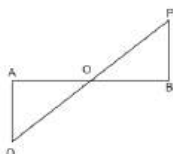
    (A) 15 cm   (B) 25 cm

    (C) 10 cm   (D) 8 cm

7. The value of $\dfrac{4 - sin^2 45^0}{cotk \, tan60^0}$ is 3.5. What is the value of k?   1

    (A) 30^0 (B) 45^0

    (C) 60^0 (D) 90^0

8. If a cos θ + b sin θ = m and a sin θ – b cos θ = n, then a² + b² is equal to   1

    (A) $m^2 - n^2$ (B) $m^2 n^2$

    (C) $n^2 - m^2$ (D) $m^2 + n^2$

9. In a $\triangle ABC$, DE ∥ BC. If $\frac{AD}{DB} = \frac{3}{2}$ and AE = 2.7 cm, then EC is equal to   1

    (A) $2.0\ cm$ (B) $1.8\ cm$

    (C) $4.0\ cm$ (D) $2.7\ cm$

10. Consider the triangles below.   1
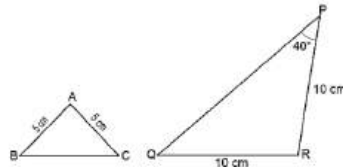

Which statement is correct?

    (A) For triangles to be similar, the measure of ∠A = 40°.

    (B) For triangles to be similar, the measure of ∠A = 100°.

    (C) Triangles are similar as corresponding sides of the triangles are in the ratio 1 : 2.

    (D) Triangles are similar as all isosceles triangles are similar.

11. In the given figure, if PA and PB are tangents to the circle with centre O such that ∠APB = 50°, then ∠OAB is equal to   1

    (A) 30^0 (B) 25^0
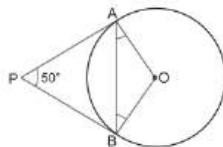
    (C) 40^0 (D) 50^0

12. The area of the shaded region in the given figure is (Take $\pi = 3.14$).   1
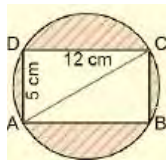
    (A) 75 cm²   (B) 73 cm²

    (C) 70 cm²   (D) 80 cm²

13. The value of $(1 + \cot θ - \operatorname{cosec} θ)(1 + \tan θ + \sec θ)$ is   1

    (A) 2   (B) -1

(C) 1   (D) 0

14. A wheel has diameter 84 cm. The number of complete revolution it takes to cover 792 m is   1

    (A) 330   (B) 400

    (C) 360   (D) 300

15. Consider the following frequency distribution of the height of 60 students of a class: 1

Height (in cm)	150-155	155-160	160-165	165-170	170-175	175-180
No. of students	15	13	10	8	9	5

The sum of the lower limit of the modal class and upper limit of the median class is

    (A) 310   (B) 315

    (C) 320   (D) 330

16. Two identical solid cubes of side k units are joined end to end. What is the volume, in cubic units, of the resulting cuboid?   1

    (A) $2k^3$ (B) $3k^3$

    (C) $4k^3$ (D) $6k^3$

17. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6,000 tickets are sold, how many tickets has she bought?   1

    (A) 40   (B) 240

    (C) 480   (D) 750

18. The table below shows the time taken by a group of students to complete 100 m race.   1

Time Taken (in sec)	18-20	20-22	22-24	24-26	26-28	28-30
No. of students	3	18	26	19	6	5

Which of these is the mean time taken, in sec, by the group of students to complete the 100 m race?

    (A) 18.16   (B) 18.96

    (C) 23.7   (D) 33.7

Directions for Q 19 & 20 :-
There is one Assertion (A) and one Reason (R). Choose the correct answer of these questions from the four options (A), (B), (C) and (D) given below :

(a) **Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the assertion (A).**

(b) **Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of the assertion (A).**

(c) **Assertion (A) is true but reason (R) is false.**

(d) **Assertion (A) is false but reason (R) is true.**

19. **Assertion (A):** For any two positive integers a and b, HCF (a, b) × LCM (a, b) = a × b.   1

    Reason (R): The HCF of two numbers is 5 and their product is 150. Then their LCM is 40.
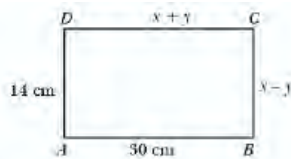
20. **Assertion (A):** The value of y is 6, for which the distance between the points   1
    P(2, –3) and Q (10, y) is 10.

    Reason (R): Distance between two given points A $(x1, y1)$ and B $(x2, y2)$
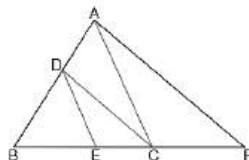   is given by $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Section – B

Q 21–25 are very short answer type questions. Each question is of 2 marks.

21. In the given figure, ABCD is a rectangle. Find the values of x and y.   2

22. In the given figure, DE ∥ AC and DC ∥ AP, Prove that $\frac{BE}{EC} = \frac{BC}{CP}$ 2

23. If from an external point P of a circle with centre O, two tangents PQ and   2
    PR are drawn such that ∠QPR = 120°, prove that 2 PQ = PO.

24. A race track is in the form of a ring whose inner circumference is 352 m,   2
    and the outer circumference is 396 m. Find the width of the track.

OR

A piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. Find the radius of the circle.

25. If sin θ = cos θ, then find the value of 2tan θ + cos²θ   2

OR

If $\sin^2 A = 2\sin A$ then find the value of A.

Section – C

Q 26 – 31 are short answer type questions. Each question is of 3 marks.

26. Given that $\sqrt{2}$ is irrational, prove that $5 + 3\sqrt{2}$ is an irrational number.   3

27. Quadratic polynomial $2x^2 - 3x + 1$ has zeros as α and β. Form a quadratic polynomial whose zeros are 3α and 3β.   3

28. A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water.   3

OR

The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages.

29. If $\sin \theta + \cos \theta = \sqrt{3}$, then prove that $\tan \theta + \cot \theta = 1$.   3

30. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC.   3

OR

Prove that the lengths of two tangents drawn from an external point to a circle are equal.

31. Two different dice are thrown together. Find the probability that the numbers obtained (i) have a sum less than 7 (ii) have a product less than 16 (iii) is a doublet of odd numbers.   3

Section – D

Q 32 – 35 are long answer type questions. Each question is of 5 marks.

32. Rs. 9,000 were divided equally among a certain number of persons. Had there been 20 more persons, each would have got Rs. 160 less. Find the original number of persons.   5

OR

A two-digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

33. In Fig., P is the mid-point of BC and Q is the mid-point of AP. If BQ when produced meets AC at R, prove that $RA = \frac{1}{3} CA$
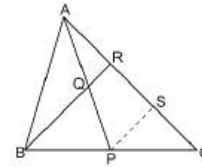
5

34. Water is flowing through a cylindrical pipe of internal diameter 2 cm, into a cylindrical tank of base radius 40 cm at the rate of 0.7 m/sec. By how much will the water rise in the tank in half an hour?

5

OR

Rasheed got a playing top (lattu) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 5 cm in height and the diameter of the top is 3.5 cm. Find the area he has to colour.

35. The distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean and the median of the number of wickets taken.

5

No. of wickets	20-60	60-100	100-140	140-180	180-220	220-260
No. of bowlers	7	5	16	12	2	3

Section – E

Q 36 – 38 are case based questions. Each question is of 4 marks.

36. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6th year and 22600 in 9th year.

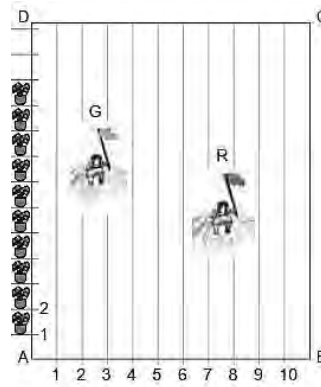On the basis of above information, answer the following questions:

(i) What is the production during 8th year? 1

(ii) Write the total production in (during) first 3 years. 1

(iii) In which year, the production is 29,200? 2

OR

(iii) Write the difference of the production during 7th year and 4th year. 2

37. In order to conduct Sports Day activities in your School, lines have been drawn with chalk powder at a distance of 1 m each, in a rectangular shaped ground ABCD, 100 flowerpots have been placed at a distance of 1 m from

each other along AD, as shown in given figure below. Niharika runs 1/4 th the distance AD on the 2nd line and posts a green flag. Preet runs $1/5^{th}$ distance AD on the eighth line and posts a red flag.

Based on the above information, answer the following questions.

i.   Write the position of red flag.   1

ii.   What is the distance between both the flags?   1

iii. If Rashmi has to post a blue flag exactly halfway between the line segment   2
      joining the two flags, where should she post her flag?

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

iii. If Joy has to post a flag at one-fourth distance from green flag in the line   2
      segment joining the green and red flags, then where should he post his flag?

38.   A guard, stationed at the top of a 300 m tower, observed an unidentified boat coming towards it. A clinometer or inclinometer is an instrument used for measuring angles or slopes(tilt). The guard used the clinometer to measure the angle of depression of the boat coming towards the lighthouse and found it to be 30°.

Based on the above information, answer the following questions.

i.   Make a labelled figure on the basis of the given information.   1

ii.   After 10 minutes, the guard observed that the boat was approaching the   1
      tower and its distance from tower is reduced by $300(\sqrt{3} - 1)$m. He
      immediately raised the alarm. What was the new angle of depression of the
      boat from the top of the observation tower?

iii. When angle of depression of boat coming towards the light house is found   2
      to be 60°, then find the distance of boat from the tower.

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

iii. Write the difference of the distance when angle of depression changes from   2
      45° to 60°. (use $\sqrt{3} = 1.73$)