LEGACY SCHOOL

GEMS

GEMS LEGACY SCHOOL
Rehearsal Examination-2025-2026
Subject Code No: 041
Date: 10/11/2025

Subject: Mathematics Standard **Grade: 10**
Maximum Marks: 80 **Time: 3 hours**

General Instructions:
Read the following instructions carefully and follow them:

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

SECTION A

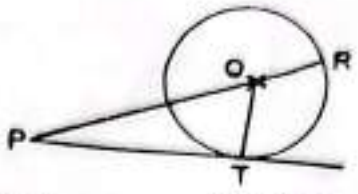
*This section has **20** Multiple Choice Questions (MCQs) carrying **1** mark each. 20 x 1=20*

1. For which natural number n, 6^n ends with digit zero?
(A) 6 (B) 5 (C) 0 (D) None

2. The pair of linear equations $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are
(A) Intersecting (B) Parallel
(C) Coincident (D) Either intersecting or parallel

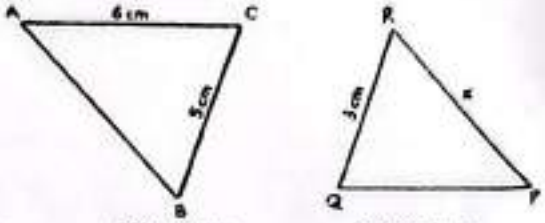
3. Which of the following is **NOT** a quadratic equation?
(A) $2(x-1)^2 = 4x^2 - 2x + 1$ (B) $2x - x^2 = x^2 + 5$
(C) $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$ (D) $(x^2 + 2x)^2 = x^4 + 3 + 4x^3$

4. In the given figure, a circle of radius 7 cm, tangent PT is drawn from a point P such that $PT = 24$ cm. If O is the centre of the circle, then the length of PR is



(A) 30 cm (B) 28 cm (C) 32 cm (D) 25 cm

5. In the given figure, $\triangle ABC \sim \triangle QPR$. If $AC = 6$ cm, $BC = 5$ cm, $QR = 3$ cm and $PR = x$; then the value of x is



(A) 3.6 cm (B) 2.5 cm (C) 10 cm (D) 3.2 cm

6. A ladder makes an angle of 60° with the ground when placed against a wall. If the foot of the ladder is 2m away from the wall, then the length (in meters) is

(A) $\frac{4}{\sqrt{3}}$ (B) $4\sqrt{3}$ (C) $2\sqrt{2}$ (D) 4

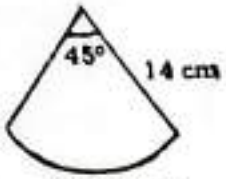
7. A bag contains 5 red dolls and n green dolls. If the probability of drawing a green doll is three times that of a red doll, then the value of n is

(A) 18 (B) 15
(C) 10 (D) 20

8. If a pole 6m high casts a shadow $2\sqrt{3}$ m long on the ground, then sun's elevation is

(A) 60° (B) 45°
(C) 30° (D) 90°

9. The perimeter of the sector of a circle of radius 14 cm and central angle 45° is



(A) 11 cm (B) 22 cm (C) 28 cm (D) 39 cm

10. For the following distribution:

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

The sum of lower limits of median class and modal class is

(A) 15 (B) 25 (C) 30 (D) 35

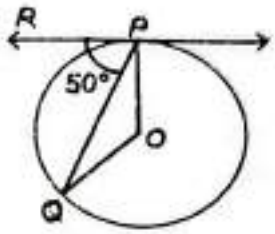
11. $(1 + \tan^2 A)(1 + \sin A)(1 - \sin A) =$
(A) $\frac{\cos^2 A}{\sec^2 A}$ (B) 1 (C) 0 (D) 2

12. If α and β are zeroes of the polynomial $x^2 - 1$, then the value of $(\alpha + \beta)$ is
(A) 2 (B) 1 (C) -1 (D) 0

13. The values of x and y satisfying the two equations $32x + 33y = 34$, $33x + 32y = 31$ respectively are
(A) $-1, 2$ (B) $-1, 4$ (C) $1, -2$ (D) $-1, -4$

14. If $k + 2, 4k - 6$ and $3k - 2$ are three consecutive terms of an A.P., then the value of k is
(A) 3 (B) -3 (C) 4 (D) -4

15. In the given figure, O is the centre of the circle and PQ is the chord. If the tangent PR at P makes an angle of 50° with PQ, then the measure of $\angle POQ$ is



(A) 50° (B) 40°
(C) 100° (D) 130°

16. If $a\cot\theta + b\,\text{cosec}\theta = p$ and $b\cot\theta + a\,\text{cosec}\theta = q$, then $p^2 - q^2 =$
(A) $a^2 - b^2$ (B) $b^2 - a^2$ (C) $a^2 + b^2$ (D) $b - a$

17. If θ is an acute angle and $\tan\theta + \cot\theta = 2$, then the value of $\sin^3\theta + \cos^3\theta$ is
(A) 1 (B) $\frac{1}{2}$ (C) $\frac{\sqrt{2}}{2}$ (D) $\sqrt{2}$

18. The minute hand of a clock is 84 cm long. The distance covered by the tip of minute hand from 10:10 am to 10:25 am is
(A) 44 cm (B) 88 cm (C) 132 cm (D) 176 cm

*Questions number **19** and **20** are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given.*

(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.

19. ***Assertion (A):*** If S_n is the sum of the first n terms of an A.P., then its nth term a_n is given by $a_n = S_n - S_{n-1}$.
Reason (R): The 10th term of the A.P. 5, 8, 11, 14, ... is 35.

20. ***Assertion (A):*** The point on the $x-axis$ which is equidistant from the points $A(-2,3) and\ B(5,4)$ is (2,0).
Reason (R): The coordinates of the point $P(x,y)$ which divides the line segment joining the points $A(x_1,y_1)$ and $B(x_2,y_2)$ in the ratio $(m_1:m_2)$ is $\left(\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$

SECTION B

This section has 5 Very Short Answer (VSA) type questions carrying 2 marks each. 5x2=10

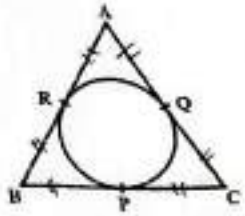
21. Prove that $\frac{2\sqrt{5}+3}{7}$ is an irrational number, given that $\sqrt{5}$ is an irrational number.

22. (a) If P divides the joining of $A(-2,-2) and\ B(2,-4)$ such that $\frac{AP}{AB}=\frac{3}{7}$, find the co-ordinates of P.

OR

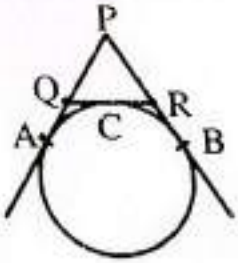
(b) Find the co-ordinates of the point which divides the join of A(-1, 7) and B(4, -3) in the ratio 2:3.

23. (a) In the figure, an isosceles triangle ABC, with AB=AC, circumscribes a circle. Prove that the point of contact P bisects the base BC.



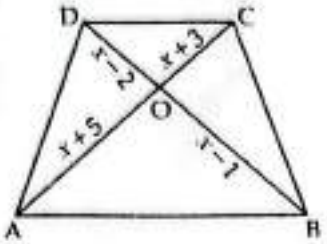
OR

(b) In the given figure, perimeter of ΔPQR is 20 cm. Find the length of tangent PA.



24. Find the middle term of the A.P. 7, 13, 19, ... 247.

25. In the given figure, if AB || DC, find the value of x.

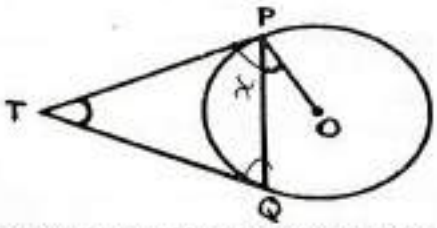


SECTION C

This section has 6 Short Answer (SA) type questions carrying 3 marks each. 6x3=18

26. If the points $A(6,1), B(8,2), C(9,4) and\ D(p,3)$ are the vertices of a parallelogram, taken in order, find the value of p.

27. Two tangents TP and TQ are drawn to a circle with center O from an external point T. Prove that ∠PTQ = 2 ∠OPQ.



28. There are 104 students in class X and 96 students in class IX in school. In a house examination, the students are to be evenly seated in parallel rows such that no 2 adjacent rows are of the same class.

(i) Find the maximum number of parallel rows of each class for the seating arrangement.

(ii) Find the number of students in class IX and of class X in a row.

29. (a) To warn ships for underwater rocks, a lighthouse spreads a red colored light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned. $(Use\ \pi = 3.14)$

OR

(b) A chord of a circle of radius 15 cm subtends an angle of 60° at the center. Find the areas of the corresponding minor and major segments of the circle. $(Use\ \pi = 3.14\ and\ \sqrt{3} = 1.73)$

30. Prove the following:

$$\frac{(1+\cot A+\tan A)(\sin A-\cos A)}{sec^3 A-cosec^3 A}=sin^2 A\,cos^2 A$$

31. (a) If one zero of the polynomial $(a^2-9)x^2+13x+6a$ is the reciprocal of the other, then find the value of a.

OR

(b) Find the zeros of the polynomial $p(x)=4\sqrt{3}x^2+5x-2\sqrt{3}$ and verify the relationship between the zeroes and its coefficients.

SECTION D

This section has 4 Long Answer (LA) type questions carrying 5 marks each. 4x5= 20

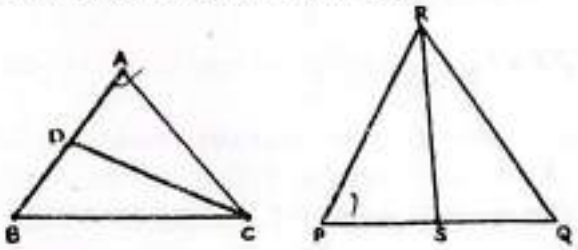
32. An incomplete distribution is given below:

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	12	30	x	65	y	25	18

Given median is 46 and the total number of items is 230.
(i) Find the missing frequencies.
(ii) Calculate the mode of the completed distribution.

33. A trader bought a few articles for ₹900. Five articles were found damaged. He sold each of the remaining articles at ₹2 more than what he paid for it. He got a profit of ₹80 on the whole transaction.
(i) Find the number of articles he bought.
(ii) For how much he sold each article?

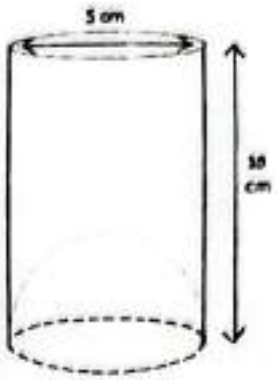
34. (a) In the given figure, CD and RS are respectively the medians of ΔABC and ΔPQR.
If $\Delta ABC \sim \Delta PQR$, prove that:
(i) $\Delta ADC \sim \Delta PSR$
(ii) $\frac{CD}{RS}=\frac{AB}{PQ}$
(iii) $\Delta CDB \sim \Delta RSQ$



OR

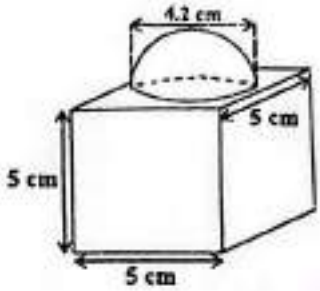
(b) Prove that the parallelogram circumscribing a circle is a rhombus.

35. (a) A juice seller was serving his customers using glasses as shown in the figure. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. ($Use\ \pi = 3.14$)



OR

(b) The decorative block shown in the figure is made of two solids — a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block.



SECTION E

This section has 3 case study-based questions carrying 4 marks each. 3x4=12

36. During festival season, a sweet shop made 200 ladoos and arranged them in such way that in the bottom row there are 20 ladoos, 19 in the next row and 18 in the row next to it and so on.

Based on the above information, answer the following questions:

(i) If sum of nth term of an AP is given by $S_n = 2n^2 + 3n$, then find common difference of an AP. 1

(ii) Find the difference in number of ladoos placed in 7 th and 3 rd rows. 1

(iii) (ii) (A) How many rows are needed to place all the ladoos? 2

OR

(B) How many ladoos are placed in the top row 2

37. A guard, stationed at the top of a 300m tower, observed an unidentified boat coming towards it. A clinometer or inclinometer is an instrument used for measuring angles or slopes. The guard used the clinometers 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 labeled figure based on the given information. 1

(ii) Find the distance of the boat from the foot of the observation tower. 1

(iii) (A) After 10 minutes, the guard observed that the boat was approaching the tower and its distance from the tower is reduced by $300(\sqrt{3}-1)$ m. What was the new angle of depression of the boat from the top of the observation tower? 2

OR

(B) Write the difference of the distance of the boat to the tower when angle of depression changes from 45° to 60°. $(use\ \sqrt{3} = 1.732)$ 2

38. Two friends are travelling on the train. As they were feeling bored, they started playing a game with a pair of dice. Each one of them started rolling the pair of dice one by one stating one condition before rolling. If one person gets the numbers according to the condition stated by him, he wins and gets a score.

Based on the above information, answer the following questions:

(i) First friend says, 6 will come up either time. What will be the probability of his losing? 1

(ii) First friend says, "a doublet". Find the probability of his winning? 1

(iii)(A) Second friend says, "sum is not an even number". Write all possible outcomes & find the probability of his losing. 2

OR

(B) Second friend says, 'sum is utmost 9'. Write all the possible outcomes and find the probability of his winning 2

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