PODAR INTERNATIONAL SCHOOL (IGCSE)

Prelim Examination (23-24)

Std: X

Subject: Mathematics

Maximum Marks: 80

Duration: 2 hours 30 minutes

MATHEMATICS

Maximum Marks: 80

Time allowed: Two and a half hours

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during the first 15 minutes.

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Attempt all questions from Section A and any four questions from Section B.

All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.

Omission of essential work will result in loss of marks.

The intended marks for questions or parts of questions are given in brackets [ ].

Mathematical tables are provided.

Section A (40 marks)

Attempt all questions from this Section

Question 1

Choose the correct answers to the questions from the given options. [15]

(i) If $\frac{1}{2}$ is the slope of the line through (-1, -2) and (x, -4), then the value of 'x' is

(a) -2 (b) 3 (c) 4 (d) 1

(ii) The list price of an article is Rs. 20000. A dealer sells it to a consumer at a loss of 10%. If rate of GST is 5 %, then the bill amount is :

(a) ` 19900 (b) ` 20000 (c) ` 18000 (d) ` 18900

(iii) A wall 8m long cast shadow 5 m long. At same time, a tower casts shadow 50 m long, then the height of tower is :

(a) 40 m (b) 60 m (c) 80 m (d) 100 m

(iv) The smallest value for 'x' the inequation $x - 3(2 + x) < 2(3x - 1)$, $x \in W$ is

(a) 0 (b) -1 (c) 4 (d) -3

(v) The remainder when $x^2 + 5x - 7$ is divided by $(x - 1)$ is

(a) 0 (b) 1 (c) –2 (d) –1

(vi) When a dealer in Delhi sells a product to a dealer or consumer in Uttarakhand, the tax collected is

a) SGST (b) CGST (c) IGST (d) None of the above

(vii) The value/s of 'p' for which the quadratic equation $px^2 + 8x + 1 = 0$ has real roots

(a) $p \leq 16$ (b) $p < 16$ (c) $p > 16$ (d) $p = 16$

(viii) The coordinates of the endpoints of a diameter are (–6, 3) and (6, 4). Find the coordinates ofthe centre of the circle.

(a) (8, –1) (b) (4, 7) (c) (0 , 7 / 2) (d) (4 , 7 / 2)

(ix) The median of the following set of numbers will be 4, 4, 5, 7, 6, 7, 7, 12, 3

(a) 4 (b) 5 (c) 6 (d) 7

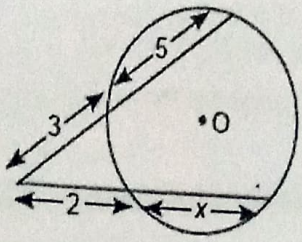
(x) If three unbiased coins are tossed together, what is the probability of getting at least twoheads?

a) 3/8 b) 2/7 c) ½ d)1/3

(xi) Find the locus of a man having the same distance from a tower.

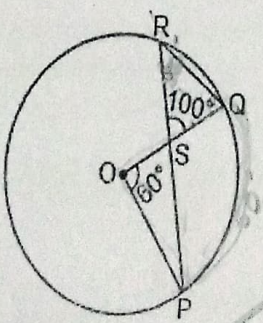
(a) a line (b) any random figure (c) 6 d) a circle

(xii) From the given figure, the length of x will be ..



a) 7.5 cm b) 10 cm c) 12 cm d) 30 cm

(xiii) In the given figure, O is the centre of the circle, $\angle POQ = 60°$ and $\angle QSR = 100°$; Find $\angle OQR$.



a) 30° b) 80° c) 50° d) 130°

(xiv) A right circular cone is 84 cm high. The radius of the base is 35 cm, then volume of the cone is

a) 203785 cm^3 b) 100807cm^3 c) 107800 cm^3 d) 82320 cm^3

(xv) What is the angle of elevation of the sun, when the length of the shadow of a tree is equal to its vertical height?

a) 30° b) 60° c) 40° d) 45°

Question 2

(i) Geeta deposited Rs 400 every month in a bank's recurring deposit account for $2\frac{1}{2}$ years. If she gets Rs 1085 as interest at the time of maturity, then find the rate of interest per annum. [4]

(ii) The 24th term of an A.P. is twice its 10th term. Show that 72th term is 4 times its 15th term. [4]

(iii) Prove that: $(\sin\theta + \cos\theta)(\tan\theta + \cot\theta) = \sec\theta + \operatorname{cosec}\theta$ [4]

Question 3

(i) A straight line passes through the points P (2, –5) and Q (4, 3). Find [4]

(a) The slope of the line PQ.

(b) The equation of the line PQ

(c) The value of p if PQ passes through the point $(p-1, p+4)$.

(ii) The total surface area of a right circular cone of slant height 13 cm is 90π cm^2. Calculate: [4]

(a) Its radius in cm.

(b) Its volume in cm^3

(Take $\pi = 3.141$)

(iii) Use graph paper for this question: [5]

(a) Plot the points (3, 5) and B (–2, –4). Use 1 cm = 1 unit on both the axis.

(b) A′ is the image of A when reflected in the X-axis. Write the coordinates of A′ and plot it on the graph paper.

(c) B′ is the image of B when reflected in the Y-axis. Write the coordinates of B′ and plot it on the graph paper.

(d) Write the geometrical name of AA′BB′.

(e) Name two invariant points under reflection in the X-axis.

Section B (40 marks)

PODAR
INNOVATION CENTRE

Attempt any four questions from this Section

Question 4

(i) The following bill shows the GST and the marked price of the articles. Find the total bill amount paid by the consumer. [3]

Articles	Marked Price	Discount	GST
Mobile Phone	Rs. 20000	15%	28%
Watch	Rs. 3750	10%	12%

(ii) Solve the following equation using the quadratic formula and give your answer correct to two decimal places. [3]

$3x^2 - x - 7 = 0$

(iii) A ma invests R. 7770 in accompany paying dividend 5%, Face value of share is Rs. 100 & he purchases it at a premium of 5%, [4]

Find

(a) No.of shares bought

(b) Annual Income

(c) Percentage income.

Question 5

(i) Find the fourth vertex of a parallelogram ABCD, if the three consecutive vertices are A(10, –6), B(2, –6) and C(–4, –2). [3]

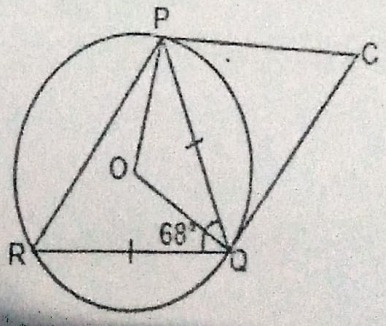
[3]

(ii) Find the S_{12} for G.P: 1, ½, ¼ ...

(iii) Construct an equilateral triangle ABC with each side is 6cm. Find the locus of a point equidistant from sides AB& BC also from angle B & C. [4]

Question 6

(i) In the given figure, PQ = QR, ∠RQP = 68°, PC and CQ are tangents to the circle with centre O. Calculate the values of: (*i*) ∠QOP (*ii*) ∠QCP [3]



(ii) A man standing on the bank of a river observes that the angle of elevation of a tree on the opposite bank is 60°. When he moves 50 m away from the bank, he finds the angle of elevation to be 30°. Calculate:
(*i*) the width of the river and
(*ii*) the height of the tree. [3]

(iii) If $x^3 + ax^2 - x + b$ has $(x-2)$ as a factor and leaves a remainder 3 when divided by $(x-3)$, find a and b. [4]

Question 7

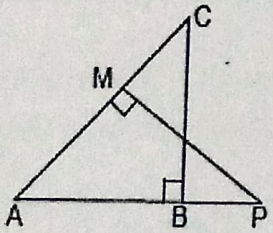
(i) If $A = \begin{bmatrix} 2 & 3 \\ -1 & -5 \end{bmatrix}$ & $B = \begin{bmatrix} 0 & -3 \\ -1 & -3 \end{bmatrix}$; Find $A^2 + 2B$. [3]

(ii) The following gives marks scored by students in an examination. [3]

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Number of students	3	7	15	24	16	8	5	2

Calculate the mean mark correct to 2 decimal places using step-deviation method.

(iii) In the given figure, ΔABC and ΔAMP are right-angled at B and M respectively. [4]
Given AC = 10 cm, AP = 15 cm and PM = 12 cm.



((*i*) Find AB and BC....

Question 8

(i) There are 60 balls in a box. Some are white and others are black. Probability of getting a white ball is $\frac{3}{2}$ of getting a black ball. How many of each coloured balls are there. [3]

(ii) A hollow sphere of internal and external diameters 6 cm and 10 cm respectively is melted and recast into a cone of base diameter 14 cm. Find the height of the cone. [3]

(iii) Calculate the mean of the distribution given below using the short cut method.

Marks	11–20	21–30	31–40	41–50	51–60	61–70	71–80
No. of students	2	6	10	12	9	7	4

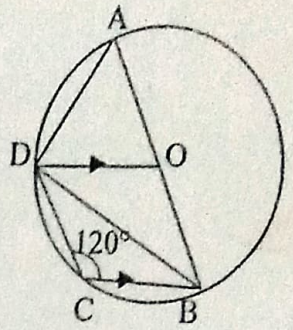
(iii) In the given figure, AB is a diameter of the circle with centre O, DO||CB and ∠DCB = 120°.Calculate: [4]

(a) ∠DAB

(b) ∠DBA

(c) ∠DBC

(d) ∠ADC



Question 9

(i) `7500 were divided equally among a certain number of children. Had there been 20 less children, each would have received `100 more. Find the original number of children. [4]

(ii) The following table shows the daily wages of 80 workers in a project. [6]

Wages (in `)	400-450	450-500	500-550	550-600	600-650	650-700	700-750
No. of workers	2	6	12	18	24	13	5

Use a graph sheet to draw an ogive for the distribution (use a scale of 2 cm = `50 on X-axis and 2 cm =10 workers on Y-axis). Use the ogive to estimate:

(a) the medium wage of the workers

(b) the lower quartile wage of workers.

(c) the number of workers who earn more than `625 daily.

Question 10

(i) If $\frac{x^2+y^2}{x^2-y^2} = \frac{17}{8}$ find the values of [3]

(a) $x : y$

(b) $\frac{x^3+y^3}{x^3-y^3}$

(ii) Using ruler and compass construct a triangle ABC where AB = 3 cm, BC = 4cm and ∠ABC = 90°. Hence construct a circle circumscribing the triangle ABC. Measure and write the radius of the circle. [3]

(iii) As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships. [4]