Time : 1 Hr.



Max. Marks : 60

PAPER CODE

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IMO (STAGE-2) MOCK TEST

(ACADEMIC SESSION 2023-2024)

Pre Foundation Division

CLASS IX

MOCK TEST # 01

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

- 1. Answers are to be given on a separate OMR sheet.
- 2. This test contains Mathematical Reasoning (45 Questions) and Achievers Section (5 Questions). Total questions are **50**. Duration of test is **1 Hr**.
- 3. Each question in **Achievers Section carries 3** marks whereas all other questions carry 1 mark. There is no negative marking for wrong answers. Total marks are **60**.
- 4. Mark your answers for questions 1–50 on the OMR sheet by darkening the circles.
- 5. If you do not know the answer to any question, do not waste time on it and pass on to the next one. Time permitting, you can come back to the questions, which you have left in the first instance and attempt them.
- 6. Since the time allotted for this question paper is very limited you should make the best use of it by not spending too much time on any one question.
- 7. Rough work can be done anywhere in the booklet but not on the OMR sheet/loose paper.

Prepare to be a Winner with Class24

MATHEMATICS

- In a gym, in one exercise you have to continuously toss solid cylindrical dumbbells and catch them. Cylindrical dumbbells are of length 1m and base diameter also 1m. If density of the material used is 4 kg per m³, then the weight tossed is.
 - (1) 3.14 kg
 - (3) 4π kg (4) 12.56 kg
- **2.** In the given figure, AB = 14 cm, radius of incircle of $\triangle ABC$ is 4 cm, AF = 6 cm, AE = 6 cm and BD = 8 cm. Find AC and BC.

(2) $\frac{\pi}{2}$ kg



| (1) 14 cm, | 16 cm | (2) | 11 | cm, | 13 cm |
|------------|-------|-----|----|--|-------|
| (3) 12 cm, | 14 cm | (4) | 13 | cm, | 15 cm |
| | | | | A CONTRACTOR OF THE OWNER OWNER OF THE OWNER OWNE OWNER OWN | |

- **3.** Find the sum :
 - $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} + \frac{1}{72} + \frac{1}{90} + \frac{1}{110} + \frac{1}{132}.$ (1) $\frac{7}{8}$ (2) $\frac{11}{12}$

(3)
$$\frac{15}{16}$$
 (4) $\frac{1}{12}$

- 4. If 3x 4y + z = 7; 2x z + 3y = 19; x + 2y + 2z = 24, then what is the value of z? (1) 4 (2) 5 (3) 6 (4) 8
- **5.** On multiplying a number by 7, the product is a number each of whose digits is 3. The smallest such number is.

| (1) 47619 | (2) 47719 |
|-----------|-----------|
| (3) 48619 | (4) 47649 |

6. The dimensions of a rectangular piece of paper are $22 \text{ cm} \times 14 \text{ cm}$. It is rolled once across the breadth and once across the length to form right circular cylinders of biggest possible surface areas. Find the difference in volumes of the two cylinders that will be formed.

| (1) 196 cm ³ | (2) 308 cm ³ |
|-------------------------|-------------------------|
| (3) 49 cm ³ | (4) 105 cm ³ |

7. The mean of the data x_1, x_2, \dots, x_n is 102, then mean of the data $5x_1, 5x_2, \dots, 5x_n$ is

- (1) 102 (2) 204
- (3) 606 (4) 510

8. How many statements are INCORRECT ?

(i) If a circle is divided into four equal arcs, each is a minor arc.

(ii) A sector of a circle can have area more than the area of the whole circle.

(iii)The area of each quadrant of a circle is one-third of the area of the whole circle.

(iv) One and only one chord of a circle can be the diameter of the circle.

(1) 1 (2) 2 (3) 3 (4) 0

There is a cone of height 12 cm, out of which a smaller cone (which is the top portion of the original cone) with the same vertex and vertical axis is cut out. What is the ratio of the volume of the larger (actual) cone to the remaining part of the cone, if the height of the smaller cone is

9 cm and
$$\frac{AD}{AB} = \frac{DE}{BC}$$
?

9.



 $(1) \ 3:1 \qquad (2) \ 9:1 \qquad (3) \ 64:37 \quad (4) \ 16:7$

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|-----|---|------------|---|---|--|
| 10. | Kamla has a triangular field with sides 240 m, 200 m, 360 m, where she grew wheat. In another triangular field with sides 240 m, 320 m, 400 m adjacent to the previous field, she wanted to grow potatoes and onions. She divided the field in two parts by joining the mid-point of the longest side to the opposite | 16. | A triangle and a parallelogram have same base and same area. If the sides of the triangle are 20 cm, 25 cm and 35 cm, and the base side is 25 cm for the triangle as well as the parallelogram, find the vertical height of the parallelogram. | | |
| | vertex and grew potatoes in one part and onions in the other part. How much area (in hectares) has been used for wheat potatoes | | (1) $2\sqrt{6}$ cm (2) | 2) $4\sqrt{6}$ cm | |
| 11. | and onions ? (1 hectare = $10,000 \text{ m}^2$). (1) 6.10 (2) 5.32 (3) 8.27 (4) None of these ABCD is a parallelogram. The diagonals AC and BD intersect at a point O. If E, F, G and H are the mid-points of AO, DO, CO and BO respectively, then the ratio of (EF + FG + GH + HE) to (AD + DC + CB + BA) is. (1) 1 : 1 (2) 1 : 2 (3) 1 : 3 (4) 1 : 4 | 17. 18. | (3) $\sqrt{6}$ cm (4) It is not possible to const with BC = 5 cm, $\angle B$ = equal to (1) 7.5 cm (2) (3) 9 cm (4) If the roots of $(p-q)^2 x^2 +$ are equal, then k =(1) (p + q)^2 | A) None of these ruct a triangle ABC 75° and AB + AC A) 8 cm A) 4.5 cm $2(p^2 - q^2)x + k = 0$ $- \frac{1}{2}(p^2 - q^2)^2$ | |
| 12. | Which of the following polynomials has (x+1) as a factor ? (i) $x^3 + x^2 + x + 1$ (ii) $x^4 + x^3 + x^2 + x + 1$ (iii) $x^4 + 3x^3 + 3x^2 + x + 1$ (iv) $x^3 - x^2 - (2 + \sqrt{2})x + \sqrt{2}$ (1) (i) (2) (iii) (2) (iii) and (iv) (4) (i) and (ii) | 19. | (1) $(p + q)$ (2 (3) $p^2 - q^2$ (4 P is the mid-point of side A ABCD. A line through B p DC at Q and AD produce equal to | A) (p - q) A) 0 B to a parallelogram parallel to PD meets ed at R. Then BR is B | |
| 13. | (3) (ii) and (iv) (4) (i) and (ii) What is the unit digit in the product $(3^{65} \times 6^{59} \times 7^{71})$? (1) 1 (2) 2 (3) 4 (4) 6 | | DQQ | C | |
| 14. | One diagonal of a parallelogram is 70cm and the perpendicular distance of this diagonal from either of the outlying vertices is 27 cm. The area of the parallelogram (in sq. cm) is. (1) 1800 (2) 1836 (3) 1800 (4) 1080 | | R (1) BQ (2 | $\frac{1}{2}BQ$ | |
| 15. | A can go round a circular path 8 times in 40 minutes. If the diameter of the circle is increased to 10 times the original diameter, then the time required by A to go round the new path once, travelling at the same speed as before, is. (1) 20 mins (2) 25 mins (3) 50 mins (4) 100 mins | 20. | (3) $2BQ$ (4)The equations $x - y = 1$ agiven. The area boundedand y-axis is(1) 8 sq. units(2)(3) 11 sq. units(4) | A) None of these and 2x + y = 8 are by these two lines A) 13.5 sq. units A) 9 sq. units | |

CLASS24

Class - IX IMO STAGE - II

- **21.** A rectangular paper, when folded into two congruent parts had a perimeter of 34 cm for each part folded along one set of sides and the same was 38 cm when folded along the other set of sides. What is the area of the paper ?
 - (1) 140 $\rm cm^2$ (2) 240 cm^2
 - (3) 560 $\rm cm^2$ (4) None of these
- **22.** How many linear equations are satisfied by x = 2 and y = -3?
 - (1) Only one (2) Two
 - (3) Three (4) Infinitely many
- If (2x + 1) is a factor of the polynomial p(x) =23. $kx^{3} + 23x^{2} + 71x + 30$, then find the value of
 - $\frac{\left(k-1\right)}{8}\,.$

(1) –2

- (2) $\frac{5}{8}$ (3) $\frac{1}{8}$

(4) 2

- **24.** A field is 15 m long and 12 m broad. At one corner of this field a rectangular well of dimensions $8 \text{ m} \times 2.5 \text{ m} \times 2 \text{ m}$ is dug, and the dug-out soil is spread evenly over the rest of the fielf. Find the rise in the level of the rest of the field.
 - (1) 25 cm (2) 15 cm
 - (3) 125 cm (4) 200 cm
- **25.** Find the area of the quadrilateral ABCD in which AB = 7 cm, BC = 6 cm, CD = 12 cm, DA = 15 cm and AC = 9 cm. (Take $\sqrt{110} = 10.5$ approx.) (1) 57 $\rm cm^2$ (2) 45 cm^2 (3) 75 cm^2 (4) 72 cm^2
- **26.** If $\frac{x}{(b-c)(b+c-2a)} = \frac{y}{(c-a)(c+a-2b)}$ $=\frac{z}{(a-b)(a+b-2c)}$, then the value of (x + y + z) is _____ (1) a + b + c(2) 0(3) $a^2 + b^2 + c^2$
 - (4) Can't be determined

- If α , β , γ are such that $\alpha + \beta + \gamma = 2$, $\alpha^2 + \beta^2 + \beta^2$ 27. $\gamma^2 = 6$, $\alpha^3 + \beta^3 + \gamma^3 = 8$, then $\alpha^4 + \beta^4 + \gamma^4$ is equal to (1) 10(2) 12
 - (3) 18
 - (4) None of these
- In a class, teacher gave two identical cardboard **28**. pieces which are in the shape of a parallelogram to two groups. First group was asked to find area of parallelogram using AB as base. Then, another group was asked to find height h of the parallelogram with AD as base.



What is the height of the parallelogram in group II?

- (1) 4.8 cm
- (2) 4 cm
- (3) 5.6 cm
- (4) 8.4 cm
- 29. In the given figure, AB is a diameter of a circle with centre O. If ADE and CBE are straight lines, meeting at E such that $\angle BAD = 35^{\circ}$ and $\angle BED = 25^\circ$, find $\angle BDC$.



| (1) 25° | (2) 30° |
|---------|----------|
| (3) 35° | (4) 115° |

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|-----|---|------------|--|---|
| 30. | A bar code is formed using 25 black and certain white bars. White and black bars alternate. The first and the last are black bars. Some of the black bars are thin and others are wide. | 33. | Select the INCORRECT state (1) The difference of a ratio an irrational number is an irr (2) The product of a non-zero with an irrational number number (3) The quotient of an irratio a non zero rational number number (4) None of these | ement. onal number and rational number o rational number is an irrational onal number with r is an irrational |
| 31. | thin black bars. The number of thick black bars is (1) 14 (2) 15 (3) 16 (4) 17 A hemispherical bowl is filled to the brim with | 34. | A rationalizing factor of (1) $\sqrt[3]{4} + 1$ (2) $\sqrt[3]{4} + 2$ (4) $\sqrt[3]{4} + 2$ | $\sqrt[3]{16} - \sqrt[3]{4} + 1$ is $\sqrt[3]{4} - 1$ $\sqrt[3]{4} - 2$ |
| | a beverage. The contents of the bowl are transferred into a cylindrical vessel whose radius is 50% more than its height. If the diameter is same for both the bowl and the cylinder, then how much beverage is contained in the vessel from the bowl ? | 35. 36. | If the polynomial $16x^4 - 24x$ 16 be a perfect square, then (1) 12 (2) -12 (3) 2 When 5 is added to the | $x^{3} + 41x^{2} - mx +$ the value of 'm' is x^{2} (4) -24 numerator and |
| | (1) $66\frac{2}{3}\%$ (2) $78\frac{1}{2}\%$ | | $\begin{array}{c} \text{denominator both of a (positive the new ratio of numerator becomes 11:15. What is the (1) 15:25 (2) 3 (3) 38:40 (4) 1 \end{array}$ | ive) fraction, then to denominator e original ratio ? 5 : 5 Data inadequate |
| 32. | (3) 100% (4) More than 100% (i.e., some liquid will be left in the bowl). In the figure given below, <i>1</i> u and m n. If (ACB = 55° and (AED = 20° find u u p) | 37. | A large solid sphere of diamet and recast into several su diameter 3m. What is the per in the surface area of the sma that of the large sphere 2 | ter 15 m is melted mall spheres of ccentage increase aller spheres over |
| | $z_{ACB} = 35^{\circ} \text{ and } z_{AED} = 30^{\circ}, \text{ find } x, y, z$ and θ respectively. $\xrightarrow{m} \qquad x \qquad x \qquad y \qquad z \qquad y \qquad y$ | 38. | (1) 200% (2) 400% (3) 500% (4) Can't be determined In the adjoining figure, the value | alue of x is |
| | (1) 95°, 125°, 150°, 55° (1) 95° , 125°, 150°, 55° | | 130° A B | |
| | (2) 150°, 95°, 125°, 55° (3) 125°, 150°, 95°, 55° (4) 55°, 95°, 150°, 125° | | (1) 110° (2) 130° (3) 1 | → 20° (4) 125° |

CLASS24

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39. A triangle has sides with lengths 13 cm, 14 cm and 15 cm. A circle whose centre lies on the longest side touches the other two sides. The radius of the circle is (in cm) _____ .



40. OCDE is a rectangle inscribed in a quadrant of a circle of radius 10 cm. If $OE = 2\sqrt{5}$ cm, find the area of the rectangle.



- (1) x > y > z(3) z > y > x(2) y > z > x(4) x < y = z
- 42. In a parallelogram ABCD, AP and CQ are drawn perpendicular to the diagonal BD. On measuring it is found that ∠PAB = 65° and ∠DAB = 75° then the measure of ∠QCD is. (1) 90° (2) 75° (3) 65° (4) 10°
- **43.** If $a * b = \frac{ab}{a+b}$, find the value of 3*(3*(-1)).

(1)
$$-3$$
 (2) -1.5 (3) -1 (4) $\frac{2}{3}$

- **44.** If the perpendicular distance of a point P from the x-axis is $(7776)^{1/6}$ and the foot of the perpendicular lies on the negative side of x-axis, the point P always has.
 - (1) Negative y-coordinate
 - (2) Positive y-coordinate
 - (3) Negative x-coordinate
 - (4) Positive x-coordinate
- **45.** In a quadrilateral ABCD, bisectors of angles A, B, C and D form another quadrilateral EFGH as shown, If \angle HEF = 70° and \angle GHE = 80°, then \angle HGF and \angle GFE are.



(3) \angle HGF = 110°, \angle GFE = 90°

- (4) \angle HGF = 110°, \angle GFE = 100°
- 46. Three circles A, B and C have a common centre O. A is the inner circle, B middle circle and C is outer circle. The radius of the outer circle C, OP cuts the inner circle at X and middle circle at Y such that OX = XY = YP. The ratio of the area of the region between the inner and middle circles to the area of the region between the inner and middle and outer circle is :

(1)
$$\frac{1}{3}$$
 (2) $\frac{2}{5}$ (3) $\frac{3}{5}$ (4) $\frac{1}{5}$

47. The value of

$$\left(\frac{\sqrt{\sqrt{5}+2}+\sqrt{\sqrt{5}-2}}{\sqrt{\sqrt{5}+1}}\right) - \sqrt{3-2\sqrt{2}} \text{ is.}$$
(1) 1 (2) -1 (3) 2 (4) -2

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48. Fill in the blanks.

(i) The triangle formed by joining the mid-points of the sides of an isosceles triangle is P.

(ii) The triangle formed by joining the mid-

points of the sides of a right triangle is Q.

(iii) The figure formed by joining the mid-points of consecutive sides of a quadrilateral is R.

- (1) (P \rightarrow Isosceles), (Q \rightarrow Scalene), (R \rightarrow Parallelogram)
- (2) (P \rightarrow Equilateral), (Q \rightarrow Equilateral), (R \rightarrow Trapezium)
- (3) (P \rightarrow Isosceles), (Q \rightarrow Right triangle), (R \rightarrow Parallelogram)
- (4) (P \rightarrow Equilateral), (Q \rightarrow Right triangle), (R \rightarrow Trapezium)
- **49.** Which of the following statements is true ?

Statement 1 :- A cylinder is within the cube touching all the vertical faces. A cone is inside the cylinder. If their heights are same with the same base, then the ratio of their volumes is

40:31:11

Statement 2 :- A conical tent accommodates 11 persons. Each person must have 4 sq. meters of the space on the ground and 20 cubic meters of air to breath. Then the height of the cone is 15 meters.

- (1) Only statement 1
- (2) Only statement 2
- (3) Both Statement 1 and Statement 2
- (4) Neither Statement 1 Nor Statement 2

50. In a bullet the gun powder is to be filled up inside the metallic enclosure. The metallic enclosure is made up of a cylindrical base and conical top with the base of radius 5 cm. The ratio of height of cylinder and cone is 3 : 2. A cylindrical hole is drilled through the metal solid with height two-third the height of metal solid. What would be the radius of the hole, so that the volume of the hole (in which gun powder is to be filled up) is one-third the volume of metal solid after drilling ?

(1)
$$\sqrt{\frac{88}{5}}$$
 cm (2) $\sqrt{\frac{55}{8}}$ cm (3) $\frac{55}{8}$ cm (4) $\frac{88}{5}$ cm