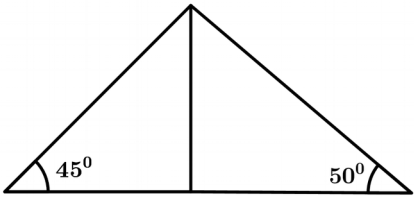


HALF YEARLY EVALUATION 2023 - 2024

A	MATHEMATICS EM – ANSWER KEY	E-1003	
Qn no.	Key	Score	
Each questions from 1 to 4 carries 2 scores. (Answer any 3)			
1	a) (3 , 0) b) 3	1 1	2
2	a) 105° b) 180°	1 1	2
3	a) $\sqrt{3}$ b) 60°	1 1	2
4	a) Length of a base edge = $\frac{48}{8} = 6 \text{ cm}$ b) $6^2 = 36 \text{ sq. cm}$	1 1	2
Each questions from 5 to 10 carries 3 scores. (Answer any 4)			
5	For drawing a square and mark a point 7.5 cm away from the centre . For drawing perpendicular bisector of 7.5 cm long line . For drawing tangents .	1 1 1	3
6	a) $7\sqrt{2} \text{ cm}$ b) $7\sqrt{2} \times 7\sqrt{2} = 98 \text{ sq. cm}$	2 1	3
7	a) $\sqrt{13^2 - 5^2} = 12 \text{ cm}$ b) $2 \times 10 \times 12 = 240 \text{ sq. cm}$	2 1	3
8	a) (4 , 7) , (9 , 3) b) 5	2 1	3
9	$3d = 12$ a) $6d = 24$ b) $11 + 9d = 45 + 36 = 81$	1 1 1	3
10	a) (11 , 10) b) $\left(\frac{5+9}{2}, \frac{8+6}{2}\right) = (7,7)$ OR $\left(\frac{3+11}{2}, \frac{4+10}{2}\right)$	1 2	3

Each questions from 11 to 21 carries 4 scores. (Answer any 8)

11	<p>a) 7</p> <p>b) Number of black balls = 14</p> $\frac{14}{30} = \frac{7}{15}$ <p>c) $\frac{6}{27} = \frac{2}{9}$</p>	1 1 1 1	4
12	<p>a) 4</p> <p>b) $x_n = 4n + 2$</p> $2n^2 + 4n = 510$ $n = 15$	1 1 1 1	4
13	<p>a) $B(8, 0)$, $A(-2, 0)$</p> <p>b) $OA \times OB = OP^2$</p> $OP = \sqrt{16} = 4$ <p>Coordinates of P = $(0, 4)$</p>	1 1 1 1	4
14	<p>a)</p>  <p>b) 80 m.</p> <p>c) Distance between tower and the second person = $\frac{80}{\tan 50^\circ} = \frac{80}{1.19}$</p> <p>Distance between the persons = $80 + \frac{80}{1.19} m$</p>	1 1 1 1	4
15	<p>a) 110°</p> <p>b) $\angle C = 110^\circ$</p> $\angle A = \angle B = \frac{180 - 110}{2} = 35^\circ$	1 1 2	4
16	<p>a) $\sqrt{20^2 + 15^2} = 25 m$</p> <p>b) $\pi \times 20 \times 25 = 500\pi sq.m$</p> <p>c) $500\pi \times 60 = 500 \times 3.14 \times 60 = 94200 Rs.$</p>	2 1 1	4

17	<p>a) $AB = \sqrt{20}$ $BC = \sqrt{5}$ $AC = \sqrt{25}$</p> <p>b) Right triangle .</p>	1 1 1 1	4
18	<p>a) 260°</p> <p>b) $\angle PSR = 50^{\circ}$, $\angle PQR = 130^{\circ}$</p> <p>c) $\angle OSP + \angle OSR = 50^{\circ}$ (Hint: join OS)</p>	1 1 2	4
19	<p>Volume of the cone = $\frac{1}{3} \times \pi \times 12^2 \times 15$</p> <p>Volume of the sphere = $\frac{4}{3} \times \pi \times 3^3$</p> $\frac{\frac{1}{3} \times \pi \times 12^2 \times 15}{\frac{4}{3} \times \pi \times 3^3} = 20$	1 1 2	4
20	<p>a) $180^{\circ} - 55^{\circ} = 125^{\circ}$</p> <p>b) For drawing a circle of radius 2.5 cm</p> <p>For marking the supplementary angles of the given angles at the centre of the circle</p> <p>For completing the triangle</p>	1 1 1 1	4
21	<p>a) $\left(\frac{2+10}{2}, \frac{8+14}{2} \right) = (6, 11)$</p> <p>b) 5</p> <p>c) $\sqrt{(9-6)^2 + (15-11)^2} = 5$</p> <p>Yes</p>	1 1 1 1	4
Each questions from 22 to 29 carries 5 scores. (Answer any 6)			
22	<p>For drawing triangle in the given measures</p> <p>For drawing the bisectors of the angles</p> <p>For drawing perpendicular distance from the point of intersection of the bisectors of the angles to a side .</p> <p>For drawing incircle .</p> <p>For measuring the radius .</p>	1 1 1 1 1	5

23	<p>a) 60°</p> <p>b) $4\sqrt{3} \text{ cm}$</p> <p>c) $DE = BE = 8 \text{ cm}$</p> <p>d) $AB = 4 + 8 = 12 \text{ cm}$ $\text{Area} = 48\sqrt{3} \text{ sq. cm}$</p>	1 1 1 1 1	5
24	<p>a) For drawing the axes and marking the points .</p> <p>b) $(4 + 5 - 2, 5 + 0 - 0) = (7, 5)$</p>	4 1	5
25	<p>a) 110°</p> <p>b) $\angle OPQ = \frac{110^\circ}{2} = 55^\circ$</p> <p>c) $\angle OQP = \frac{120^\circ}{2} = 60^\circ$ $\angle OPA + \angle OQA = 125^\circ + 120^\circ = 245^\circ$ Since the opposite angles are not supplementary , it is not cyclic .</p>	1 1 1 1 1	5
26	<p>a) $\frac{51}{3} = 17$</p> <p>b) $d = 17 - 12 = 5$ $x_8 = 12 + 35 = 47$</p> <p>c) $15 \times 47 = 705$</p>	1 1 1 2	5
27	<p>a) 15 cm</p> <p>b) $\sqrt{8^2 + 15^2} = 17 \text{ cm}$</p> <p>c) Surface of the toy = Curved surface area of the hemisphere + Curved surface area of the cone . = $128 \pi + 136 \pi = 264 \pi \text{ sq. cm}$</p>	1 2 2	5
28	<p>a) 6</p> <p>b) $\left(\frac{2+8}{2}, \frac{0+0}{2}\right) = (5, 0)$</p> <p>c) Height of triangle ABC = $3\sqrt{3}$ Coordinates of B = $(5, 3\sqrt{3})$ Coordinates of D = $(5, -3\sqrt{3})$</p>	1 1 1 1 1	5

29	<p>a) $1^3 + 2^3 + 3^3 + 4^3 + 5^3 = (1 + 2 + 3 + 4 + 5)^2 = \left(\frac{5 \times 6}{2}\right)^2$</p> <p>b) 7</p> <p>c) 9</p> <p>d) $(1 + 2 + 3 + \dots + 100)^2$ OR $\left(\frac{100 \times 101}{2}\right)^2$</p> <p>e) $(1 + 2 + 3 + \dots + n)^2$ OR $\left(\frac{n(n+1)}{2}\right)^2$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>5</p>
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