Quant Mega Quiz for SSC CGL Tier – 2 (Solutions)

S1. Ans.(a)

Sol.

$a^2 + 2 = 2a$

$a^3 + 2a = 2a^2$

$a^4 + 2a^2 = 2a^3$

$a^5 + 2a^3 = 2a^4$

add all

$a^5 + a^4 + a^3 + a^2 + 2 = 2a^4$

$a^5 - a^4 + a^3 + a^2 + 2 = 0$

S2. Ans.(a)

Sol.

$x + \frac{1}{x} = 1 \Rightarrow x^3 = -1$

$(x^3)^{18}.x + \frac{1}{(x^3)^{18}.x} = x + \frac{1}{x} = 1$

S3. Ans.(b)

Sol.

$a^3 + b^3 + c^3 - 3abc = (a + b + c)\,[(a + b + c)^2 - 3\,(ab + bc + ca)]$

$a^3 + b^3 + c^3 + 12 = 11\,(121 - 51)$

$a^3 + b^3 + c^3 = 770 - 12 \Rightarrow 758$

S4. Ans.(d)

Sol.

$a^2 + b^2 - ab = \frac{183.68}{16.4} = 11.2$

$ab = \frac{16.4 - 11.2}{2} = 2.6$

S5. Ans.(c)

Sol.

$a + \frac{1}{b} = 3, b + \frac{1}{c} = 2, c + \frac{1}{a} = \frac{7}{3}$

Multiply all

$abc + \frac{1}{abc} + 3 + 2 + \frac{7}{3} = 14$

$abc + \frac{1}{abc} = 9 - \frac{7}{3} = \frac{20}{3} = 6\frac{2}{3}$

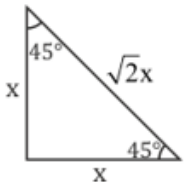
S6. Ans.(a)
Sol.

$\text{Side of square} = 11 \times \frac{\sqrt{3}}{\sqrt{3}+2} = \frac{11 \times 1.732}{1.732+2}$

$= \frac{19.052}{3.732} = 5.10$

$\text{Area} = (5.10)^2 = 26.01 \text{ cm}^2$

S7. Ans.(d)
Sol.



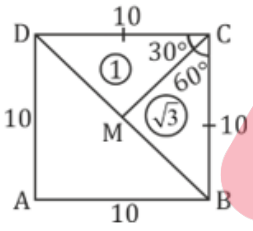
$2x + \sqrt{2}x = 4a$

$x = \frac{4a}{2+\sqrt{2}} = 2a(2 - \sqrt{2})$

$\text{Area} = \frac{1}{2} \times x^2 = \frac{1}{2} \times 4a^2 (2 - \sqrt{2})^2$

$= 2a^2 (2 - \sqrt{2})^2 = 4a^2 (3 - 2\sqrt{2})$

S8. Ans.(b)
Sol.



$\frac{\Delta DCM}{\Delta CMB} = \frac{\frac{1}{2} \times 10 \times CM \times \sin 30°}{\frac{1}{2} \times 10 \times CM \times \sin 60°} = \frac{1}{2} \times \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}}$

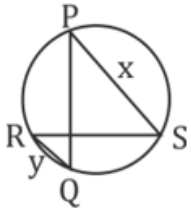
$\text{Area of } \Delta DCB = \frac{1}{2} \times 10 \times 10 = 50 \text{ cm}^2$

$\text{Area of } \Delta CMB = \frac{50}{\sqrt{3}+1} \times \sqrt{3}$

$= \frac{50\sqrt{3}(\sqrt{3} - 1)}{2}$

$= 25\sqrt{3} (\sqrt{3} - 1) \text{ cm}^2$

S9. Ans.(a)
Sol.



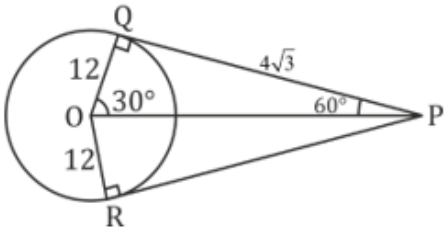
$r = \frac{\sqrt{x^2+y^2}}{2} = \frac{\sqrt{(77)^2+(36)^2}}{2}$

$r = \frac{85}{2} = 42.5 \text{ cm}$

$\text{Area} = \pi r^2 = 1806.25 \ \pi \text{ cm}^2$

S10. Ans.(d)

Sol.



OQ = 12 cm

$\therefore$ PQ = $4\sqrt{3}$ cm

PQ = PR

$\sqrt{PQ^2 + PR^2} = \sqrt{2} \times PQ = \sqrt{2} \times 4\sqrt{3} = 4\sqrt{6}$ cm^2

S11. Ans.(b)

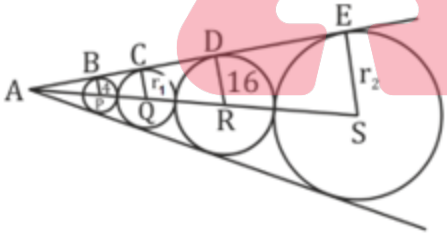
Sol.

$\frac{\sqrt{3}}{2}a = 6 + 4 + 5$

$a = \frac{30}{\sqrt{3}} = 10\sqrt{3}$ cm

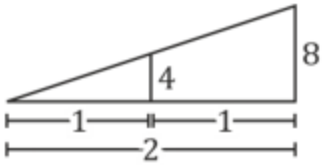
S12. Ans.(b)

Sol.



$r_1 = \sqrt{16 \times 4} = 8$ cm

$r_2 = \frac{(16)^2}{8} = 32$ cm



1 —— 12

AP = 12 cm, PQ = 12 cm, QR = 24 cm, RS = 48 cm

AS = 96 cm

ES = 32 cm

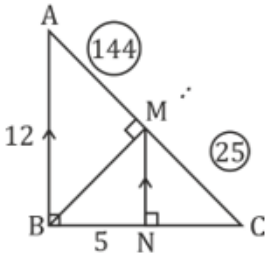
$AE = \sqrt{AS^2 - ES^2}$

$= \sqrt{(96)^2 - (32)^2}$

$= \sqrt{128 \times 64}$

$= 64\sqrt{2}$ cm

S13. Ans.(a)
Sol.



$\frac{AB^2}{BC^2} = \frac{AM}{MC} = \frac{144}{25}$

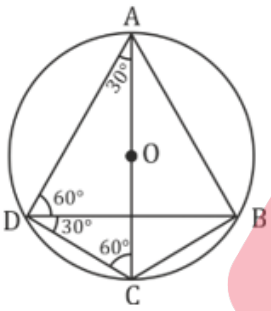
$\frac{MN}{AB} = \frac{25}{169}$

$169 - 12$

$1 - \frac{12}{169}$

$25 - \frac{12}{169} \times 25 = \frac{300}{169}$ cm

S14. Ans.(d)
Sol.



AC = 10 cm

In ΔADC

AD = $5\sqrt{3}$ cm

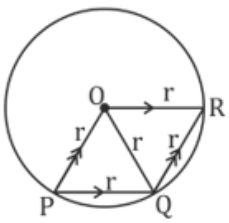
CD = 5 cm

Area of ΔADC = $\frac{1}{2} \times 5\sqrt{3} \times 5$

$= \frac{25\sqrt{3}}{2}$ cm^2

Therefore area of quadrilateral ABCD = $\frac{25\sqrt{3}}{2} \times 2 = 25\sqrt{3}$ cm

S15. Ans.(d)
Sol.



ΔPOQ is equilateral Δ ∠POQ = 60°

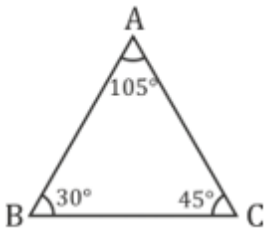
ΔQOR is equilateral Δ ∠QOR = 60°

∠POR = 120°

Reflex angle = 360 – 120 = 240°

S16. Ans.(a)

Sol.

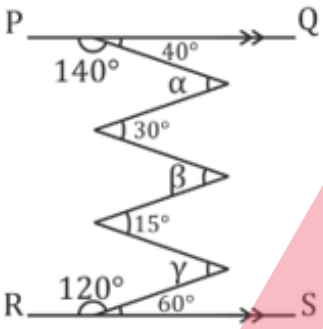


$$\frac{AB}{BC} = \frac{\sin 45°}{\sin 105°}$$

$$AB = \frac{40}{\sin 75°} \times \frac{1}{\sqrt{2}} = \frac{40}{\frac{\sqrt{3}+1}{2\sqrt{2}}} \times \frac{1}{\sqrt{2}} = \frac{80}{\sqrt{3}+1} = 40(\sqrt{3}-1)$$

S17. Ans.(a)

Sol.



$$40 + 30 + 15 + 60 = \alpha + \beta + \gamma$$

$$145° = \alpha + \beta + \gamma$$

S18. Ans.(c)

Sol.

$$D = \sqrt{R^2 - 2.R.r}$$

$$= \sqrt{25 - 15}$$

$$= \sqrt{10}\ \text{cm}$$

$$= 3.16\ \text{cm}$$

S19. Ans.(d)

Sol.

$$13 = \sqrt{(x-2)^2 + (-7-5)^2}$$

$$169 = x^2 + 4 - 4x + 144$$

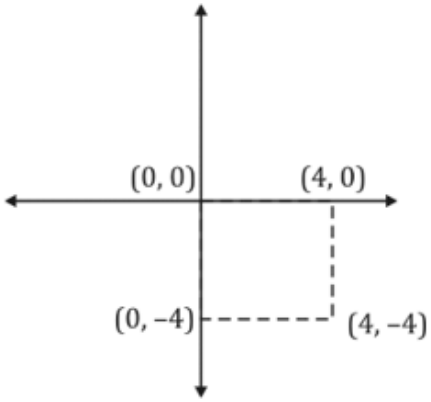
$$x^2 - 4x - 21 = 0$$

$x = 7$ or -3 (-3 is not given in the options)

$x = 7$

S20. Ans.(c)

Sol.



S21. Ans.(b)

Sol.

$x : y = 3 : 2$

$y : z = 3 : 2$

$x : y : z = 9 : 6 : 4$

$9a + 6a + 4a = 342$

$a = 18$

So,

$A \rightarrow 162$

$B \rightarrow 108$

$C \rightarrow 72$

S22. Ans.(c)

Sol.

$\frac{A}{2} = \frac{B}{3} = \frac{C}{4}$

$A : B : C = 2 : 3 : 4$

$A = \frac{2}{9} \times 900 = 200$

$B = \frac{3}{9} \times 900 = 300$

$C = \frac{4}{9} \times 900 = 400$

S23. Ans.(c)

Sol.

$A : B : C = 2 : 5 : 4$

$\text{Difference} = \left(\frac{5}{11} - \frac{2}{11}\right) \times 126.50$

$= \frac{3}{11} \times 126.50 = 34.50$

S24. Ans.(b)

Sol.

$\frac{a+b+c}{3} = 2d$

$a + b + c = 6d$ ...(i)

$\frac{a+b+c+d}{4} = 12$

$a + b + c + d = 48$

$6d + d = 48$

$d = \frac{48}{7}$

S25. Ans.(b)

Sol.

No. $= x, x + 2 \ldots\ldots\ldots\ldots, x + 10$

Req. diff $= x + 10 - x = 10$

S26. Ans.(d)

Sol.

Req. Avg. Speed $= \frac{2 \times 30 \times 20}{30 + 20} = 24$ kmph

S27. Ans.(b)

Sol.

On adding 6. arithmetic mean $= 24 + 6 = 30$

On multiplying by 2.5 arithmetic mean $= 30 \times 2.5 = 75$

S28. Ans.(c)

Sol.

ATQ,

$11(x - 5) + 120 = 12x$

$x = 65$ runs

S29. Ans.(d)

Sol.

Sixth result $= 6 \times 49 + 6 \times 52 - 11 \times 50$

$= 294 + 312 - 550 = 56$

S30. Ans.(a)

Sol.

SP of 25m of cloth – CP of 25m of cloth

= SP of 5m of cloth

∴ CP of 25m of cloth = SP of 20m of cloth

CP = 20, SP = 25

gain percent $= \frac{5}{20} \times 100 = 25\%$