Quant Mega Quiz for SSC CGL (Solutions)

S1. Ans.(a)

Sol.

$\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0$

$xy+yz+zx=0, \quad x+y+z=11$

$x^2+y^2+z^2=(x+y+z)^2-2(xy+yz+zx)$

$=121-2\times 0=121$

$x^3+y^3+z^3-3xyz=(x+y+z)(x^2+y^2+z^2-xy-yz-xz)$

$=11\times(121-0)$

$=1331$

S2. Ans.(c)

Sol.

$$\left[\frac{(1+x^3)}{x^2-1}\div\frac{(x^2+1-x)}{x-1}\right]\times(x-1)$$

$$=\left[\frac{1+x^3}{x^2-1}\times\frac{x-1}{(x^2+1-x)}\right]\times(x-1)$$

$$=\frac{1+x^3}{x^2-1}\times\frac{(x-1)^2}{x^2+1-x}$$

$$=\frac{(x-1)(x^2+1-x)}{(x^2+1-x)}=x-1$$

S3. Ans.(a)

Sol.

$$\frac{x+\sqrt{x^2-1}}{x-\sqrt{x^2-1}}+\frac{x-\sqrt{x^2-1}}{x+\sqrt{x^2-1}}=62$$

By the given condition in question x < 0,

only option (a) satisfy the condition,

S4. Ans.(b)
Sol.

$x^2 - 3x + 1 = 0$

$$x\left(x - 3 + \frac{1}{x}\right] = 0$$

$$x + \frac{1}{x} = 3$$

$$\left(x^2 + \frac{1}{x^2}\right) = \left(x + \frac{1}{x}\right)^2 - 2$$

$= 9 - 2 = 7$

S5. Ans.(b)
Sol.

$$x^4 + \frac{1}{x^4} = 98$$

$$\left(x^2 + \frac{1}{x^2}\right)^2 = x^4 + \frac{1}{x^4} + 2$$

$= 100$

$$x^2 + \frac{1}{x^2} = 10$$

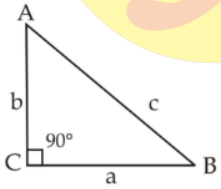
$$\left(x - \frac{1}{x}\right)^2 = \left(x^2 + \frac{1}{x^2}\right) - 2$$

$= 10 - 2$

$= 8$

$$x - \frac{1}{x} = 2\sqrt{2}$$

S6. Ans.(b)
Sol. In Right angle triangle



$$R = \frac{C}{2}$$

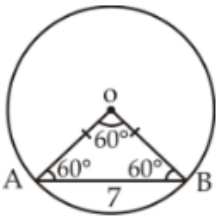
$C^2 = b^2 + a^2$

$= 24^2 + 10^2$

$C = 26$

$$R = \frac{26}{2} = 13$$

S7. Ans.(c)
Sol.



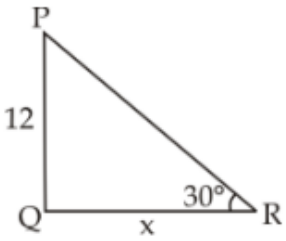
∵ OA = OB = radius

∠A = ∠B = 60°

So, ΔAOB is equilateral triangle

So, R = 7

S8. Ans.(a)
Sol.

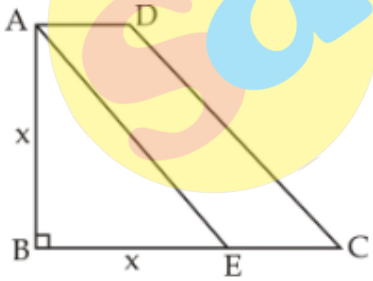


$tan30° = \frac{PQ}{QR}$

$= \frac{1}{\sqrt{3}} = \frac{12}{x}$

$x = 12\sqrt{3}$

S9. Ans.(d)
Sol.



Area of ΔABE $= \frac{1}{2} x \times x = 72$

(AB = BE) = x = 12

$AD = \frac{AB}{2} \quad (given)$

= 6

BC = 12 + 6 = 18 cm

Area of trapezium ABCD

$= \frac{1}{2} \times h \times (AD + BC)$

$= \frac{1}{2} \times \underset{(AB)}{\overset{12}{\downarrow}} \times (6 + 18)$

$= \frac{1}{2} \times 12 \times 24$

$=144$

S10. Ans.(a)

Sol.

Let DB = x and DE=y

in ΔABC and ΔOBP

$\frac{AB}{AC} = \frac{OB}{OP(r)}$

$\frac{40 + x}{36} = \frac{20 + x}{20}$

X = 5

Now, in ΔABC and ΔDBE

$\frac{AB}{AC} = \frac{DB}{DE}, \frac{45}{36} = \frac{5}{y}$

y = 4

S11. Ans.(a)

Sol.

$x \times \frac{117.5}{100} + 11.55 = x \times \frac{92}{100} \times \frac{130}{100}$

$x = 550$

S12. Ans.(b)

Sol.

12.5% of profit = $\frac{12.5}{100} \times 880 = 110$

Remaining 770 is divided in ratio = 5000 : 6000
= 5 : 6

So, profit to Anu = $\frac{5}{11} \times 770 + 110 = 460$

Profit to Bimla = $\frac{6}{11} \times 770 = 420$

S13. Ans.(b)

Sol.

$$\text{loss percent} = \frac{x^2}{100} = 2.25\% \quad (x = 15)$$

S14. Ans.(c)

Sol.

Let the output be x and percentage be y
Then,

$$x\left(1+\frac{y}{100}\right)^2 = 2x$$

$$y = 100\left(\sqrt{2}-1\right)\%$$

S15. Ans.(c)

Sol.

$$x + y = 5500 \quad \therefore (x = \text{Male},\ y = \text{Female})$$

$$\text{And, } \frac{111x}{100} + \frac{120y}{100} = 6330$$

$$\text{So, } y = 2500$$

S16. Ans.(a)

Sol.

$$\text{Milk in mixture} = 6\times\frac{25}{100} + 4\times\frac{30}{100} = \frac{270}{100}$$

$$\text{Req. percentage} = \frac{270\times(6+4)}{100} = 27\%$$

S17. Ans.(b)

Sol.

$$\sqrt{2+\sqrt{2+\sqrt{2+2\cos 8\theta}}}$$

$$= \sqrt{2+\sqrt{2+\sqrt{2+2\left(2\cos^2 4\theta - 1\right)}}}$$

$$= \sqrt{2+\sqrt{2+\sqrt{2+4\cos^2 4\theta - 2}}}$$

$$= \sqrt{2+2\cos 2\theta}$$

$$= \sqrt{4\cos^2\theta} = 2\cos\theta$$

S18. Ans.(b)
Sol.

$x\cos\alpha + y\sin\alpha = P$ .....(i)

$x\cos\beta + y\sin\beta = P'$ .....(ii)

Slope of (i)

$$m_1 = -\frac{\cos\alpha}{\sin\alpha}$$

Slope of (ii)

$$m_2 = \frac{-\cos\beta}{\sin\beta}$$

$$\tan\theta = \frac{m_1 - m_2}{1 + m_1 m_2} = \frac{\sin\alpha.\cos\beta - \cos\alpha.\sin\beta}{\cos\alpha.\cos\beta + \sin\alpha.\sin\beta}$$

$$\tan\theta = \frac{\sin(\alpha-\beta)}{\cos(\alpha-\beta)}$$

$\tan\theta = \tan(\alpha - \beta)$

$\theta = (\alpha - \beta)$

S19. Ans.(a)
Sol.

By C & D

$$\frac{\sin(x+y)+\sin(x-y)}{\sin(x+y)-\sin(x-y)} = \frac{a+b+a-b}{a+b-a+b} = \frac{a}{b}$$

$$\frac{\tan x}{\tan y} = \frac{a}{b}$$

S20. Ans.(a)
Sol.

$a\sec\theta + b\tan\theta + C = 0$

$P\sec\theta + q\tan\theta + r = 0$

$$\frac{\sec\theta}{br - qc} = \frac{\tan\theta}{cp - ar} = \frac{1}{aq - bp}$$

$$\sec\theta = \frac{br - cq}{aq - bp}$$

$$\tan\theta = \frac{cp - ar}{aq - bp}$$

Now,

$\sec^2\theta - \tan^2\theta = 1$

$$\left(\frac{br - cq}{aq - cq}\right)^2 - \left(\frac{cp - ar}{aq - bp}\right)^2 = 1$$

$(br - cq)^2 - (cp - ar)^2 = (aq - bp)^2$

S21. Ans.(d)

Sol.

$$a = \sin\frac{\pi}{4} = \frac{1}{\sqrt{2}}, c = -\operatorname{cosec}\frac{\pi}{4} = -\sqrt{2}$$

$$b = \cos\frac{\pi}{4} = \frac{1}{\sqrt{2}}$$

$$\Rightarrow a + b + c = \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} - \sqrt{2} = 0$$

$$a^3 + b^3 + c^3 = 3abc \quad \therefore [a + b + c = 0]$$

$$= 3.\frac{1}{\sqrt{2}}.\frac{1}{\sqrt{2}}\left(-\sqrt{2}\right)$$

$$= \frac{-3}{2}\sqrt{2}$$

S22. Ans.(b)

Sol. Curved surface Area of 50 pillars

$= 50 \times 2 \times 3.14 \times 0.25 \times 4 \times 0.5 = 157$

S23. Ans.(a)

Sol.

Total surface area $= 2\pi rh + \pi r^2 + \pi rl$

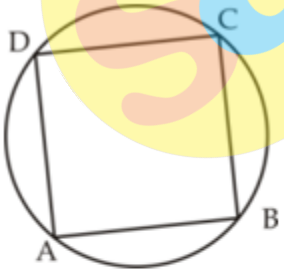
$240\pi + 64\pi + 136\pi$

$440\pi \text{ cm}^2$

S24. Ans.(b)

Sol.

$\angle A = 2.\angle C$



$\angle A + C = 180°$

So, $\angle C = 60°$ & $\angle A = 120°$

$\angle B - \angle D = \frac{1}{3}\angle A = 40°$

$\angle B = 110°$

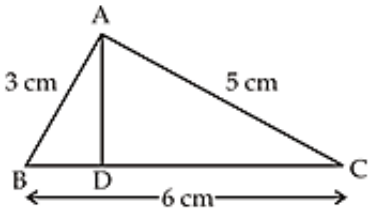
$\angle D = 70°$

Min. difference between two angle is $= 10°$

S25. Ans.(b)

Sol.

$$\frac{BD}{AB}=\frac{DC}{AC}$$



$$\frac{BD}{DC}=\frac{3}{5}$$

$$BD=\frac{3}{(3+5)}*6$$

$$=\frac{9}{4}=2.25\ \text{cm}$$

S26. Ans.(b)

Sol.

$$\frac{(7+\sqrt{5})^2-(7-\sqrt{5})^2}{49-5}=\frac{7}{11}\sqrt{5}$$

so, $\frac{7}{11}\sqrt{5}=a+\frac{7}{11}\sqrt{5}.b$

on comparison , a = 0, b = 1

S27. Ans.(d)

Sol. x = 6, y = 4 or solving both eq.

S28. Ans.(b)

Sol.

$b^2 = a.c$ (G.p.)

$$\frac{a^2-b^2+c^2}{\frac{1}{a^2}-\frac{1}{b^2}+\frac{1}{c^2}}=\frac{a^2-ac+c^2}{\frac{c^2-ac+a^2}{a^2.c^2}}$$

$$=a^2.c^2\left(\frac{a^2-ac+c^2}{a^2-ac+c^2}\right)$$

$=b^4$

S29. Ans.(a)
Sol. pqr = 1
Put p =q = r = 1
so, we get answer 1

S30. Ans.(d)
Sol.

$$a^x . a^y . a^z = (x + y + z)^{x+y+z}$$
$$a^{(x+y+z)} = (x + y + z)^{x+y+z}$$
$$a = x + y + z$$