# SSC CHSL SUNDAY QUANT(Solutions)

**S1. Ans.(c)**
**Sol.**

$3\sin\theta = 2\cos^2\theta$

Take $\theta = 30°$

$\frac{3}{2} = 2 \times \frac{3}{4}$

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

$\tan\theta + \cos\theta + \sin\theta$

$= \frac{1}{\sqrt{3}} + \frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{1}{\sqrt{3}} + \frac{\sqrt{3}+1}{2}$

$= \frac{2+\sqrt{3}(\sqrt{3}+1)}{2\sqrt{3}} = \frac{2+3+\sqrt{3}}{2\sqrt{3}} = \frac{5+\sqrt{3}}{2\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{5\sqrt{3}+3}{6}$

**S2. Ans.(c)**
**Sol.**

$\frac{6x-4}{5x-4} = \frac{5}{4}$

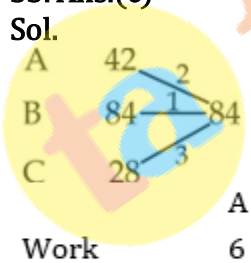
$x = 4$

$\therefore$ present ages = 24 and 20

After 12 years = 36 and 32

$\therefore$ Ratio $= \frac{36}{32} = \frac{9}{8}$

**S3. Ans.(c)**
**Sol.**




| | A | (A+B) | (A+B+C) |
|---|---|---|---|
| Work done. | 6 | 6 | $\frac{84-12}{6} = \frac{72}{6} = 12\ days.$ |
| | In 3 days | in 2 days | |

$\therefore$ A worked for = 12 + 3 + 2 = 17 days.

**S4. Ans.(c)**
**Sol.**

$2012 = \frac{325-250}{250} \times 100$

$= \frac{75}{250} \times 100 = 30\%$

S5. Ans.(c)

Sol.

$a + b + c = 4$

$a^2 + b^2 + c^2 = 16 - 2(1) = 14$

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

$= 4(14 - 1)$

$= 4 \times 13 = 52$

S6. Ans.(a)

Sol.

| | Income | Expenditure | Saving |
|---|---|---|---|
| | 100 | 90 | 10 |
| +25.5% | | +25% | +30% |
| | 125.5 | 112.5 + | 13 |

S7. Ans.(a)

Sol.

$\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{9}{16}$

$\frac{AB}{PQ} = \frac{3}{4}$

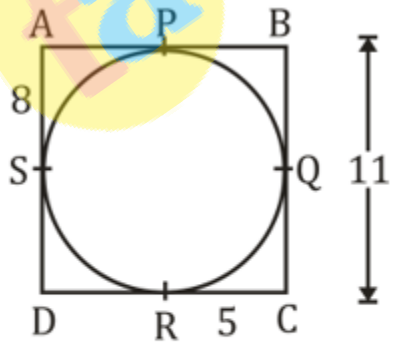
$\therefore$ 3unit = 12

1unit=4

$\therefore PQ - 4 - 4 \times 4 = 16$ cm.

S8. Ans.(d)

Sol.




CR = QC = 5 cm

$\therefore$ BQ = 11 - 5 = 6 cm = PB

AS = AP = 8 cm

$\therefore$ AB = AP + PB = 8 + 6 = 14 cm

**S9. Ans.(b)**

**Sol.**

$3\cos^2A + 6\sin^2A = 3$

$3\cos^2A + 6 - 6\cos^2A = 3$

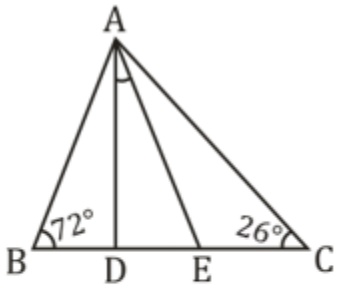
$3 = 3\cos^2A$

$\cos^2A = 1$

$A = 0°$

**S10. Ans.(a)**

**Sol.**




$\angle DAE = \frac{1}{2}(\angle B - \angle C)$

$= \frac{1}{2}(72 - 26)$

$= \frac{1}{2} \times 46$

$= 23°$

**S11. Ans.(c)**

**Sol.**

$\text{Ratio} = \frac{100+125}{135} = \frac{225}{135} = \frac{5}{3}$

**S12. Ans.(b)**

**Sol.**

$A + B - 16$ — 6

$A + C - 32$ — 3 — 96

$B + C - 24$ — 4

∴ Efficiency by solving the above equations.

A = 5/2, B = 7/2, C = ½

When they work combinely for 12 days

then work done $= \frac{13}{2} \times 12 = 78$

∴ Remaining work = 96 − 78 = 18

∴ Remaining work done by C $= \frac{18}{1/2} = 36$ days.

**S13. Ans.(d)**

**Sol.**

$a^2 + b^2 + 2ab = 25$

$a^3 + b^3 = (a + b)(a^2 + b^2 - ab)$

$110 = 5(25 - 2ab - ab)$

$22 = 25 - 3ab$

$\boxed{ab = 1}$

$\therefore (a + b)^2 - 3ab = 25 - 3 = 22$

**S14. Ans.(a)**

**Sol.**

$$\frac{90+140}{100+70+110+125+95} \times 100$$

$$= \frac{230}{500} \times 100$$

$= 46\%$

**S15. Ans.(a)**

**Sol.**

$A + B = 96$

| A | | B | |
|---|---|---|---|
| 140 | | 100 | |
| (7) | : | (5) | $\longrightarrow$ 12 – 96 |
| ×8 | | ×8 | 1 – 8 |
| 56 | | 40 | |

Average ratio

| A | B |
|---|---|
| 2x | 3x |

A.T.Q $\Rightarrow 96 \times 58 = 56 \times 2x + 40 \times 3x$

$96 \times 58 = 232x$

$x = 24$

$\therefore$ Average of B = $24 \times 3 = 72$ kg

**S16. Ans.(d)**

**Sol.**

$a + b + c = 5$

$a^2 + b^2 + c^2 = 33$

$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$ab + bc + ca = -4$

$a^3 + b^3 + c^3 - 3abc = (a + b + c)$

$(a^2 + b^2 + c^2 - ab - bc - ca)$

$= 5 \times (33 + 4)$

$= 5 \times 37$

$= 185$

**S17. Ans.(b)**

**Sol.**

$40\sqrt{5}x^3 - 3\sqrt{3}y^3 = (2\sqrt{5}x - \sqrt{3}y) \times (Ax^2 + Bxy + Cy^2)$

$(2\sqrt{5}x)^3 - (\sqrt{3}y)^3 = (2\sqrt{5}x - \sqrt{3}y)(20x^2 + 2\sqrt{15}xy + 3y^2)$

$A = 20, B = 2\sqrt{15}, C = 3$

$\therefore \sqrt{B^2 + C^2 - A} = \sqrt{60 + 9 - 20}$

$= \sqrt{49} = 7$

**S18. Ans.(c)**

**Sol.**

$P = 4096, T = \frac{5}{2}$ years, $R = 15\%$

For 10 monthly-

$T = \frac{5}{2} \times 12 = 30 = 10 + 10 + 10 = 3$ years

$R = \frac{15}{12} \times 10 = 12.5\% = \frac{1}{8}\%$

$$\begin{array}{ccccc} & \overset{1/8}{\frown} & & & \\ 4096 & & 512 & \overset{1/8}{\frown} & \\ & & 512 & 64 & \overset{1/8}{\frown} \\ & & 512 & 128 & 8 \end{array}$$

$CI = 512 \times 3 + 64 + 128 + 8 = 1736$

**S19. Ans.(c)**

**Sol.**

$$\frac{x+y}{(84+52)\times\frac{5}{18}} = 12$$

$$\frac{x+\frac{2}{3}x}{(84+52)\times\frac{5}{18}} = 12$$

$x = 272$ m

**S20. Ans.(b)**

**Sol.**

$c = \frac{135-110}{110} \times 100$

$= \frac{25}{110} \times 100 \approx 23\%$

**S21. Ans.(b)**

**Sol.**

$x^2 + 1 = 3x$

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

$$\frac{x^4+\frac{1}{x^4}}{x^2+5x+1} = \frac{x\left(x^3+\frac{1}{x^3}\right)}{8x} = \frac{x^3+\frac{1}{x^3}}{8}$$

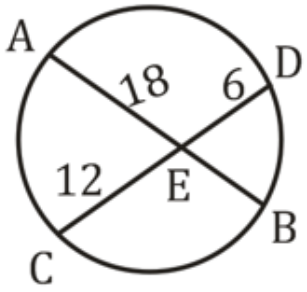
$= \frac{27-9}{8} = \frac{18}{8} = \frac{9}{4} = 2\frac{1}{4}$

**S22. Ans.(b)**
**Sol.**

| S | F | | | |
|---|---|---|---|---|
| 5 | $2 \times 14$ | 70 | 28 | ) 7 – 14 |
| 9 | $5 \times 7$ | 63 | 35 | ) 1 – 2 |

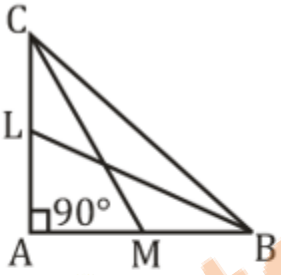
∴ Total number of candidates = 70 × 2 + 28 × 2
= 140 + 56
= 196

**S23. Ans.(d)**
**Sol.**




AE × EB = EC × ED
18 × EB = 12 + 6
EB = 4 cm

**S24. Ans.(b)**
**Sol.**




$CM^2 = AC^2 + AM^2$
$CM^2 = AC^2 + \frac{AB^2}{4}$ ...(i)
$BL^2 = AL^2 + AB^2$
$BL^2 = \frac{AC^2}{4} + AB^2$ ...(ii)
Add eq$^n$ (i) + eq$^n$ (ii)
$CM^2 + BL^2 = AC^2 + \frac{AC^2}{4} + \frac{AB^2}{4} + AB^2$
$4(CM^2 + BL^2) = 5\ (AC^2 + AB^2)$
$4(CM^2 + BL^2) = 5BC^2$

**S25. Ans.(c)**
**Sol.**
$2\pi rh = 440$
$\pi rh = 220$
∴ volume = $\pi rh \times r = 220 \times 7$
= 1540 $cm^3$

**S26. Ans.(c)**

**Sol.**

$$\frac{(\cos 9+\sin 81)(\sec 9°+\operatorname{cosec} 81°)}{\sin 56 \sec 34+\cos 25° \operatorname{cosec} 65°}$$
$$= \frac{2 \sin 81 \times 2 \operatorname{cosec} 81}{\sin 56 \operatorname{cosec} 56+\cos 25 \sec 25}$$
$$= \frac{4}{1+1} = 2$$

**S27. Ans.(a)**

**Sol.**

$$\text{Avg. of B, C and E} = \frac{90+135+120}{3}$$
$$= \frac{345}{3} = 115$$
$$\therefore \text{Required\%} = \frac{125-115}{125} \times 100$$
$$= \frac{10}{125} \times 100$$
$$= 8\%$$

**S28. Ans.(d)**

**Sol.**

$$\left(\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta}\right)\left(\frac{1}{\tan\theta+\cot\theta}\right)$$
$$= \frac{\sin^2\theta+1+\cos^2\theta+2\cos\theta}{\sin\theta(1+\cos\theta)} \times \sin\theta \cos\theta$$
$$= \frac{2(1+\cos\theta)}{(1+\cos\theta)} \times \cos\theta$$
$$= 2 \cos\theta$$

**S29. Ans.(d)**

**Sol.**

$3 - 2 \sin^2\theta - 3 \cos\theta = 0$
$3 - 2 + 2 \cos^2\theta - 3 \cos\theta = 0$
$2 \cos^2\theta - 3 \cos\theta + 1 = 0$
$2 \cos^2\theta - 2 \cos\theta - \cos\theta + 1 = 0$
$2 \cos\theta (\cos\theta - 1) - 1 (\cos\theta - 1) = 0$
$(2 \cos\theta - 1) (\cos\theta - 1) = 0$
$\therefore 2 \cos\theta = 1$
$\cos\theta = \frac{1}{2}$
$\theta = 60° \{\because 0° < \theta < 90°\}$
$\therefore 2 \operatorname{cosec}\theta + \tan\theta$
$= 2 \operatorname{cosec} 60° + \tan 60°$
$= \frac{4}{\sqrt{3}} + \sqrt{3} = \frac{4+3}{\sqrt{3}} = \frac{7}{\sqrt{3}} = \frac{7\sqrt{3}}{3}$

**S30. Ans.(a)**
**Sol.**