

**SSC CGL Tier-II Quantitative Aptitude 2020 Mock 12 (Solutions)**

**S1. Ans.(c)**

**Sol.**

5% answered all and 5% answered none

Remains = 90%

Candidates percentage answered 1 question

$$= 90 \times \frac{25}{100} = 22.5\%$$

Candidates percentage answered 4 questions

$$= 90 \times \frac{20}{100} = 18\%$$

All these makes  $(18 + 22.5 + 10) = 50.5\%$

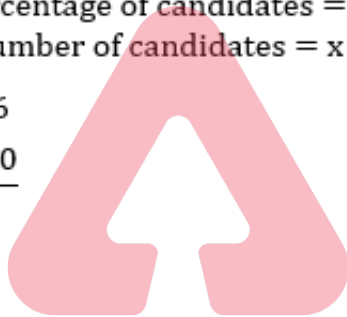
Remaining percentage of candidates = 49.5%

Let the total number of candidates = x

$$x \times \frac{49.5}{100} = 396$$

$$x = \frac{396 \times 100}{49.5}$$

$$x = 800$$



**S2. Ans.(b)**

**Sol.**

$$\text{Women} = \frac{43}{83} \times 311250 = 161250$$

$$\text{Men} = 311250 - 161250 = 150000$$

∴ Total number of literate person

$$= 161250 \times \frac{8}{100} + 150000 \times \frac{24}{100}$$

$$= 48900$$

**S3. Ans.(d)**

**Sol.**

Let the number of students be x. Then,

Number of students either above 8 years of age or

of 8 years =  $(100 - 20)\%$  of x = 80% of x.

so 80% of x = 48 +  $\frac{2}{3}$  of 48

$$\Rightarrow \frac{80}{100} x = 80$$

$$\Rightarrow x = 100.$$

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**S4. Ans.(b)****Sol.**

$$5T + 9C = \text{Rs. } 23,400$$

$$\downarrow \quad \downarrow$$

$$(+10\%) \quad (+10\% + 10\%)$$

$$10\% \text{ profit of 9 chairs} = 3030 - 2340 = \text{Rs. } 690$$

$$100\% (9 \text{ chairs}) = \text{Rs. } 6900$$

$$\text{C.P of 3 chairs} = \text{Rs. } 2300$$

**S5. Ans.(b)****Sol.**

Let CP of 1 chair = Rs. 1

$$\therefore \frac{\text{Profit}}{\text{CP}} = \frac{60}{135} = \frac{4}{9}$$

$$\begin{array}{lcl} \text{CP} & : & \text{SP} \\ (143 + 26) \times 9 & : & 13 \times (143) \quad \text{CP : SP} \\ & \downarrow & = 9 : 11 \end{array}$$

$$169 \times 9 \quad : \quad 13 \times 143$$

$$\therefore \text{profit \%} = \frac{2}{9} \times 100 = 22\frac{2}{9}\%$$

**S6. Ans.(a)****Sol.**

$$\begin{array}{lcl} \text{CP} & \xrightarrow{+5 \times 83} & \text{SP} \\ 11 \times 83 & : & 16 \times 83 \end{array}$$

$$100 \times 16 \quad : \quad 83 \times 16$$

$$\xrightarrow{-17 \times 16}$$

$$\Rightarrow \text{Total profit} = 83 \times 5 - 17 \times 16 = 143$$

$$\therefore \text{Profit \%} = \frac{143}{2513} \times 100 = 5.69\%$$

**SSC****adda247****S7. Ans.(d)****Sol.**

Let x → number of apples

y → number of oranges

$$SP_A = 23 \quad SP_O = 10$$

$$CP_A = 20 \quad CP_O = 8$$

Now,

$$23x + 10y = 673$$

$$\downarrow \quad \downarrow$$

$$x = 21 \quad y = 19$$

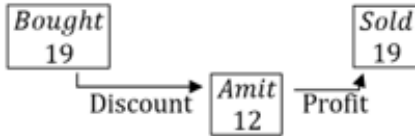
(by hit & trial, satisfying  $x > y$ )

$$\therefore \text{Profit \%} = \frac{673 - 572}{20 \times 21 + 8 \times 19} \times 100$$

$$= 17.65\%$$

**S8. Ans.(b)****Sol.**

$$58\frac{1}{3}\% = \frac{7}{12}$$



$$\% \text{ discount} = \frac{7}{19} \times 100 = 36\frac{16}{19}\%$$

**S9. Ans.(c)****Sol.**

$$SP \rightarrow \left(\frac{39304}{64000}\right)^{\frac{1}{3}} = \frac{17}{20}$$

For two years

$$SP \rightarrow \left(\frac{17}{20}\right)^2 = \frac{289}{400} \xrightarrow{\times 16} \text{Rs. } 4624$$

$$MP \rightarrow \left(\frac{17}{20}\right)^2 = \frac{289}{400} \xrightarrow{\times 16} \text{Rs } 6400$$

**S10. Ans.(b)****Sol.**

CP	:	SP
20	:	29
100	:	77
1000	:	1120
880	:	1000
1000	:	1421

$$\text{Profit} = 42.1\%$$

**S11. Ans.(a)****Sol.**

$$\frac{SP}{D} = \frac{13}{2} \times \frac{17}{17}$$

$$\& \frac{D}{MP} = \frac{P}{CP} \Rightarrow \frac{13}{13} \times \frac{2}{15} = \frac{P}{CP}$$

Now, 34 units → Rs. 374

15 × 13 units → Rs. 2145

**S12. Ans.(d)****Sol.**

	Principal	Amount
Ist year	20	21 × 441
	8820	9261
IInd year	400	441 × 21
	8400	9261
IIIrd year	8000	9261

ATQ,  $8820 + 8400 + 8000 = 25220$   
 $25220 \text{ units} \rightarrow \text{Rs. } 5044$   
 $1 \text{ unit} \rightarrow 0.2 \text{ Rs}$   
 Value of each installment = 9261 unit  
 $\Rightarrow 9261 \times 0.2 = \text{Rs. } 1852.2$

**S13. Ans.(b)**

**Sol.**

<i>Principle</i>	<i>Amount</i>
100	256
<i>After 1 year</i>	
$100^{\frac{1}{2}}$	$256^{\frac{1}{2}}$
$\Rightarrow 10$	16

C.I =  $\frac{6}{10} \times 100 = 60\%$

**S14. Ans.(a)**

**Sol.**

Let x be the sum borrowed

ATQ,  $\frac{x \times 12}{(x - 5400) 10} = \frac{5}{4}$   
 $\Rightarrow 24x = 25x - 135000$   
 $\Rightarrow x = 135000$

**S15. Ans.(c)**

**Sol.**

$14 \frac{2}{7} = \frac{1}{7}$

Investment ratio's =  $7^3 : 8^3$

$\Rightarrow 343 : 512$

ATQ,  $512x - 343x = 169x \rightarrow 2873$

$x = 17$

Total investment =  $343x + 512x$   
 $= 855 \times 17 = 14535$

**S16. Ans.(d)**

**Sol.**

SI in 2year = 24%

CI in 2year = 25.44%

ATQ, 1.44%  $\rightarrow$  Rs 72

i.e. 100%  $\rightarrow$  Rs 5000

New CI =  $a + b + \frac{ab}{100}$   
 $= 12.36 + 12.36 + \frac{(12.36)^2}{100}$   
 $= 26.25\%$

Difference = 2.25%

Required value =  $\frac{2.25}{100} \times 5000 = \text{Rs } 112.5$



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**S17. Ans.(c)**

**Sol.** New average =  $749 \times 0.3 + 7.3 = 232$

**S18. Ans.(c)**

**Sol.**

Let no. be x.

ATQ.  $\frac{x^2 + x^3}{2} = 276x$

$\Rightarrow \frac{x^2(1+x)}{2} = 276x$

$\Rightarrow x^2 + x = 552$

$\Rightarrow x = 23$

**S19. Ans.(b)**

**Sol.**

$S = \frac{13}{2} [24 + (12)12] = 1092$

Average =  $\frac{1092}{13} = 84$

**S20. Ans.(a)**

**Sol.**

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

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

$x + \frac{1}{x} = \sqrt{2M + 2}$

Average =  $\frac{\sqrt{2M+2}}{2}$

**S21. Ans.(b)**

**Sol.**

	Milk	Water	
Mixture I	14	13	× 13
	182	169	
Mixture II	13	15	× 14
	<u>182</u>	<u>210</u>	

Quantity of Water added =  $210x - 169x = 41x$

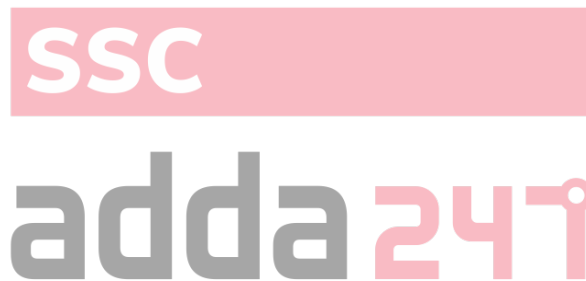
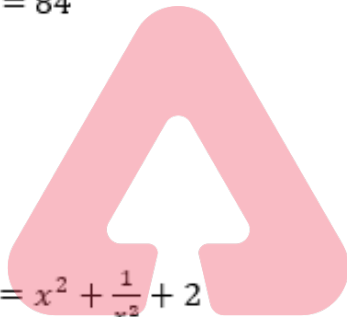
$41x = 82$  litre

$x = 2$  litre

Initial quantity of Milk =  $182 \times 2 + 54 \times \frac{14}{27}$

=  $364 + 28$

= 392 litre.



S22. Ans.(a)

Sol.

	Water	Spirit	
Vessel I	3	9	] × 13
	39	117	
Vessel II	7	6	] × 12
	<u>84</u>	<u>72</u>	
	123	189	

Required ratio = 41 : 63

S23. Ans.(b)

Sol.

ATQ,

$$\frac{x}{10} + \frac{y}{4} = 46$$

$$\Rightarrow 2x + 5y = 920$$

$$\text{Also } x + y = 250$$

On solving,  $x = 110$ ,  $y = 140$

S24. Ans.(a)

Sol.

$$\text{Initially, } \frac{\text{Water}}{\text{Mixture}} = \frac{5}{9}$$

$$\text{Final, } \frac{\text{Water}}{\text{Mixture}} = \frac{3}{5}$$

$$\text{Final} - \text{Initial} = \frac{3}{5} - \frac{5}{9} = \frac{2}{45}$$



S25. Ans.(c)

Sol.

Let total person be  $12x$

No. of males =  $6x$

No. of Females =  $6x$

Males who dance =  $\frac{2}{3} \times 6x = 4x$

No. Of people who dance =  $6x$

Required ratio =  $\frac{2x}{4x} = 1 : 2$

S26. Ans.(b)

Sol.

A : B + C

2    3

$\Rightarrow$  Total investment = 5 units

A's investment = 2 units.

A's 4% profit = 420

1% profit = 105

100% profit = 10500 = A's Investment

So, 2 unit  $\rightarrow$  Rs 10500

3 unit  $\rightarrow$  Rs 15750

S27. Ans.(b)

Sol.

Profit ratios P : Q : R

$$= 8 : 3 : 3$$

Investment  $\times$  time = Profit

$$\frac{P \times 6}{R \times 6} = \frac{8}{3}$$

$$\frac{P \times 6}{2400 \times 6} = \frac{8}{3}$$

$$P = \text{Rs } 6400$$

Also,

$$\frac{Q \times 5}{2400 \times 6} = \frac{3}{3}$$

$$Q = 2880$$

$$P + Q = 6400 + 2880 = 9280$$

S28. Ans.(d)

Sol.

Let total work =  $16x$

No. of days to do total work = 20 days

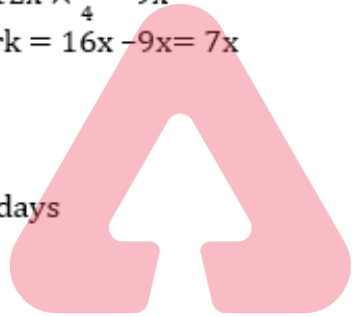
$$\text{Done Work} = 12x \times \frac{3}{4} = 9x$$

Remaining Work =  $16x - 9x = 7x$

$$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

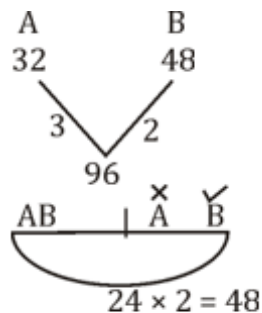
$$\frac{36 \times 20}{16x} = \frac{30 \times D_2}{7x}$$

$$D_2 = \frac{21}{2} = 10\frac{1}{2} \text{ days}$$



S29. Ans.(b)

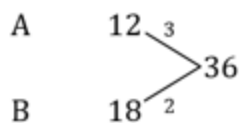
Sol.



$$\text{Remaining work} = 96 - 48 = \frac{48}{3} = 16 \text{ days.}$$

S30. Ans.(c)

Sol.



$$\frac{36}{9} = 4$$

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Together efficiency (5) (4)

1 — 180  
36 — 6480

S31. Ans.(c)

Sol.

M: W: C = 8: 5: 3 efficiency  
M: W: C = 9: 7: 5 No. of people  
72 + 35 + 15 = 112 -- 1344  
1 -- 12

21 -- 126

7 -- 42

Wage per woman =  $\frac{35 \times 12}{42} = 10$

S32. Ans.(d)

Sol.

$$\left(\frac{18}{6} + \frac{28}{14}\right) \times D = 25$$

$$5D = 25$$

$$D = 5$$

For 4 houses,  $5 \times 4 = 20$

S33. Ans.(d)

Sol.

A 25  $\xrightarrow{6}$   
B 30  $\xrightarrow{5}$  150

Let t minutes be the time to fill the tank full

$$\frac{3t}{5} \times 5 + \frac{2t}{5} \times 11 = 150$$

$$3t + 4.4t = 150$$

$$7.4t = 150$$

$$t = \frac{1500}{74} = 20 \frac{10}{37} \text{ mins.}$$

S34. Ans.(c)

Sol.

A 8  $\xrightarrow{15}$   
B 10  $\xrightarrow{12}$  120  
C 12  $\xrightarrow{10}$

Remaining work completed by A in

$$= \frac{120 - 74}{15} = \frac{46}{15} = 3 \frac{1}{15} \text{ min}$$

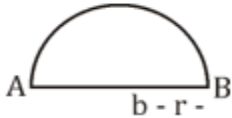
$$\text{Total time} = 2 + 3 \frac{1}{15} = 5 \frac{1}{5} \text{ marks}$$





S35. Ans.(b)

Sol.



$$\text{Distance} = \pi r : 2r$$

$$\text{Times} = 11 : 7$$

$$4 \quad 180 \text{ sec}$$

$$1 \quad 45 \text{ sec}$$

$$7 \quad 315 \text{ secs}$$

$$\text{Radius, } r = \frac{315}{2} \times \frac{40}{16} = 393.75 \text{ m}$$

S36. Ans.(b)

Sol.

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{5 + 8}{\frac{5}{160} + \frac{8}{64}}$$

$$= 83.2 \text{ km/hr.}$$

S37. Ans.(a)

Sol.

Let distance covered by train and bus be x and y respectively

ATQ,

$$x + y = 420 \quad \dots (i)$$

$$\text{Also, } \frac{x}{12} + \frac{y}{15} = 34$$

$$\Rightarrow 5x + 4y = 2040 \quad \dots (ii)$$

On Solving

$$x = 360 \quad y = 60$$

S38. Ans.(b)

Sol.

	Upstream	Downstream
Speed	4	13
Time	13	4

$$4 \text{ units} \rightarrow 4 \text{ hr } 32 \text{ min}$$

$$1 \text{ unit} \rightarrow 1 \text{ hr } 8 \text{ min}$$

$$13 \text{ units} \rightarrow 14 \text{ hr } 44 \text{ min}$$

S39. Ans.(a)

Sol.

Let speed of boat in still water = x

Speed of current = x - 6

ATQ

$$\frac{44}{2x-6} + \frac{36}{6} = 8$$

$$2x - 6 = 22$$

$$x = 14 \text{ km/hr.}$$

**S40. Ans.(b)****Sol.** Let total distance be 630x

Time to cover at 45 kmph = 14hr

Time to cover at 42 kmph = 15hr

i.e. train stops for 1hr

for every 15 hr journey.

i.e. it stops for 4 min/hr.

**S41. Ans.(a)****Sol.**

$$\begin{aligned} \text{Household expenditure} &= \frac{28}{100} \times 40000 \\ &= 11200 \end{aligned}$$

**S42. Ans.(a)****Sol.**

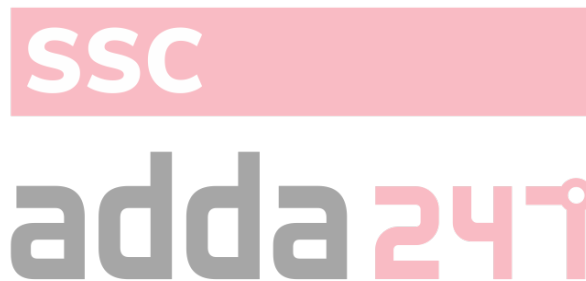
Difference between expenditure Fuel and Education = 6%

$$\begin{aligned} &= \frac{6}{100} \times 85000 \\ &= 5100 \end{aligned}$$

**S43. Ans.(a)****Sol.**

Savings = 10%

$$\begin{aligned} 2900 &= \frac{10}{100} x \\ 29000 &= x \end{aligned}$$

**S44. Ans.(d)****Sol.**

Difference between clothing &amp; Bills = 12%

$$\begin{aligned} 8400 &= \frac{12}{100} x \\ 70000 &= x \end{aligned}$$

Annual income = 70000 X 12 = 840000

**S45. Ans.(c)****Sol.** Difference in the expenditure of clothing & education

= 20 - 14 = 6%

Difference in the monthly saving &amp; monthly expenditure on bills =

(10 - 8)%

If 6% → 24000

2% → 8000

Difference in the yearly saving &amp; yearly expenditure on bills = 8000 X

12 = 96000

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**S46. Ans.(b)****Sol.** Total grain production of state

$$P = 45 + 103 + 27 + 29$$

$$= 204 \text{ lakh tonne}$$

$$Q = 48 + 86 + 73 + 19 + 15$$

$$= 241 \text{ lakh tonne}$$

$$R = 59 + 32 + 67 + 14 + 31$$

$$= 203 \text{ lakh tonne}$$

$$S = 41 + 37 + 59 + 21 + 15$$

$$= 173 \text{ lakh tonne}$$

Obviously state Q had highest grain production.

**S47. Ans.(c)****Sol.** Total rice production = 45 + 48 + 59 + 41 + 37 + 68 + 57 + 38

$$= 393 \text{ lakh tonne}$$

Total wheat production = 103 + 86 + 32 + 37 + 22 + 15 + 18 + 8 + 28

$$= 331 \text{ lakh tonne}$$

$$\therefore \text{Required ratio} = 393 : 331$$

**S48. Ans.(b)****Sol.** In the state Q Jowar shows highest production.**S49. Ans.(d)****Sol.**

$$\text{Required percentage} = \frac{103}{331} \times 100$$

$$= 31.11\%$$

$$= 30\% \text{ (approx.)}$$

**S50. Ans.(b)****Sol.**

$$\frac{1}{1 \times 2 \times 3} + \frac{1}{2 \times 3 \times 4} + \frac{1}{3 \times 4 \times 5} + \dots - \frac{1}{50 \times 51 \times 52}$$

$$\frac{1}{2} \left[ \frac{1}{1 \times 2} - \frac{1}{51 \times 52} \right]$$

$$\frac{1}{2} \times \frac{1}{2} \left[ 1 - \frac{1}{51 \times 52} \right]$$

$$\frac{1}{4} \left( \frac{1325}{1326} \right) = \frac{1325}{5304}$$

**S51. Ans.(d)****Sol.**

$$36 = 2^2 \times 3^2$$

$$\text{No. of factors} = 3 \times 3 = 9$$

$$\text{Product} = \left( (36)^{\frac{9}{2}} \right)^{\frac{1}{9}} = \left( (6^2)^{\frac{9}{2}} \right)^{\frac{1}{9}} = (6)^9 = 10077696$$

**S52. Ans.(c)**

**Sol.**

$$11 \times 12 \times 13 \times 14 \times 15$$

0

**S53. Ans.(d)**

**Sol.** By unit digit (a) eliminates

A perfect square has digital sum 1, 4, 7, 9

So, (c) and (b) eliminates.

**S54. Ans.(c)**

**Sol.**  $408383 - 62 = 408321$  perfect square rest all when subtracted will not be perfect square.

**S55. Ans.(a)**

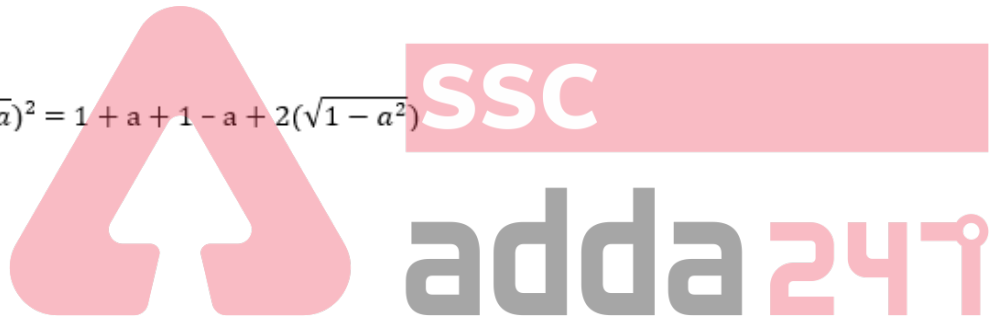
**Sol.**

$$\frac{\sqrt{4 \times 21 + 1} - 1}{2} = \frac{\sqrt{85} - 1}{2}$$

**S56. Ans.(d)**

**Sol.**

$$\begin{aligned} (\sqrt{1+a} + \sqrt{1-a})^2 &= 1+a+1-a+2(\sqrt{1-a^2}) \\ &= 2+2\sqrt{\frac{2}{9}} \\ &= 2+\frac{2}{3}\sqrt{2} \\ &= \frac{6+2\sqrt{2}}{3} \end{aligned}$$



**S57. Ans.(c)**

**Sol.** L.C.M of 15, 18, 25, 30 = 450

No. =  $450k + 7 = 442k + 8k + 7$

$8k + 7$  should be divisible by 13

$K = 4$

Required number =  $450 \times 4 + 7$

= 1807

Sum of digit = 16

**S58. Ans.(c)**

**Sol.**

$$5x \times 7x = 15435$$

$$x^2 = 441$$

$$x = 21$$



difference =  $2x$

difference = 42

**S59. Ans.(a)**

**Sol.**

$$x^8 - 727x^4 + 1 = 0$$

$$2 + x^4 + \frac{1}{x^4} = 727 + 2$$

$$x^2 + \frac{1}{x^2} = 27$$

$$x - \frac{1}{x} = \sqrt{27 - 2} = 5$$

$$x + \frac{1}{x} = \sqrt{(5)^2 + 4} = \sqrt{29}$$

**S60. Ans.(d)**

**Sol.**

$$a^2 + b^2 + c^2 + 14 = 6a - 4b + 2c$$

$$\Rightarrow a^2 - 6a + 9 + b^2 + 4b + 4 + c^2 - 2c + 1 = 0$$

$$\Rightarrow (a - 3)^2 + (b + 2)^2 + (c - 1)^2 = 0$$

$$a = 3, b = -2, c = 1$$

$$\therefore 4a - 3b + 2c$$

$$= 4 \times 3 - 3 \times -2 + 2 \times 1$$

$$= 12 + 6 + 2 = 20$$

**S61. Ans.(a)**

**Sol.**

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

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

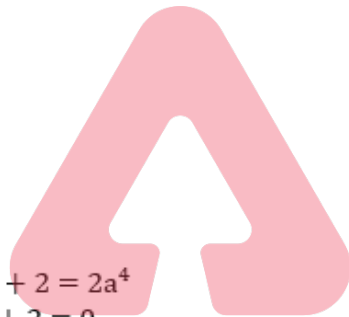
$$a^4 + 2a^2 = 2a^3$$

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

add all

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

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



**S62. Ans.(a)**

**Sol.**

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

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

**S63. Ans.(b)**

**Sol.**

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

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

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

**S64. Ans.(d)**

**Sol.**

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

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

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S65. Ans.(c)

Sol.

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

Multiply all

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

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

S66. Ans.(a)

Sol.

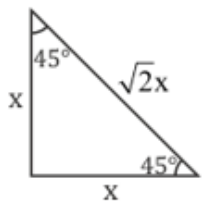
$$\text{Side of square} = 11 \times \frac{\sqrt{3}}{\sqrt{3}+2} = \frac{11 \times 1.732}{1.732+2}$$

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

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

S67. Ans.(d)

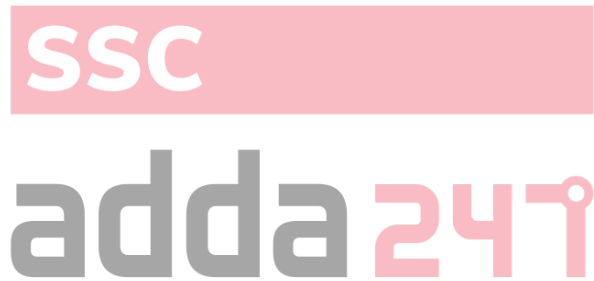
Sol.



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

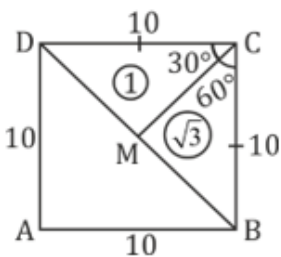
$$x = \frac{4a}{2+\sqrt{2}} = 2a(2-\sqrt{2})$$

$$\begin{aligned} \text{Area} &= \frac{1}{2} \times x^2 = \frac{1}{2} \times 4a^2 (2-\sqrt{2})^2 \\ &= 2a^2 (2-\sqrt{2})^2 = 4a^2 (3-2\sqrt{2}) \end{aligned}$$



S68. Ans.(b)

Sol.



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

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

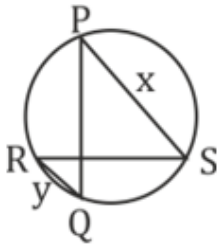
$$\text{Area of } \Delta CMB = \frac{50}{\sqrt{3}+1} \times \sqrt{3}$$

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

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

S69. Ans.(a)

Sol.



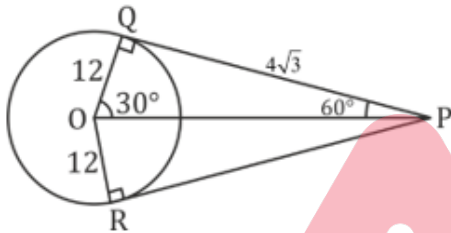
$$r = \frac{\sqrt{x^2 + y^2}}{2} = \frac{\sqrt{(77)^2 + (36)^2}}{2}$$

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

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

S70. Ans.(d)

Sol.



$$OQ = 12 \text{ cm}$$

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

$$PQ = PR$$

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

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S71. Ans.(b)

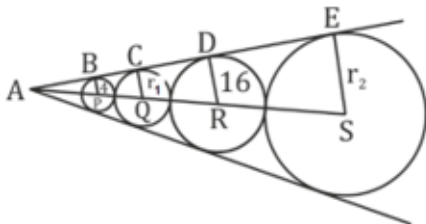
Sol.

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

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

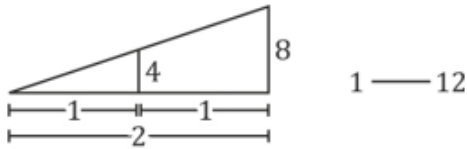
S72. Ans.(b)

Sol.



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

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



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

AS = 96 cm

ES = 32 cm

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

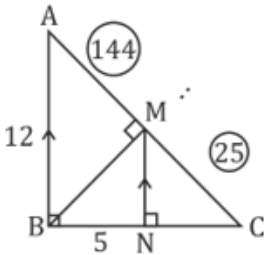
$$= \sqrt{(96)^2 - (32)^2}$$

$$= \sqrt{128 \times 64}$$

$$= 64\sqrt{2} \text{ cm}$$

**S73. Ans.(a)**

**Sol.**



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

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

$$169 - 12$$

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

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

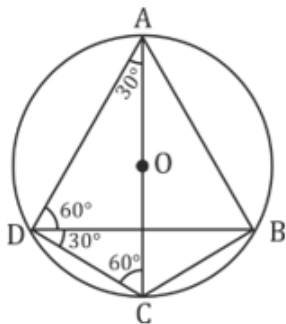
$$25 - \frac{12}{169} \times 25 = \frac{300}{169} \text{ cm}$$

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



**S74. Ans.(d)**

**Sol.**



AC = 10 cm

In  $\triangle ADC$

AD =  $5\sqrt{3}$  cm

CD = 5 cm

$$\text{Area of } \triangle ADC = \frac{1}{2} \times 5\sqrt{3} \times 5$$

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

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

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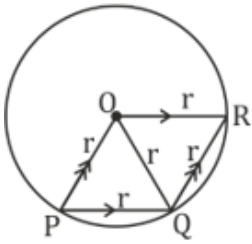
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S75. Ans.(d)

Sol.



$\Delta POQ$  is equilateral  $\Delta \angle POQ = 60^\circ$

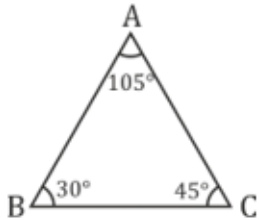
$\Delta QOR$  is equilateral  $\Delta \angle QOR = 60^\circ$

$\angle POR = 120^\circ$

Reflex angle =  $360 - 120 = 240^\circ$

S76. Ans.(a)

Sol.



$$\frac{AB}{BC} = \frac{\sin 45^\circ}{\sin 105^\circ}$$

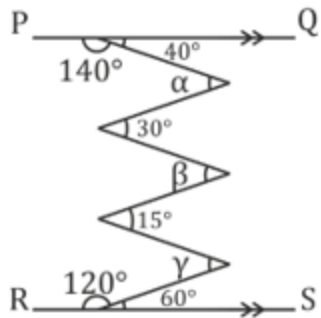
$$AB = \frac{40}{\sin 75^\circ} \times \frac{1}{\sqrt{2}} = \frac{40}{\frac{\sqrt{8+1}}{2\sqrt{2}}} \times \frac{1}{\sqrt{2}} = \frac{80}{\sqrt{3+1}} = 40(\sqrt{3}-1)$$

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S77. Ans.(a)

Sol.



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

$$145^\circ = \alpha + \beta + \gamma$$

S78. Ans.(c)

Sol.

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

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

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

$$= 3.16 \text{ cm}$$

**S79. Ans.(d)**

**Sol.**

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

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

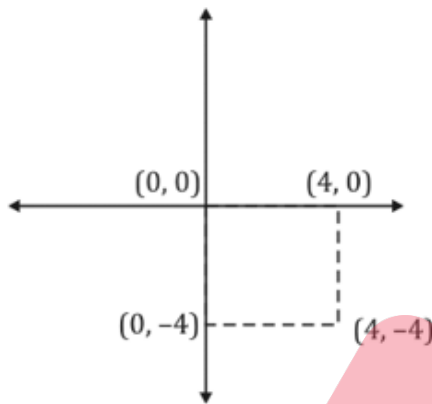
$$x^2 - 4x - 21 = 0$$

$$x = 7 \text{ or } -3 \text{ (-3 is not given in the options)}$$

$$x = 7$$

**S80. Ans.(c)**

**Sol.**



**S81. Ans.(d)**

**Sol.**

$$D = \sqrt{l^2 + b^2 + h^2} = \sqrt{(32)^2 + (16)^2 + (11)^2} = 37.42 \text{ m}$$

**S82. Ans.(a)**

**Sol.**

$$\frac{CSA}{TSA} = \frac{2\pi rh}{2\pi r(r+h)} = \frac{h}{r+h} = \frac{7}{11}$$

$$11 -- 5038$$

$$7 -- 3206$$

$$V = \frac{1}{2}(2\pi rh)r = 1603 r$$

$$3206 = 2 \times \frac{22}{7} \times r \times \frac{7}{4} r$$

$$r = \sqrt{\frac{3206}{11}}$$

$$V = 1603 \sqrt{\frac{3206}{11}} \text{ cm}^3$$

**S83. Ans.(b)**

**Sol.**

$$\text{pythagoras triplet} \begin{cases} h = 85 \text{ cm} \\ r = 132 \text{ cm} \\ l = 157 \text{ cm} \end{cases}$$

$$R = \frac{r \times h}{l} = \frac{85 \times 132}{157} = 71.46 \text{ cm}$$

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S84. Ans.(c)

Sol.

$$\frac{v_1}{v_2} = \frac{8 \times 8}{19 \times 8} = \frac{64}{152} = \frac{v_1}{v_1 + v_2} = \frac{64}{216} \text{ (Small cone)}$$

$$\frac{h_1}{h_2} = \sqrt[3]{\frac{v_1}{v_2}} = \sqrt[3]{\frac{4}{6}} = \frac{2}{3} \quad \begin{array}{l} 3 - 42 \\ 1 - 14 \text{ cm} \end{array}$$

$$h_1 = 28$$

Therefore height from base = 42 - 28 = 14 cm

S85. Ans.(d)

Sol.

$$\begin{aligned} V &= \frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2) \\ &= \frac{1}{3} \times \frac{22}{7} \times 63 (36 + 64 + 48) \\ &= 9768 \text{ cm}^3 \end{aligned}$$

S86. Ans.(c)

Sol.

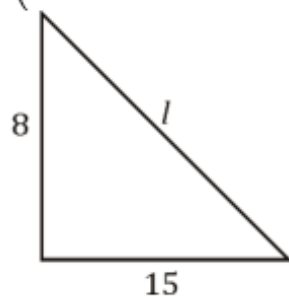
$$\begin{aligned} 4\pi r^2 &= 6 \text{ ltr} \\ 8\pi r^2 &= 12 \text{ ltr} \end{aligned}$$

S87. Ans.(b)

Sol.

$$\begin{aligned} \text{T.S.A} - \text{L.S.A} + \text{area of base} \\ &= \frac{1}{2} \times 60\sqrt{3} \times 17 + \sqrt{3} \times 75 \times 6 \end{aligned}$$

$$\left( (h) = \frac{\sqrt{3}}{2} \times 10\sqrt{3} = 15 \text{ cm} \right)$$



$$\begin{aligned} &= 510\sqrt{3} + 450\sqrt{3} \\ &= 960\sqrt{3} \text{ cm}^2 \end{aligned}$$

S88. Ans.(a)

Sol.

$$\begin{aligned} \pi (6)^2 \times (5) &= \pi (0.2)^2 \times 1000 \times t \\ t &= \frac{36 \times 5}{40} = \frac{36}{8} = \frac{9}{2} = 4.5 \text{ hrs.} \end{aligned}$$



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**S89. Ans.(c)**

**Sol.**

Let side of cube = 2 cm

$$\text{Volume} = 8 \text{ cm}^3$$

$$\begin{aligned} \text{Volume of cylinder} &= \pi (1)^2 \times 2 \\ &= 2\pi \end{aligned}$$

$$\begin{aligned} \% \text{ required} &= \frac{8-2\pi}{8} \times 100 \\ &= 21.5\% \end{aligned}$$

**S90. Ans.(a)**

**Sol.**

$$h = \sqrt{(73)^2 - (48)^2}$$

$$h = 55 \text{ cm}$$

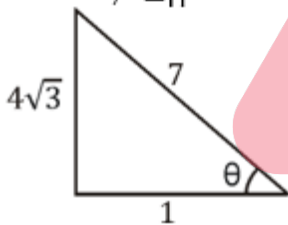
$$a = \frac{\sqrt{2}rh}{\sqrt{2}r+h} = \frac{\sqrt{2} \times 48 \times 55}{48\sqrt{2}+55}$$

$$a = 30.3 \text{ cm}$$

**S91. Ans.(c)**

**Sol.**

$$\cos\theta = \frac{1}{7} = \frac{-B}{-H}$$



$$4\sqrt{3} + \frac{4\sqrt{3}}{7}$$

$$4\sqrt{3} \left( \frac{8}{7} \right) = \frac{32\sqrt{3}}{7}$$

**S92. Ans.(d)**

**Sol.**

$$N = \frac{89-1}{2} + 1 = 44 + 1 = 45$$

$$\text{Sum} = 45/2 = 22 \frac{1}{2}$$

**S93. Ans.(c)**

**Sol.**

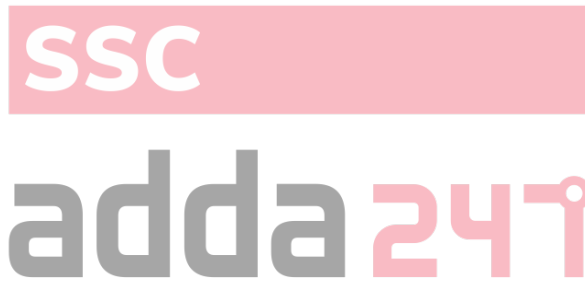
$$\text{Cosec}\theta + \sin\theta = 4$$

$$(\text{cosec}\theta + \sin\theta)^2 = 16$$

$$\text{cosec}^2\theta + \sin^2\theta + 2 = 16$$

$$\text{cosec}^2\theta + \sin^2\theta = 14$$

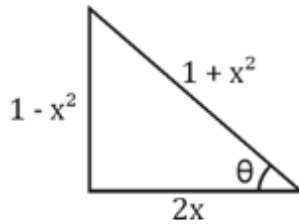
$$\cot^2\theta - \cos^2\theta = 12$$



S94. Ans.(d)

Sol.

$$\sin^2\theta + \cos^2\theta = 1$$



$$\tan \theta = \frac{1-x^2}{2x}$$

S95. Ans.(b)

Sol.

$$\begin{aligned} & \cos\theta \left[ \frac{\tan\theta + \sec\theta - (\sec^2\theta - \tan^2\theta)}{\tan\theta - \sec\theta + 1} \right] \\ & \cos\theta \left[ \frac{\tan\theta + \sec\theta(1 - \sec\theta + \tan\theta)}{\tan\theta - \sec\theta + 1} \right] \\ & \cos\theta (\tan\theta + \sec\theta) \\ & \cos\theta \left( \frac{1 + \sin\theta}{\cos\theta} \right) = 1 + \sin\theta \end{aligned}$$

S96. Ans.(c)

Sol.

$$\begin{aligned} \operatorname{Cosec}^2\theta - \cot^2\theta &= (6x)^2 - \frac{1}{(6x)^2} \\ 1 &= 36x^2 - \frac{1}{36x^2} \\ 36x^2 + \frac{1}{36x^2} &= \sqrt{(1)^2 + 4} = \sqrt{5} \end{aligned}$$



S97. Ans.(a)

Sol.

$$a \sec\theta - b \tan\theta = c \quad \dots(i)$$

$$a \tan\theta - b \sec\theta = x \quad \dots(ii)$$

Square both equation and subtract

$$a^2 - b^2 = c^2 - x^2$$

$$x^2 = c^2 - a^2 + b^2$$

$$x = \sqrt{c^2 - a^2 + b^2}$$

S98. Ans.(a)

Sol.

$$A + B = 90 \quad \sin^2A + \sin^2B = 1$$

$$\cos^2A + \cos^2B = 1$$

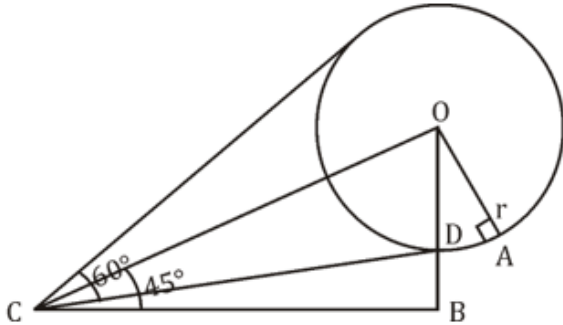
$$\sin^2 7\frac{1}{2} + \sin^2 82\frac{1}{2} + \cos^2 81\frac{1}{2} + \cos^2 8\frac{1}{2} = 1 + 1 = 2$$

S99. Ans.(a)

Sol.  $h = \sqrt{49 \times 121} = 7 \times 11 = 77\text{m}$

S100. Ans.(d)

Sol.



$\angle OCD = 30^\circ$

$\sin 30^\circ = \frac{14}{OC}$

$OC = 28$

$\sin 45^\circ = \frac{OB}{28} \Rightarrow OB = 14\sqrt{2} \text{ cm}$

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