

Quant Mega Quiz for SSC Tier-1 (Solutions)

S1. Ans.(b)

Sol.

Divisible by 72 means divisible by 8 and 9.

last 3 digit must be divisible by 8

$31y \div 8$ we get

$y = 2$

sum of digits must be multiple of 9.

so, $7 + 8 + 9 + x + 5 + 3 + 1 + 2$

$= 8 + x$

so, $x = 1$

now, $5x - 3y = 5 - 6 = -1$

S2. Ans.(c)

Sol.

Expenditure — 5 $\xrightarrow{70\%}$ 3.5
Income — 6 $\xrightarrow{60\%}$ 3.6
Saving — 1 $\xrightarrow{+0.1}$ 0.1

Increase in savings $= \frac{0.1}{1} \times 100\%$

$= 10\%$

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S3. Ans.(a)

Sol.

Speed of A be x

Speed of B be y

ATQ,

$$\frac{15}{x} - \frac{15}{y} = \frac{30}{60}$$

$$\text{or, } y - x = \frac{xy}{30} \quad \dots(i)$$

Also,

$$\frac{15}{y} - \frac{15}{2x} = 1$$

$$\Rightarrow 2x - y = \frac{2xy}{15} \quad \dots(ii)$$

adding (i) & (ii)

$$x = \frac{5xy}{30}$$

$$y = 6 \text{ km/hr}$$

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S4. Ans.(b)

Sol.

$5 \div 5$ of $5 \times 2 + 2 \div 2$ of $2 \times 5 - (5 - 2) \div 6 \times 2$

following BODMAS

$$\frac{2}{5} + \frac{5}{2} - 1 \Rightarrow \frac{19}{10}$$

S5. Ans.(d)

Sol.

$$20\% = \frac{1}{5}$$

i.e. If S.P. = 5 Units

C.P. = 6 Units

$$\text{C.P.} = 800 \times \frac{6}{5} = 960$$

$$\text{Next SP} = 960 \times \frac{5}{4} = 1200$$

S6. Ans.(a)

Sol.

New Ratio

$$1 \times \frac{105}{100} : 2 \times \frac{110}{100} : 3 \times \frac{115}{100}$$
$$\Rightarrow 21 : 44 : 69$$

S7. Ans.(c)

Sol.

$$\pi r^2 = 616$$

$$r = 14$$

$$d = 28\text{m}$$

S8. Ans.(c)

Sol.

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

$$2\text{units} \rightarrow \text{Rs } 400 \text{ crore}$$

$$3 \text{ units} \rightarrow \frac{3}{2} \times 400 = \text{Rs } 600 \text{ crore,}$$

S9. Ans.(d)

$$\text{Sol. HCF } (1.26, 1.98, 1.62) = 0.18\text{m} = 18 \text{ cm}$$

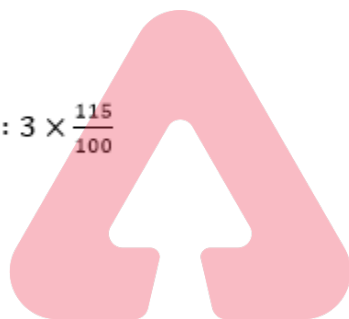
S10. Ans.(b)

Sol.

$$\text{S.I.} = \frac{13500 \times 12.5 \times 2}{100}$$

$$\text{S.I.} = 3375$$

$$\text{Amount} = 13500 + 3375 = 16875$$



S11. Ans.(a)

Sol.

$$\begin{aligned}\text{Total work} &= (7 + 5 + 4) \times 35 \\ &= 560 \text{ units}\end{aligned}$$

$$\text{Work done by A and B in 28 days} = (7 + 5) \times 28 = 336 \text{ units.}$$

$$\text{Remaining work} = 224 \text{ units}$$

$$\text{Time taken by C} = \frac{224}{4} = 56 \text{ days.}$$

S12. Ans.(a)

Sol.

Divisibility by 8

Last 3 digits must be divisible by 8.

$$\text{i.e. } 91y \text{ is divisible by 8 so } y = 2$$

Divisibility by 11, difference of the sum of alternate digits must be 0 or 11

$$\text{So, } x = 4$$

$$\text{Now, } (5x - 8y) = 20 - 16 = 4$$

S13. Ans.(d)

Sol.

$$\begin{aligned}\text{Let } \frac{A}{B} &= \frac{5}{4} & \frac{C}{A+B} &= \frac{7}{20} \\ A + B &= 180 \\ A = 100, B &= 80, C = 63 \\ \text{Required \%} &= \frac{100-63}{100} \times 100\% \\ &= 37\%\end{aligned}$$

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S14. Ans.(b)

Sol.

Let no. be a, b and c

$$\text{i.e. } \frac{a+b}{2} + c = 168$$

$$\text{or } a + b + 2c = 336 \dots (i)$$

similarly,

$$b + c + 2a = 348 \dots (ii)$$

$$\text{also, } c + a + 2b = 360 \dots (iii)$$

Adding

(i), (ii) and (iii)

$$= 4(a + b + c) = 1044$$

$$= a + b + c = 261$$

$$= \text{Average} = \frac{a + b + c}{3} = \frac{261}{3} = 87$$

S15. Ans.(d)

Sol.

$$\frac{a^3 + b^3}{a^2 + b^2 - ab} = (a + b)$$

$$100(675 + 325) = 100000$$

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S16. Ans.(a)

Sol.

LCM of (15, 18, 24) = 360

ATQ

$$\frac{360k+8}{13} = 368$$

Put $k = 1, 2, 3, \dots$

$k = 2$ is divisible by 13

$$\text{Number} = 360 \times 2 + 8 = 728$$

$$\text{Sum of digits} = 7 + 2 + 8 = 17$$

S17. Ans.(a)

Sol.

Sum of No.

$$\Rightarrow (4+5) \times 16$$

$$= 144$$

S18. Ans.(b)

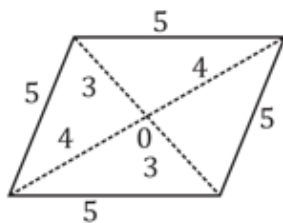
Sol.

Speed	60	80
time	4	3
	15-7=8	1 → 8

$$\text{Right Time} = 24 - 7 \\ = 17 \text{ min.}$$

S19. Ans.(d)

Sol.



$$\begin{aligned} \text{Ar. of Rhombus} &= \frac{1}{2} \times d_1 d_2 \\ &= \frac{1}{2} \times 8 \times 6 = 24 \text{ cm}^2 \end{aligned}$$

S20. Ans.(d)

Sol.

A	B	C
5500	65000	75000
11	13	15

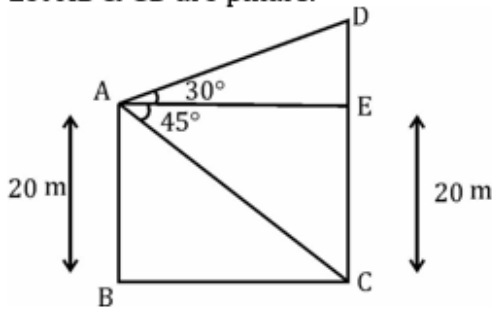
$$\text{Total profit} = 39 \rightarrow 87750$$

$$\begin{aligned} \text{A's share} &= \left(\frac{87750}{39} \times \frac{80}{100} \times 11 \right) + 87750 \times \frac{20}{100} \\ &= 19800 + 17550 = 37350 \end{aligned}$$

S21. Ans.(b)

Sol.

Let AB & CD are pillars.



Let $DE = h$

From $\triangle ADE$

$$\tan 30^\circ = \frac{h}{AE} \Rightarrow AE = h\sqrt{3} \dots\dots\dots(i)$$

From $\triangle ACE$,

$$\tan 45^\circ = \frac{20}{AE} \Rightarrow AE = 20 \dots\dots\dots(ii)$$

from (i) & (ii),

$$h\sqrt{3} = 20$$

$$h = \frac{20}{\sqrt{3}} \text{ metre}$$

$$\text{Required height} = 20 + \frac{20}{\sqrt{3}} = \frac{20}{\sqrt{3}}(\sqrt{3} + 1) \text{ m}$$

S22. Ans.(c)

Sol.

$$A + B + C = \pi$$

$$\Rightarrow \frac{A+B}{2} = \frac{\pi}{2} - \frac{C}{2}$$

$$\Rightarrow \sin\left(\frac{A+B}{2}\right)$$

$$= \sin\left(\frac{\pi}{2} - \frac{C}{2}\right) = \cos \frac{C}{2}$$

Similarly,

$$\cos\left(\frac{A+B}{2}\right) = \sin \frac{C}{2}$$

$$\cot\left(\frac{A+B}{2}\right) = \tan \frac{C}{2}$$

$$\tan\left(\frac{A+B}{2}\right) = \cot \frac{C}{2}$$

S23. Ans.(b)

Sol.

$$m^2 - n^2$$

$$= (\tan\theta + \sin\theta)^2 - (\tan\theta - \sin\theta)^2$$

$$= 4 \tan\theta \sin\theta$$

$$[\because (a+b)^2 - (a-b)^2 = 4ab]$$

$$\text{and } 4\sqrt{mn} = 4\sqrt{(\tan\theta + \sin\theta)(\tan\theta - \sin\theta)}$$

$$= 4\sqrt{\tan^2\theta - \sin^2\theta} = 4\sqrt{\frac{\sin^2\theta}{\cos^2\theta} - \sin^2\theta}$$

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$$\begin{aligned}
&= 4 \sqrt{\frac{\sin^2 \theta - \sin^2 \theta \cos^2 \theta}{\cos^2 \theta}} \\
&= 4 \sqrt{\frac{\sin^2 \theta (1 - \cos^2 \theta)}{\cos^2 \theta}} \\
&= 4 \sqrt{\frac{\sin^4 \theta}{\cos^2 \theta}} = 4 \frac{\sin^2 \theta}{\cos \theta} \\
&= 4 \sin \theta \frac{\sin \theta}{\cos \theta} = 4 \sin \theta \tan \theta \\
\therefore m^2 - n^2 &= 4\sqrt{mn}
\end{aligned}$$

S24. Ans.(a)

Sol.

$$\sec x + \cos x = 3$$

On squaring both sides

$$\sec^2 x + \cos^2 x + 2 \sec x \cos x = 9$$

$$\Rightarrow \sec^2 x + \cos^2 x = 9 - 2 = 7$$

$$[\because \sec x \cdot \cos x = 1]$$

$$\text{Now, } \tan^2 x - \sin^2 x = \sec^2 x - 1 - (1 - \cos^2 x)$$

$$[\because \sec^2 x - \tan^2 x = 1]$$

$$= \sec^2 x + \cos^2 x - 2 = 7 - 2 = 5$$

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S25. Ans.(c)

Sol.

$$(a^2 - b^2) \sin \theta + 2ab \cos \theta = a^2 + b^2$$

Dividing by $\cos \theta$,

$$(a^2 - b^2) \tan \theta + 2ab = (a^2 + b^2) \sec \theta$$

On Squaring,

$$(a^2 - b^2)^2 \tan^2 \theta + 4a^2 b^2 + 4ab(a^2 - b^2) \tan \theta = (a^2 + b^2)^2 \sec^2 \theta$$

$$\Rightarrow (a^2 - b^2) \tan^2 \theta + 4a^2 b^2 + 4ab(a^2 - b^2) \tan \theta = (a^2 + b^2)(1 + \tan^2 \theta)$$

$$\Rightarrow (a^2 + b^2)^2 \tan^2 \theta - (a^2 - b^2)^2 \tan^2 \theta + [(a^2 + b^2)^2 - 4a^2 b^2] - 4ab(a^2 - b^2) \tan \theta = 0$$

$$\Rightarrow 4a^2 b^2 \tan^2 \theta + (a^2 - b^2)^2 - 4ab(a^2 - b^2) \tan \theta = 0$$

$$\Rightarrow ((a^2 - b^2) - 2ab \tan \theta)^2 = 0$$

$$\Rightarrow (a^2 - b^2) - 2ab \tan \theta = 0$$

$$\Rightarrow 2ab \tan \theta = a^2 - b^2$$

$$\Rightarrow \tan \theta = \frac{a^2 - b^2}{2ab}$$

S26. Ans.(a)

Sol.

We have, SP = Rs. 1144

$$CP = \frac{1144}{88} \times 100 = \text{Rs. } 1300$$

S27. Ans.(d)

Sol.

$$\text{LET CP} = 100$$

$$\text{MP} = 300$$

$$\text{SP} = 300 \times \frac{75}{100} = 225$$

$$\text{If } 225 \rightarrow 540$$

$$100 \rightarrow \frac{540}{225} \times 100 = \text{Rs. } 240$$

S28. Ans.(c)

Sol.

I	II
750	1250
$\downarrow \times 5$	$\downarrow \times 3$
15	: 15
1	: 1

$$d\% = \frac{1 \times \frac{8}{100} + 1 \times \frac{20}{100}}{2} \times 100$$

$$D\% = \frac{28}{200} \times 100$$

$$D\% = 14\%$$

S29. Ans.(d)

Sol.

$$\text{Let CP} = 100$$

$$\text{MP} = 150$$

$$\text{SP} = 150 \times \frac{75}{100} = 112.5$$

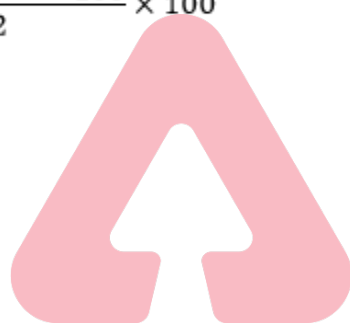
$$\text{Profit percentage} = 12.5\%$$

S30. Ans.(a)

Sol.

$$\text{SP after 15\% discount} = 800 \times \frac{85}{100} = 680$$

$$\text{Required discount} = \frac{102}{680} \times 100 = \frac{600}{40} = 15\%$$



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