

Quant Mega Quiz for SSC Tier - 1 (Solutions)

S1. Ans.(c)

Sol.

$$\text{Total surface area} = 6a^2$$

$$6a^2 = 600$$

$$a = 10$$

$$\text{diagonal} = \sqrt{3}a$$

$$= 10\sqrt{3}$$

S2. Ans.(c)

Sol.

$$\frac{\text{Volume of sphere}}{\text{Surface area}} = 27\text{cm}$$

$$\frac{\frac{4}{3}\pi r^3}{4\pi r^2} = 27\text{cm}$$

$$r = 81\text{cm}$$

S3. Ans.(c)

Sol.

$$a^3 = 27 + 64 + 125$$

$$a^3 = 216$$

$$a = 6$$

$$\text{Surface area of Larger cube} = 6a^2$$

$$= 6 \times 36 = 216$$

$$\text{Surface area of all the Smaller cubes}$$

$$= 6 \times 9 + 6 \times 6 + 6 \times 25$$

$$= 54 + 96 + 150 = 300$$

$$\text{Ratio} = 300 : 216 = 25 : 18$$

S4. Ans.(a)

Sol.

$$\text{Volume of Cylinder}$$

$$= \pi r^2 h$$

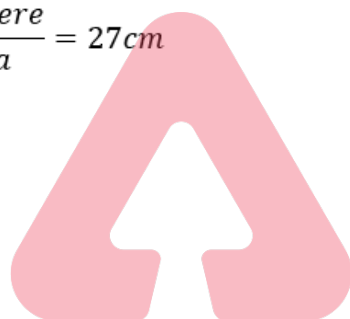
$$= 54\pi$$

$$\frac{12 \times 4 \times \pi r^3}{3} = 54\pi$$

$$r^3 = \frac{27}{8}$$

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

$$\text{Diameter} = \frac{3}{2} \times 2 = 3\text{cm}$$



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S5. Ans.(a)

Sol.

$$6a^2 = 150$$

$$a^2 = 36$$

$$a = 6$$

$$\begin{aligned}\text{Diagonal} &= \sqrt{3}a \\ &= 6\sqrt{3}\end{aligned}$$

S6. Ans.(c)

Sol.

$$a^3 = 1$$

$$a = 1$$

$$\text{Surface Area} = 6a^2$$

$$= 6 \times 1$$

$$= 6 \text{ cm}^2$$

S7. Ans.(b)

Sol.

$$6a^2 = 384$$

$$a^2 = 64$$

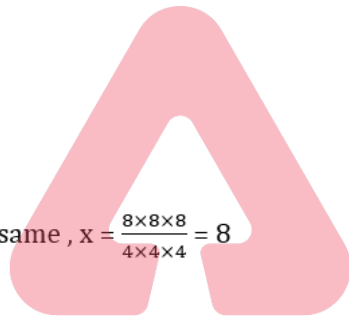
$$a = 8 \text{ cm}$$

$$6a^2 = 96$$

$$b^2 = 16$$

$$b = 4 \text{ cm}$$

$$\text{Volume Remains same, } x = \frac{8 \times 8 \times 8}{4 \times 4 \times 4} = 8$$



S8. Ans.(b)

Sol.

$$\text{Height} = 1 : 2$$

$$h_1 = x, h_2 = 2x$$

$$\pi r_1^2 h_1 = \pi r_2^2 h_2$$

$$\frac{r_1^2}{r_2^2} = \frac{h_2}{h_1}$$

$$\frac{r_1^2}{r_2^2} = \frac{2}{1}$$

$$r_1 : r_2 = \sqrt{2} : 1$$

S9. Ans.(c)

Sol.

$$\text{Total Surface area}$$

$$= 2\pi r(r + h)$$

$$880 = 2 \times 22/7 \times r \times 20$$

$$r = 7 \text{ cm}$$

$$h = 13 \text{ cm}$$

$$\text{volume} = \pi r^2 h$$

$$= \frac{22}{7} \times 7 \times 7 \times 13$$

$$= 2002 \text{ cm}^3$$

S10. Ans.(c)

Sol.

$$\begin{aligned}\pi h (r_1^2 - r_2^2) &= \pi r^2 \times 12 \\ 4(18.49 - 1.21) &= r^2 \times 12 \\ 17.28 &= r^2 \times 12 \\ r^2 &= 5.76 \\ r &= 2.4\end{aligned}$$

S11. Ans.(a)

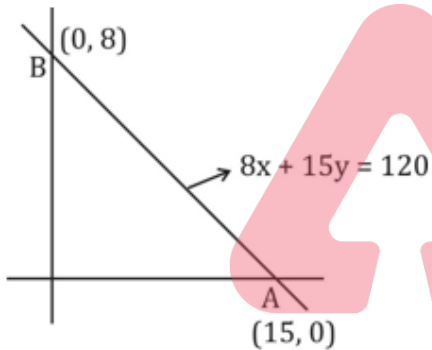
Sol.

Coordinates of P

$$\left[\frac{3 \times 3 + 2 \times \frac{11}{2}}{3 + 2}, \frac{3(-2) + 2 \times \frac{21}{2}}{3 + 2} \right]$$
$$\Rightarrow (4, 3)$$

S12. Ans.(d)

Sol.



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Point of Intersection at (x, 0)

$$8x = 120$$

$$x = 15$$

Point of Intersection at (0, y)

$$15y = 120$$

$$y = 8$$

$$AB = \sqrt{(15 - 0)^2 + (8 - 0)^2}$$

$$= \sqrt{225 + 64}$$

$$= \sqrt{289}$$

$$= 17 \text{ units}$$

S13. Ans.(d)

Sol.

$$3x + 4y - 5 = 0$$

$$4y = -3x + 5$$

$$y = \frac{-3}{4}x + \frac{5}{4}$$

$$m_1 = \frac{-3}{4}$$

Let the required equation be

$$y = m_2x + c$$

$$m_1 \times m_2 = -1$$

$$\frac{-3}{4} \times m_2 = -1$$

$$m_2 = \frac{4}{3}$$

$$y = \frac{4}{3}x + c$$

This line passes through (1, 1)

$$1 = \frac{4}{3} + c$$

$$c = \frac{-1}{3}$$

$$y = \frac{4}{3}x - \frac{1}{3}$$

$$3y = 4x - 1$$

$$4x - 3y - 1 = 0$$

S14. Ans.(b)

Sol.

$$2x - 5y + 3 = 0$$

$$-5y = -2x - 3$$

$$5y = 2x + 3$$

$$y = \frac{2}{5}x + \frac{3}{5}$$

$$m_1 = \frac{2}{5}$$

Let the equation of line be

$$y = m_2x + c$$

$$m_1 = m_2 \text{ (when two lines are ||)}$$

$$m_2 = \frac{2}{5}$$

$$y = \frac{2}{5}x + c$$

This line passes through (5, 3)

$$3 = 2 + c$$

$$c = 1$$

Equation of line

$$y = \frac{2}{5}x + 1$$

$$2x - 5y + 5 = 0$$

S15. Ans.(d)

Sol.

$$x + 2y = 3 \dots\dots i$$

$$5x + y = -12 \dots\dots ii$$

From i & ii

$$x = -3, y = 3$$



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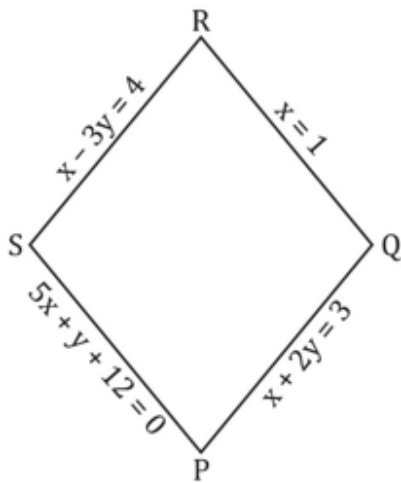
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Coordinates of P(-3, 3)

Similarly, Q(1, 1), R(1, -1) & S(-2, 2)

$$m_1, \text{ Slope of PR} = \frac{-1-3}{1+3} = -1$$

$$m_2, \text{ Slope of SQ} = \frac{-2-1}{-2-1} = 1$$

$m_1 \times m_2 = -1$ { When Two line are perpendicular }

$$\theta = 90^\circ$$

S16. Ans.(a)

Sol.

$$A = P \left(1 + \frac{r_1}{100}\right) \left(1 + \frac{r_2}{100}\right) \left(1 + \frac{r_3}{100}\right)$$

$$= 2500 \times \frac{103}{100} \times \frac{26}{25} \times \frac{21}{20}$$

$$= 2811.90$$

$$\text{C.I.} = 2811.90 - 2500$$

$$= 311.90 \text{ Rs.}$$

S17. Ans.(a)

Sol.

Compounded half yearly

$$\text{Rate} = \frac{r}{2}\%, \text{ Time} = 2 \times 2 = 4$$

$$16P = P \left(1 + \frac{r}{2 \times 100}\right)^4$$

$$2^4 = \left(1 + \frac{r}{200}\right)^4$$

$$r = 200\%$$

$$27P = P \left(1 + \frac{200}{100}\right)^t$$

$$27 = (3)^t$$

$$(3)^3 = (3)^t$$

$$\text{Time} = 3 \text{ years}$$

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S18. Ans.(d)

Sol.

$$\begin{aligned} \text{C.I.} &= \text{S.I.} = P \left(\frac{R}{100} \right)^2 \\ 147 &= 30000 \left(\frac{R}{100} \right)^2 \\ \frac{49}{10000} &= \left(\frac{R}{100} \right)^2 \\ \frac{7}{100} &= \frac{R}{100} \\ R &= 7\% \end{aligned}$$

S19. Ans.(b)

Sol.

Interest $\rightarrow$ For 1st year $\rightarrow$ S.I.

For 2nd year $\rightarrow$ S.I. + A

For 3rd year $\rightarrow$ S.I. + A + A + B

Difference of C.I. & S.I. for 2 years $\Rightarrow$ A

Difference of C.I. & S.I. for 3 years $\Rightarrow$ 3A + B

$$A : 3A + B = 4 : 13$$

$$A = 4$$

$$B = 1$$

$$\begin{aligned} \text{Rate \%} &= \frac{B}{A} \times 100 \\ &= \frac{1}{4} \times 100 = 25\% \end{aligned}$$

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S20. Ans.(c)

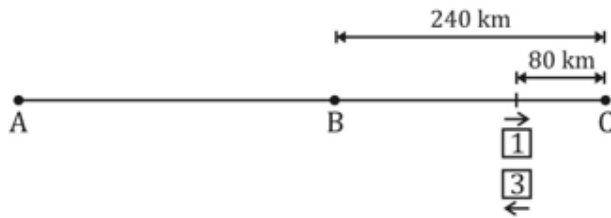
Sol.

ATQ,

$$\begin{aligned} a \left(1 + \frac{4}{100} \right)^7 &= b \left(1 + \frac{4}{100} \right)^9 \\ a : b &= \left(1 + \frac{4}{100} \right)^2 : 1 \\ &= (26)^2 : (25)^2 \\ &= 676 : 625 \\ a + b &= 39030 \\ a &= 39030 \times \frac{676}{1301} \\ &= 30 \times 676 \\ &= 20280 \end{aligned}$$

S21. Ans.(a)

Sol.



Let speeds of car be V_1, V_2 & V_3

$$\frac{AB}{V_1} - \frac{AB}{V_2} = \frac{AB}{V_2} - \frac{AB}{V_3} \quad \dots (i)$$

$$\frac{240}{V_1} - \frac{240}{V_2} = 1 \quad \dots (ii)$$

In BC car 1 travels 160 km before meeting Car 3 & Car 3 travels 320 km before meeting car 1

$$\therefore V_3 = 2V_1 \left[\frac{320}{V_3} = \frac{160}{V_1} \right]$$

From equation (i)

$$\frac{1}{V_1} - \frac{1}{V_2} = \frac{1}{V_2} - \frac{1}{2V_1}$$

$$\frac{1}{V_1} + \frac{1}{2V_1} = \frac{1}{V_2} + \frac{1}{V_2}$$

$$\frac{3}{2V_1} = \frac{2}{V_2}, V_2 = \frac{4}{3}V_1$$

From (ii)

$$\frac{240}{V_1} - \frac{240}{\frac{4}{3}V_1} = 1, \frac{240}{V_1} - \frac{180}{V_1} = 1$$

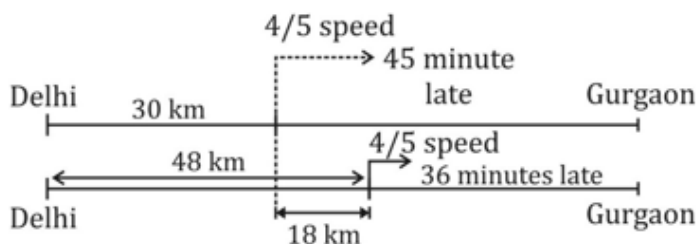
$$V_1 = 60$$

$$V_3 = 2 \times V_1 = 2 \times 60 = 120$$

$$\text{Difference} = 120 - 60 = 60$$

S22. Ans.(b)

Sol.



18 km travelled with $\frac{4}{5}$ speed - 18 km travelled with usual speed = 45 - 36

$$\frac{18}{\frac{4}{5}s} - \frac{18}{s} = \frac{9}{60}$$

$$18 \left(\frac{5-4}{4s} \right) = \frac{9}{60}$$

$$\frac{18 \times 1}{4s} = \frac{9}{60}$$

$$\begin{aligned}
 s &= 30 \text{ km/hr} \\
 d &= 30 \times T \\
 T &= d/30 \\
 \frac{30}{30} + \frac{(d-30)}{30 \times \frac{4}{5}} &= T + \frac{45}{60} \\
 1 + \frac{(d-30)}{24} &= \frac{d}{30} + \frac{3}{4} \\
 d &= 120 \text{ km}
 \end{aligned}$$

S23. Ans.(d)

Sol.

Let the distance be x miles.

When Tom meets Jerry

distance travelled by Tom = x + 9

distance travelled by Jerry = x - 9

$$\frac{x+9}{T} = \frac{x-9}{J}, \quad \frac{T}{J} = \frac{x+9}{x-9}$$

When Jerry meets Bill.

Distance travelled by Jerry = x + 7

Distance travelled by Bill = x - 7

$$\frac{x+7}{J} = \frac{x-7}{B}, \quad \frac{J}{B} = \frac{x+7}{x-7}$$

$$3T = 5B \text{ [Given]}$$

$$\frac{T}{B} = \frac{5}{3}$$

$$\frac{T}{J} \times \frac{J}{B} = \frac{5}{3}$$

$$\frac{(x+9)}{(x-9)} \times \frac{(x+7)}{(x-7)} = \frac{5}{3}$$

$$5(x-9)(x-7) = 3(x+9)(x+7)$$

$$5x^2 - 80x + 315 = 3x^2 + 48x + 189$$

$$2x^2 - 128x + 126 = 0$$

$$x^2 - 64x + 63 = 0$$

$$x = 63 \text{ or } 1$$

$$x = 63$$

S24. Ans.(c)

Sol.

Ratio of distance covered by second train to first train = 125 : 1 = 5 : 4

Time is same

So, ratio of speeds = 5 : 4

Speed of second train = $40 \times \frac{5}{4} = 50 \text{ km/hr}$

Distance covered by 1st train in half an hour = 20 km

Let 3rd train takes 't' hours to overtake 1st train & speed of 3rd train → x km/hr

$$t = \frac{20}{x-40} \quad \dots (ii)$$

Distance covered by 2nd train in half an hour = 25 km

$$t + \frac{3}{2} = \frac{25}{x-50} \quad \dots (i)$$

From (i) & (ii)

x = 60 km/hr




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S25. Ans.(b)

Sol.

Total distance travelled by both the trains before meeting = D

This distance will be covered in proportion of their speeds.

3 hours after meeting distance travelled by

$$A = 3 \times S_A$$

$$B = 3 \times S_B$$

$$3S_A + 3S_B = 675$$

$$S_A + S_B = 225$$

$$\text{Remaining distance to be covered by 1st train} = \frac{DS_B}{S_A + S_B}$$

$$\text{Time taken} \Rightarrow \frac{DS_B}{(S_A + S_B)S_A} = 16 \quad \dots (i)$$

$$\text{Remaining Distance covered by second train} = \frac{DS_A}{(S_A + S_B)}$$

$$\text{Time taken} \Rightarrow \frac{DS_A}{(S_A + S_B)S_A} = 25 \quad \dots (ii)$$

Dividing (i) by (ii)

$$\frac{S_A^2}{S_B^2} = \frac{25}{16}$$

$$S_A = \frac{5}{4}S_B, S_A + \frac{4}{5}S_A = 225$$

$$S_A = 125$$

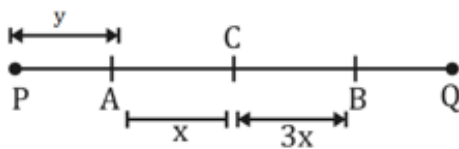
$$S_B = 100$$

From (i)

$$\text{Time} = \frac{D}{S_A} = 16 \times \frac{225}{100} = 36 \text{ h}$$

S26. Ans.(b)

Sol.



Speed of Bus $\rightarrow b$

Speed of Man $\rightarrow m$

When the bus goes from P to A, the man goes from C to A

Time taken by both are equal

$$\therefore \frac{y}{b} = \frac{x}{m}$$

$$\frac{b}{m} = \frac{y}{x} \quad \dots (1)$$

When Bus goes from P to B, the man goes from C to B,

Again time taken by both are equal.

$$\frac{y + x + 3x}{b} = \frac{3x}{m}$$

$$\frac{b}{m} = \frac{y + x + 3x}{3x} \quad \dots (2)$$

From (1) & (2)

$$\frac{y}{x} = \frac{4x + y}{3x}$$

$$3y = 4x + y$$

$$2y = 4x$$

$$y = 2x$$

From (1)

$$\frac{b}{m} = \frac{2x}{x}$$

$$b = 2m$$

S27. Ans.(a)

Sol.

Speed of car A = a

Speed of car B = b

Let they meet after t minutes.

Distance travelled by car A before meeting car B = a × t

Distance travelled by car B before meeting car A = b × t

Distance travelled by car A after meeting car B = 54 a

Distance travelled by car B after meeting car A = 24 b

Distance travelled by car A after crossing car B
= Distance travelled by car B before crossing car A (vice versa)

$$at = 54 b \quad \dots(1)$$

$$bt = 24 a \quad \dots(2)$$

Multiplying (1) & (2)

$$abt^2 = 54 \times 24 \times ab$$

$$t^2 = 54 \times 24$$

$$t = 36 \text{ minutes}$$

Both cars travelled 36 minutes before meeting

Time taken By B = 24 + 36 = 60 minutes.

S28. Ans.(a)

Sol.

Train Car

$$240 \quad 210 = 8 \text{ h } 40 \text{ min.}$$

$$180 \quad 270 = 9 \text{ h}$$

To travel extra 60 km by car increase in time = 20 min

So, travel extra 240 km by car increase in time = 80 min

$$\therefore 450 \text{ km by car in } = 8 \text{ h } 40 \text{ min } + 80 \text{ min } = 10 \text{ h}$$

$$\text{Speed of car} = 450/10 = 45 \text{ km/h}$$

S29. Ans.(d)

Sol.

Let length → x meters

speed of B → y kmph

$$27 = \frac{x + 500}{(63 + y)}$$

$$\frac{27}{3600} = \frac{x + 0.5}{63 + y} \quad \dots(1)$$

$$\frac{162}{3600} = \frac{x + 0.5}{(36 - y)} \quad \dots(2)$$

Form (1) & (2)

$$\frac{27}{3600} \times (63 + y) = \frac{162}{3600} \times (63 - y)$$

$$63 + y = 6 (63 - y)$$

$$63 + y = 378 - 6y$$

$$7y = 315$$

$$y = 45 \text{ km}$$

$$\frac{27}{3600} = \frac{x + 0.5}{108}$$

$$0.81 = x + 0.5$$

$$x = 0.31 \text{ km} = 310 \text{ m}$$

S30. Ans.(b)

Sol.

$$\frac{D}{x - 15} - \frac{D}{x} = 45 \quad \dots(1)$$

$$\frac{D}{x} - \frac{D}{x + 10} = 20 \quad \dots(2)$$

Form (1) & (2)

We will get D = 9750 km.



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