

Solution

S1. Ans. (d)

Sol.

$$= \frac{(1^2+2^2+\dots+10^2)-(1^2+2^2+\dots+5^2)}{(2+\sqrt{3})-(\sqrt{3}+1)} = \frac{385-55}{1} = 330$$

S2. Ans. (a)

Sol.

$$= \frac{100 + 200}{150 + 225} \times 100$$

$$= 80\%$$

S3. Ans. (d)

Sol.

$$= \frac{150}{275} \times 100$$

$$= 54.5\%$$

S4. Ans. (a)

Sol.

$$= \frac{150 - 125}{150} \times 100$$

$$= 16.7\%$$

S5. Ans. (b)

Sol.

$$= \frac{100 + 125 + 200 + 225 + 275 + 275}{175 + 150 + 125 + 175 + 175 + 225}$$

$$= \frac{1200}{1025} = \frac{48}{41}$$

S6. Ans. (c)

Sol.

$$\text{Average production} = \frac{1200}{6} = 200$$

In 2012, 2013 and 2014 the production is more than 200.



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**10 TEST BOOKLETS (PRINTED TEST)**  
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S7. Ans. (b)

Sol.

$$\begin{aligned}3(a^2 + b^2 + c^2) &= (a^2 + b^2 + c^2) + 2(ab + bc + ca) \\ \Rightarrow 2a^2 + 2b^2 + 2c^2 - 2ab - 2bc - 2ac &= 0 \\ \Rightarrow (a - b)^2 + (b - c)^2 + (c - a)^2 &= 0 \\ \Rightarrow a = b = c\end{aligned}$$

S8. Ans. (b)

Sol.

$$\begin{aligned}\text{Average speed} &= \frac{7+7+7+7}{\frac{7}{10} + \frac{7}{20} + \frac{7}{30} + \frac{7}{60}} \\ &= 20 \text{ km/hr.}\end{aligned}$$

S9. Ans. (d)

Sol.

$$\begin{aligned}\pi(8)^2(2) &= \frac{1}{3}\pi(r)^2 \cdot (6) \\ \Rightarrow r &= 8 \text{ cm}\end{aligned}$$

S10. Ans. (c)

Sol.

Let the cost price be Rs  $100x$

$$\begin{aligned}\Rightarrow 100x \left( \frac{100 + 40}{100} \right) \left( \frac{100 - 20}{100} \right) - 100x &= 48 \\ \Rightarrow 100x &= 400\end{aligned}$$

S11. Ans. (a)

Sol.

$$\text{Average} = \frac{na + 2 + 4 + 8 + \dots + 2^n}{n} = \frac{na + 2 \left( \frac{2^n - 1}{2 - 1} \right)}{n} = a + 2 \cdot \frac{2^n - 1}{n}$$

S12. Ans. (a)

Sol.

$$\begin{aligned}x^2 &= a^2 \sin^2 \theta + b^2 \cos^2 \theta - 2ab \sin \theta \cos \theta \\ y^2 &= a^2 \cos^2 \theta + b^2 \sin^2 \theta + 2ab \sin \theta \cos \theta \\ \Rightarrow x^2 + y^2 &= a^2 (\sin^2 \theta + \cos^2 \theta) + b^2 (\cos^2 \theta + \sin^2 \theta) \\ &= a^2 + b^2\end{aligned}$$

S13. Ans. (a)

Sol.

$$x + y = \frac{\sqrt{13} - \sqrt{11}}{\sqrt{13} + \sqrt{11}} + \frac{\sqrt{13} + \sqrt{11}}{\sqrt{13} - \sqrt{11}} = \frac{2(13 + 11)}{13 - 11} = 24$$
$$3x^2 - 5xy + 3y^2 = 3(x + y)^2 - 11xy$$
$$= 3(24)^2 - 11(1) = 1717.$$

S14. Ans. (b)

Sol.

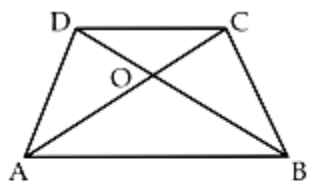
$\frac{2}{3}$  rd of the tank is emptied using 64 buckets.

$\Rightarrow$  Volume of the tank =  $64 \times \frac{3}{2}$  i.e., 96 buckets of water

$$\therefore \text{Volume of each bucket} = \frac{1.2 \times 1.2 \times 1.2 \times 1000 \text{ litres}}{96}$$
$$= 18 \text{ litres}$$

S15. Ans. (b)

Sol.



$$\left. \begin{array}{l} \angle OAB = \angle OCD \\ \angle OBA = \angle ODC \\ \angle DCA = \angle CDB \end{array} \right\} \begin{array}{l} \Delta AOB \text{ is similar to} \\ \Delta COD \end{array}$$

$$\frac{AB}{CD} = \frac{2}{1} \Rightarrow \frac{\text{Area of } \Delta AOB}{\text{Area of } \Delta COD} = \left(\frac{2}{1}\right)^2$$
$$\Rightarrow \text{Area of } \Delta COD = 84 \times \frac{1}{4} = 21 \text{ cm}^2.$$

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S16. Ans. (b)

Sol.

$$(20) + (-20) + \frac{(20)(-20)}{100} = -4$$

4% decrease.

S17. Ans. (c)

Sol.

$$N = 361x + 47 = 19(19x + 2) + 9$$

$$\text{Remainder} \left( \frac{N}{19} \right) = 9$$

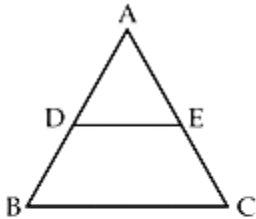
S18. Ans. (c)

Sol.

$$\frac{(p^{-4}q^4)^{\frac{1}{3}}}{(p^8q^{-6})^{\frac{1}{3}}} = p^a \cdot q^b = p^{-4}q^{\frac{10}{3}}$$
$$a + b = -4 + \frac{10}{3} = -\frac{2}{3}$$

S19. Ans. (d)

Sol.



$\Delta ADE$  is similar to  $\Delta ABC$  and  $\frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC} = \frac{1}{2}$

$$\Rightarrow \frac{AD}{AB} = \frac{1}{\sqrt{2}}$$

$$\therefore \frac{DB}{AB} = 1 - \frac{AD}{AB} = 1 - \frac{1}{\sqrt{2}} = \frac{\sqrt{2}-1}{\sqrt{2}}$$

S20. Ans. (a)

Sol.

$$8x - 5y = 12000 \rightarrow (1)$$

$$5x - 3y = 10000 \rightarrow (2)$$

From (1) and (2) :  $x = 14000$

$\therefore$  Difference in their incomes =  $8x - 5x$

$$3x = \text{Rs } 42,000$$

S21. Ans. (b)

Sol.

$$PA \cdot PB = PC \cdot PD$$

$$\Rightarrow PD = \frac{8 \times 6}{4} = 12 \text{ cm}$$

S22. Ans. (b)

Sol.

$$\frac{B}{G} = \frac{1554 \times \frac{4}{7} - x}{1554 \times \frac{3}{7} + 30} = \frac{7}{6}$$
$$\Rightarrow x = 76$$

  
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**350+ TOTAL TEST**

- 80+ TIER-I MOCKS
- 50+ TIER-II MOCKS
- 200+ SECTIONAL TEST

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S23. Ans. (a)

Sol.

$$4\sin^2 \theta + 3\sin^2 \theta + 3\cos^2 \theta = 4$$

$$\Rightarrow 4\sin^2 \theta = 1 \Rightarrow \sin \theta = \frac{1}{2} \Rightarrow \theta = 30^\circ \text{ (Acute)}$$

$$\therefore \tan \theta = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

S24. Ans. (a)

Sol.

$$6(3x - 2y) = 5(2x + 3y) \Rightarrow \frac{y}{x} = \frac{8}{27}$$

$$\left[ \frac{\sqrt[3]{x} \left( 1 + \sqrt[3]{\frac{y}{x}} \right)}{\sqrt[3]{x} \left( 1 - \sqrt[3]{\frac{y}{x}} \right)} \right]^2 = \left( \frac{1 + \frac{2}{3}}{1 - \frac{2}{3}} \right)^2$$
$$= \left( \frac{5}{1} \right)^2 = 25.$$

S25. Ans. (b)

Sol.

$$\tan A = n \tan B \Rightarrow \cot B = n \cot A \quad \rightarrow (i)$$

$$\sin A = m \sin B \Rightarrow \operatorname{Cosec} B = m \operatorname{cosec} A \quad \rightarrow (ii)$$

$$(2)^2 - (1)^2 : \operatorname{Cosec}^2 B - \cot^2 B = m^2 \operatorname{cosec}^2 A - n^2 \cot^2 A$$

$$\Rightarrow \frac{m^2 - n^2 \cos^2 A}{\sin^2 A} = 1 \Rightarrow m^2 - n^2 \cos^2 A = 1 - \cos^2 A$$

$$\therefore \cos^2 A = \frac{m^2 - 1}{n^2 - 1}.$$

S26. Ans. (a)

Sol.

Total	100	
	Males	Females
	60	40
Married	→ 30	28
Unmarried	→ 30	12 = 42

S27. Ans. (b)

Sol.

$$\frac{4(85)+5(87)}{9} = 86.1$$

S28. Ans. (b)

Sol.

$$\text{Cost price} = 100x$$

$$\Rightarrow \text{Marked price} = 125x$$

$$\text{and selling price} = 112.5x$$

$$\therefore \text{Discount (\%)} = \frac{12.5x}{125x} \times 100 = 10\%$$

S29. Ans. (d)

Sol.

$$\sin A = 1 - \sin^2 A = \cos^2 A$$

$$\cos^2 A + \cos^4 A = \sin A + \sin^2 A = 1$$

S30. Ans. (d)

Sol.

$$\text{Cost price} = 100 \Rightarrow \text{Selling price} = 133$$

$$\text{New cost price} = 112 \text{ and new selling price} = 133 + 13.3 = 146.3$$

$$\therefore \text{Profit (\%)} = \frac{34.3}{112} \times 100 = 30\frac{5}{8}\%$$

S31. Ans. (d)

Sol.

$$U + V = \frac{1}{\left(\frac{7.5}{60}\right)} = 8 \text{ km/hr}$$

$$U - V = 5 \text{ km/hr}$$

$$\therefore U = \frac{8+5}{2} = 6\frac{1}{2} \text{ km/hr}$$

S32. Ans. (a)

Sol.

$$(3^5)^{10} \cdot (4^4)^{10} \cdot (5^3)^{10} \cdot (6^2)^{10}$$

$$(243)^{10} \cdot (256)^{10} \cdot (125)^{10} \cdot (36)^{10}$$

$$\text{Greatest} = 4^{40}$$

S33. Ans. (c)

Sol.

$$\frac{\frac{1}{2} \times b_1 \times 4x}{\frac{1}{2} \times b_2 \times 5x} = \frac{3}{2}$$
$$\Rightarrow \frac{b_1}{b_2} = \frac{15}{8}$$

S34. Ans. (a)

Sol.

$$\sec \theta - \tan \theta = \frac{1}{\sqrt{3}}$$
$$\Rightarrow \sec \theta + \tan \theta = \sqrt{3}$$
$$\sec \theta \cdot \tan \theta = \frac{(\sec \theta + \tan \theta)^2 - (\sec \theta - \tan \theta)^2}{4}$$
$$= \frac{3 - \frac{1}{3}}{4} = \frac{2}{3}$$

S35. Ans. (d)

Sol.

$$\text{Cost price} = 100x$$

$$\Rightarrow 95x \times \frac{110}{100} = 105x - 2$$

$$\Rightarrow x = 4$$

$$\text{Cost price} = \text{Rs } 400$$

S36. Ans. (b)

Sol.

$$\frac{a^3 - b^3}{a^2 + ab + b^2} = (a - b) = (0.67 - 0.33) = 0.34$$

S37. Ans. (a)

Sol.

$$a^3 + b^3 - ab - (a^2 - b^2)^2$$
$$= (a + b)(a^2 - ab + b^2) - ab - (a + b)^2(a - b)^2$$
$$= (a^2 - 2ab + b^2) - (a - b)^2 = (a - b)^2 - (a - b)^2 = 0$$
$$[\because a + b = 1]$$

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TIER-II & TIER-III

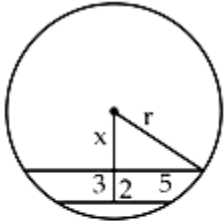
All Rounder

**100+ TOTAL TEST**

- 60 Full Length Mocks
- 50 Topicwise (Advance Maths)
- 20 eBooks (Topic Wise)
- English Descriptive eBook

S38. Ans. (a)

Sol.



$$r^2 = 5^2 + x^2 = (3 + x)^2 + 2^2$$

$$\Rightarrow x = 2$$

$$\Rightarrow r = \sqrt{5^2 + 2^2} = \sqrt{29}$$

$$\therefore \text{Diameter} = 2r = 2\sqrt{29}$$

S39. Ans. (c)

Sol.

$$\text{LCM}(5, 6, 7, 8) = 840$$

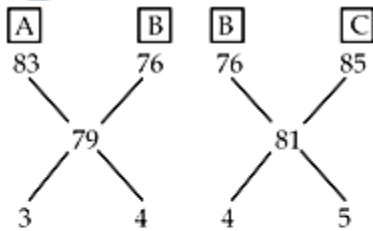
$x = 840k + 3$ , is divisible by 9 when  $k = 2$

$$\therefore x = 1683$$

$$\Rightarrow \text{sum of the digits} = 1 + 6 + 8 + 3 = 18$$

S40. Ans. (b)

Sol.



$$A : b = 3 : 4 ; B : C = 4 : 5$$

$$\Rightarrow A : B : C = 3 : 4 : 5$$

$$\text{Average} = \frac{3(83) + 4(76) + 5(85)}{3 + 4 + 5} = 81.5$$

S41. Ans. (d)

Sol.

Let the two blends be 2kg and 3 kg

$$\text{Total cost price} = 2(35) + 3(40) = \text{Rs } 190$$

$$\text{Selling price} = 1(46) + 4(55) = \text{Rs } 266.$$

$$\therefore \text{Profit (\%)} = \frac{266 - 190}{190} \times 100 = 40 \%$$



S42. Ans. (a)

Sol.

$$\begin{aligned}x^2 + y^2 + z^2 - xy - yz - zx &= 0 \\ \Rightarrow \frac{1}{2} [(x - y)^2 + (y - z)^2 + (z - x)^2] &= 0 \\ \Rightarrow x = y = z \\ &= \frac{3x^4 + 7y^4 + 5z^4}{5x^2y^2 + 7y^2z^2 + 3z^2x^2} = \frac{3+7+5}{5+7+3} = 1\end{aligned}$$

S43. Ans. (d)

Sol.

Since the selling price is same for each article there is a loss of  $\frac{(10)^2}{100}\% = 1\%$   
 $\therefore 1\%$  loss

S44. Ans. (a)

Sol.

$$\begin{aligned}(A + C) &= 2(A + B + C) - (A + B) - (B + C) \\ &= 2\left(\frac{1}{6}\right) - \frac{1}{8} - \frac{1}{12} = \frac{1}{8} \\ \therefore A \text{ and } C &\text{ can finish the work in 8 days}\end{aligned}$$

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S45. Ans. (d)

Sol.

$$\begin{aligned}\boxed{A} + \boxed{B} &= 1 \\ \Rightarrow \frac{2}{6} + \frac{2+x}{8} &= 1 \\ \Rightarrow x &= 3\frac{1}{3} \text{ hours}\end{aligned}$$

S46. Ans. (d)

Sol.

$$\begin{aligned}\text{Number of } xy &\Rightarrow y = 2x \\ x + 2x - 2 &= \frac{1}{6}(10x + 2x) \\ \Rightarrow x &= 2 \\ \Rightarrow y &= 4 \\ \therefore \text{Number} &= 24\end{aligned}$$

S47. Ans. (b)

Sol.

$$\cot 41^\circ \cdot \cot 42^\circ \cdot \cot 43^\circ \cdot \cot 44^\circ \cdot \cot 45^\circ \cdot \cot(90-44)^\circ \cdot \cot(90-43)^\circ \cdot \cot(90-42)^\circ \cdot \cot(90-41)^\circ \\ = 1.1.1.1.1 = 1$$

S48. Ans. (a)

Sol.

$$\text{CP of 15 oranges} = 5(40) = \text{Rs } 200$$

$$\text{CP of 15 oranges} = 3(60) = \text{Rs } 180$$

$$\text{SP of 30 oranges} = 1(50) = \text{Rs } 500$$

$$\therefore \text{Profit (\%)} = \frac{500-380}{380} \times 100 = 32\%$$

S49. Ans. (d)

Sol.

$$\text{Side of the rhombus, } a = \frac{60}{4} = 15 \text{ cm}$$

$$d_1^2 + d_2^2 = 4a^2$$

$$\Rightarrow (24)^2 + d_2^2 = 4(15)^2 \Rightarrow d_2 = 18$$

$$\therefore \text{Area of the rhombus} = \frac{1}{2}(24)(18) = 216 \text{ cm}^2$$

S50. Ans.(b)

Sol.

$$17640 \left(1 + \frac{5}{100}\right) + 17640 = P \left(1 + \frac{5}{100}\right)^2$$

$$\Rightarrow P = 17640 \times \frac{205}{100} \times \frac{100}{105} \times \frac{100}{105} = \text{Rs. } 32,800$$

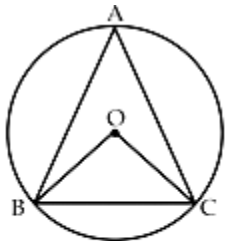
S51. Ans.(b)

Sol.

$$\frac{d}{4} + \frac{3d}{4} = 7 \Rightarrow d = 80 \text{ km.}$$

S52. Ans.(b)

Sol.



$$\angle BAC = x \Rightarrow \angle BOC = 2x$$

$$\Rightarrow \angle OBC = \frac{180-2x}{2} = 90 - x$$

$$\therefore \angle OBC + \angle BAC = 90 - x + x = 90^\circ$$



**SSC 2017**  
(COMPLETE KIT)

**400+ TOTAL TEST**

- 200+ MOCKS
- 200+ SECTIONAL TEST

Bilingual

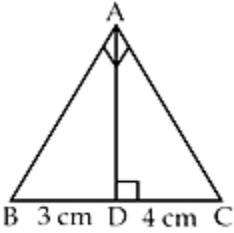
S53. Ans.(a)

Sol.

$$\frac{8}{25} P = \frac{P \times \frac{R}{2} \times R}{100} \Rightarrow R = 8\%$$

S54. Ans.(a)

Sol.



$$AD = \sqrt{BD \cdot CD} = \sqrt{3 \times 4} = \sqrt{12} = 2\sqrt{3} \text{ cm.}$$

S55. Ans.(d)

Sol.

$$\frac{\frac{2}{5} + \frac{3}{7} + \frac{4}{9}}{\frac{2}{5} + \frac{4}{7} + \frac{1}{9}} = \frac{401}{544}$$

S56. Ans.(d)

Sol.

$$A : B = 2 : 3 ; B : C = 3 : 7 \Rightarrow A : B : C = 2 : 3 : 7$$
$$\therefore (A + B) : (B + C) : (C + A) = 5 : 10 : 9.$$

S57. Ans.(c)

Sol.

$$\frac{1}{3} \pi r^2 h = \pi r l \Rightarrow \frac{l}{hr} = \frac{1}{3}$$
$$\Rightarrow \frac{1}{h^2} + \frac{1}{r^2} = \frac{r^2 + h^2}{h^2 r^2} = \left(\frac{l}{hr}\right)^2 = \left(\frac{1}{3}\right)^2 = \frac{1}{9}$$

S58. Ans.(a)

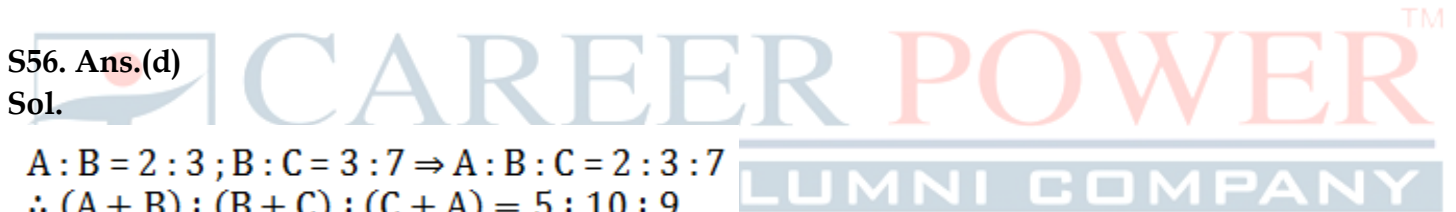
Sol.

$$\text{Speed of train Q} = S \text{ km/hr}$$
$$\Rightarrow \frac{162}{(S + 8) + S} = 6 \Rightarrow S = 9\frac{1}{2} \text{ km/hr.}$$

S59. Ans.(d)

Sol.

$$\tan \theta = \cot \theta \Rightarrow \theta = 45^\circ$$
$$\frac{\tan(\theta + 15)}{\tan(\theta - 15)} = \frac{\tan 60}{\tan 30} = \frac{\sqrt{3}}{1/\sqrt{3}} = 3.$$



S60. Ans.(b)

Sol.

$$\frac{\left(\frac{22}{7}\right)(2)^2(56)}{48 \times 16.5 \times 4} = \frac{2}{9}$$

S61. Ans.(b)

Sol.

$$\frac{x^3 - y^3}{x^2 + xy + y^2} = x - y = 5 \dots\dots (1)$$

$$\frac{x^2 - y^2}{x - y} = x + y = 7 \dots\dots\dots (2)$$

From (1) and (2):  $x = 6, y = 1$

$$\therefore \frac{2x}{3y} = \frac{2(6)}{3(1)} = \frac{4}{1}$$

S62. Ans.(a)

Sol.

$$x = \sqrt{a} + \frac{1}{\sqrt{a}} ; y = \sqrt{a} - \frac{1}{\sqrt{a}}$$

$$\Rightarrow x + y = 2\sqrt{a} ; x - y = \frac{2}{\sqrt{a}}$$

$$\begin{aligned} x^4 - x^2y^2 - 1 + y^4 - x^2y^2 + 1 &= x^4 + y^4 - 2x^2y^2 \\ &= (x^2 - y^2)^2 = [(x + y)(x - y)]^2 \\ &= \left[ (2\sqrt{a}) \left( \frac{2}{\sqrt{a}} \right) \right]^2 = 4^2 = 16. \end{aligned}$$



S63. Ans.(a)

Sol.

$$12600 \left( \frac{100-5}{100} \right) \left( \frac{100-2}{100} \right) = \text{Rs. } 11730.60$$

S64. Ans.(a)

Sol.

$$\frac{d}{5} - \frac{d}{6} = \frac{12}{60} \Rightarrow d = 6 \text{ km.}$$

S65. Ans.(c)

Sol.

$$x = \sqrt{3} + \sqrt{2} ; y = \sqrt{3} - \sqrt{2}$$

$$\Rightarrow xy = 1 \text{ and } x - y = 2\sqrt{2}$$

$$\begin{aligned} x^3 - 20\sqrt{2} - y^3 - 2\sqrt{2} &= (x - y)^3 + 3xy(x - y) - 22\sqrt{2} \\ &= (2\sqrt{2})^3 + 3(1)(2\sqrt{2}) - 22\sqrt{2} = 0 \end{aligned}$$

S66. Ans.(d)

Sol.

$$\frac{4}{3}\pi(1^3 + 6^3) = \frac{4}{3}\pi(9^3 - x^3)$$
$$\Rightarrow 729 - x^3 = 217 \Rightarrow x = 8$$

$\therefore$  Thickness =  $9 - 8 = 1$  cm.

S67. Ans.(d)

Sol.

Side of the cube = a

$$\Rightarrow \sqrt{3} a = 2(6\sqrt{3}) \Rightarrow a = 12$$

$$\therefore \text{Total surface area} = 6a^2 = 6(12)^2 = 864 \text{ cm}^2.$$

S68. Ans.(b)

Sol.

$$60\% A = 30\% B \Rightarrow B = 2A$$

$$2A = 40\% C \Rightarrow C = 5A$$

$$5A = x\% A \Rightarrow x = 500.$$

S69. Ans.(b)

Sol.

$$\frac{A}{30} + \frac{B}{36} = 1$$

$$\frac{x}{30} + \frac{x+25}{36} = 1 \Rightarrow x = 5.$$

S70. Ans.(d)

Sol.

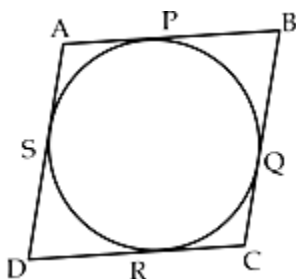
$$2p = p \left(1 + \frac{R}{100}\right)^5$$

$$\Rightarrow \left(1 + \frac{R}{100}\right)^5 = 2 \Rightarrow \left[\left(1 + \frac{R}{100}\right)^5\right]^3 = (2)^3$$

$$\Rightarrow 8p = p \left(1 + \frac{R}{100}\right)^{15}$$

S71. Ans.(c)

Sol.



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**SSC CPO 2017**

TIER-II

**TOTAL VACANCIES-2355**

**10 MOCKS**

Let PQRS be the points of contact of the circle with sides AB, BC, CD and AD respectively.

$$\text{Let } AP = AS = x \Rightarrow BP = BQ = 7 - x (\because AB = 7)$$

$$\therefore CQ = CR = x + 1.5 (\because BC = 8.5)$$

$$\therefore DS = DR = 7.7 - x (\because CD = 9.2)$$

$$\therefore AD = AS + DS = x + 7.7 - x = 7.7 \text{ cm.}$$

S72. Ans.(a)

Sol.

$$\begin{aligned} \text{Volume of the prism} &= \text{base area} \times \text{height} \\ &= \sqrt{27(27-13)(27-20)(27-21)} \times 9 \text{ cm}^2 \\ &= 1134 \text{ cm}^2. \end{aligned}$$

S73. Ans.(a)

Sol.

60% of 300gm = 180gm (quantity other than sugar)

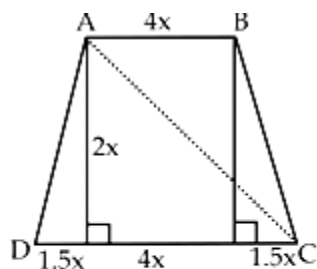
Now, 180gm is 50% of the new quantity.

$$\therefore \text{New quantity} = 100\% = 360 \text{ gm}$$

$$\therefore \text{Sugar added} = 360 - 300 = 60 \text{ gm.}$$

S74. Ans.(a)

Sol.



Given,

$$\text{Area of trapezium} = (4x)(2x) + (2x)(1.5x) = 176 \Rightarrow x = 4$$

$$\therefore \text{Diagonal} = \sqrt{(2(4))^2 + ((5.5)(4))^2} = 2\sqrt{137}.$$

S75. Ans.(b)

Sol.

Length of direct common tangent

$$= \sqrt{(13)^2 - (11 - 6)^2} = 12 \text{ cm.}$$

S76. Ans.(a)

Sol.

Let total work be 96 units.

∴ No. of units done by A, B and C per day are 6, 3 and 2 units respectively.

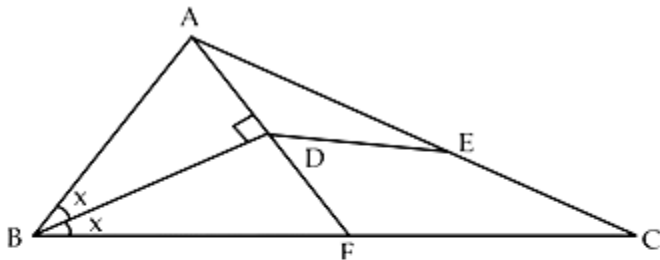
Let after 'x' days work was completed.

$$\therefore 6x + 3(x - 8) + 2(x - 6) = 96$$

$$\therefore 11x = 132 \Rightarrow x = 12.$$

S77. Ans.(b)

Sol.



AD extended meets BC at F.

$$\angle ADB = \angle BDF = 90^\circ$$

$\angle ADB = \angle FDB$  (BD is the angle bisector)

$$\therefore \angle BAD = \angle BFD$$

$\Rightarrow \triangle ABD$  and  $\triangle FBD$  are congruent.  $\Rightarrow AD = DF$

And  $\triangle ADE$  is similar to  $\triangle AFC$  ( $\because DE \parallel BC$ )

$$\frac{AE}{AC} = \frac{AD}{AF} = \frac{1}{2} \Rightarrow AE = \frac{1}{2}(12) = 6 \text{ cm.}$$

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S78. Ans.(a)

Sol.

Let the five consecutive integers be  $x - 2, x - 1, x, x + 1$  and  $x + 2$ .

$$\text{Average after adding next two numbers} = \frac{5x + x + 3 + x + 4}{7} = x + 1.$$

∴ Increase by 1.

S79. Ans.(a)

Sol.

$$(a - 3) - \frac{1}{(a-3)} = 5 - 3 = 2$$

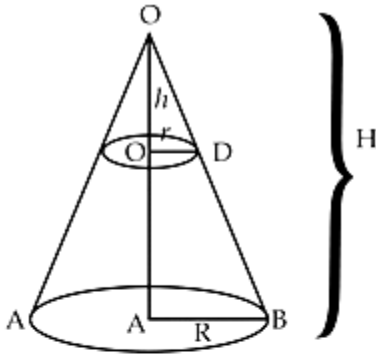
$$\therefore (a - 3)^3 - \frac{1}{(a-3)^3}$$

$$= \left( (a - 3) - \frac{1}{(a-3)} \right)^3 + 3(a - 3) \frac{1}{(a-3)} \left( (a - 3) - \frac{1}{(a-3)} \right)$$

$$= 2^3 + 3(2) = 14.$$

S80. Ans.(c)

Sol.



As shown in the figure,

$$\frac{h}{r} = \frac{H}{R} \Rightarrow r = \frac{h(R)}{H} \dots\dots\dots(1)$$

$$\text{Given that, } \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi R^2 H - \frac{1}{3} \pi r^2 h$$

$$\Rightarrow R^2 H = 2r^2 h.$$

$$R^2 H = 2 \left( \frac{h^2 R^2}{H^2} \right) \cdot h \text{ [from (1)]}$$

$$\Rightarrow H^3 = 2h^3$$

$$\Rightarrow h/H = \frac{1}{\sqrt[3]{2}}$$

$$\text{So, req. ratio} = h:(H-h) = 1: (\sqrt[3]{2} - 1)$$

$$= 1: (\sqrt[3]{2} - 1)$$

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S81. Ans.(b)

Sol.

$$\text{L.C.M (12, 16, 18, 21)} = 1008$$

$$\therefore \text{Number to be added} = 2 (1008) - 2000 = 16.$$

$$\therefore \text{Sum of digits} = 1 + 6 = 7.$$

S82. Ans.(a)

Sol.

Required speed

$$= 400 \times 60 \times 2 \times \frac{22}{7} \times \frac{70}{2} \times \frac{1}{100} \times \frac{1}{1000}$$

$$= 52.8 \text{ kmph.}$$

S83. Ans.(b)

Sol.

$$30 \left( 14 \frac{1}{3} \right) + 9 \frac{11}{12} + 4a = 35 \left( 13 \frac{3}{4} \right)$$

$$\therefore a = 10 \frac{1}{3} \text{ years} = 10 \text{ years } 4 \text{ months.}$$

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**20 FULL LENGTH MOCKS**



S84. Ans.(c)

Sol.

Part of the work done by Q and R in 6 days :

$$6 \times \frac{7}{60} = \frac{7}{10}$$

∴ Remainign  $\left(1 - \frac{7}{10}\right) = \frac{3}{10}$  of work done by P in 3 days.

∴ P alone can do the work in 10 days.

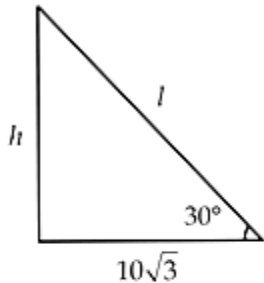
∴ Q alone can do the work in  $\frac{10 \times 6}{10 - 6} = 15$  days.

∴ R alone can do the work in  $\frac{15 \times \frac{60}{7}}{15 - \frac{60}{7}} = 20$  days.

∴ Difference =  $(20 - 10) = 10$  days.

S85. Ans.(d)

Sol.



$$\tan 30^\circ = \frac{h}{10\sqrt{3}} = \frac{1}{\sqrt{3}} \Rightarrow h = 10m$$

$$\sin 30^\circ = \frac{h}{l} = \frac{1}{2} \Rightarrow l = 2h$$

∴ length of telegraph Post =  $l + h = 3h = 30$  m



S86. Ans.(c)

Sol.

$$\text{Given, } 5 \cos\theta + 12 \sin\theta = 13 \dots\dots\dots(1)$$

$$\text{Let, } 12 \cos\theta - 5 \sin\theta = k \dots\dots\dots(2)$$

From  $(1)^2 + (2)^2$  :

$$5^2 + 12^2 = 13^2 + k^2 \Rightarrow k = 0$$

$$\therefore 12 \cos\theta = 5 \sin\theta, \tan\theta = \frac{12}{5}$$

$$\therefore \sin\theta = \frac{12}{\sqrt{12^2 + 5^2}} = \frac{12}{13}$$

S87. Ans.(b)

Sol.

$$a + \frac{1}{b} = b + \frac{1}{c} = c + \frac{1}{a}$$
$$\Rightarrow a - b = \frac{1}{c} - \frac{1}{b} = \frac{b-a}{bc} \Rightarrow bc = \frac{b-c}{a-b}$$

$$\text{Similarly, } ab = \frac{a-b}{c-a}; ca = \frac{c-a}{b-c}$$

$$\therefore a^2 b^2 c^2 = (ab)(bc)(ca)$$
$$= \frac{a-b}{c-a} \times \frac{b-c}{a-b} \times \frac{c-a}{b-c} = 1.$$

S88. Ans.(d)

Sol.

Let the number be  $21(x)$  and  $21(4x)$  as 21 is the H.C.F.

$$\text{Given L.C.M} = 21(4x) = 84 \Rightarrow x = 1$$

$$\therefore \text{The larger number} = 21(4) = 84.$$

S89. Ans.(b)

Sol.

$$\text{Part of work completed} = \frac{70 \times 24 \times 8}{90 \times 16 \times 12} = \frac{7}{9}.$$

S90. Ans.(c)

Sol.

$$110\% \text{ of } a = 115\% \text{ of } b = 120\% \text{ of } c = k \text{ (say).}$$

$$\therefore a : b : c = \frac{1}{110} : \frac{1}{115} : \frac{1}{120} = \frac{1}{22} : \frac{1}{23} : \frac{1}{24} = 23 \times 24 : 22 \times 24 : 22 \times 23$$

$$\therefore \text{Loan received by A} = \frac{23 \times 24}{1586} \times 7930 = \text{Rs. } 2760$$

S91. Ans.(c)

Sol.

$$(\text{cosec } a - \sin a) (\text{sec } a - \cos a) (\tan a + \cot a)$$

$$= \left( \frac{1}{\sin a} - \sin a \right) \left( \frac{1}{\cos a} - \cos a \right)$$

$$\left( \frac{\sin a}{\cos a} + \frac{\cos a}{\sin a} \right)$$

$$= \left( \frac{1 - \sin^2 a}{\sin a} \right) \left( \frac{1 - \cos^2 a}{\cos a} \right) \left( \frac{\sin^2 a + \cos^2 a}{(\cos a)(\sin a)} \right)$$

$$= \left( \frac{\cos^2 a}{\sin a} \right) \left( \frac{\sin^2 a}{\cos a} \right) \left( \frac{1}{(\cos a)(\sin a)} \right) = 1.$$



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S92. Ans.(d)

Sol.

Let the cost price of rice be 100 c per kg.

Given that,  $(1-0.1)(100c) = \text{Rs. } 54$

$$\Rightarrow 90 c = \text{Rs. } 54$$

$$\Rightarrow c = \text{Rs. } 0.6$$

$$\begin{aligned} \text{The required selling price} &= (1 + 0.2) (100) (\text{Rs. } 0.6) \\ &= \text{Rs. } 72 \end{aligned}$$

S93. Ans.(c)

Sol. Let R be the radius of the hemisphere and r be the radius of the smaller sphere

$$\Rightarrow \frac{2}{3} \pi R^3 = 4 \left[ \frac{4}{3} \pi r^3 \right]$$

$$\Rightarrow r^3 = \frac{R^3}{8} \Rightarrow r = R/2$$

S94. Ans.(c)

Sol.

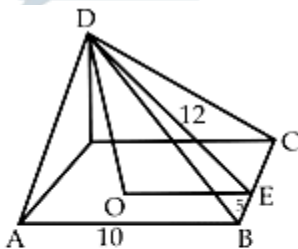
Amount of tin in the new alloy

$$= \frac{2}{5}(60) + \frac{1}{5}(100) = 24 + 20 = 44 \text{ kg.}$$



S95. Ans.(d)

Sol.



The slant height of the pyramid

$$= \sqrt{(OO^1)^2 + (O^1E)^2} = \sqrt{(12)^2 + (5)^2} = 13 \text{ cm.}$$

$$\begin{aligned} \therefore \text{The total surface area} &= 4 \left( \frac{1}{2} \times 10 \times 13 \right) + (100) \\ &= 260 + 100 = 360 \text{ sqcm.} \end{aligned}$$

S96. Ans.(c)

Sol.

$$\text{The marked price of the toy} = \frac{300}{(1-0.2)} = \text{Rs. } 375$$

$$\text{Required profit percentage} = \frac{\text{Rs. } 300}{\text{Rs. } 375} \times 100\% = 8\%$$

S97. Ans.(c)

Sol.

The units digit of the product = [units digit of  $7^{153}$ ]  $\times$  [units digit of  $1^{72}$ ]  
= units digit of  $7^1 = 7$  [As 7 is a four cycle]

S98. Ans.(a)

Sol. Let the interior and the exterior angles of the regular polygon be I and e respectively.

$$\Rightarrow I - e = 108^\circ \dots\dots\dots (1)$$

$$I + e = 180^\circ \dots\dots\dots (2)$$

From (2) - (1)

$$\Rightarrow 2e = 72 \Rightarrow e = 36^\circ$$

$$\therefore \text{Number of sides of the polygon} = \frac{360^\circ}{36^\circ} = 10.$$

S99. Ans.(a)

Sol.

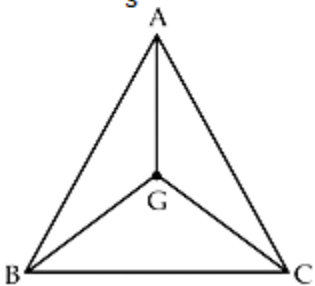
$$4 - \frac{5}{1 + \frac{1}{2 + \frac{1}{2 + \frac{1}{4}}}} = 4 - \frac{5}{1 + \frac{1}{2 + \frac{4}{9}}}$$

$$4 - \frac{5}{1 + \frac{9}{31}} = 4 - \frac{5 \times 31}{40} = \frac{32 - 31}{8} = \frac{1}{8}$$

S100. Ans.(c)

Sol.

$$\begin{aligned} \text{Area of } \Delta GBC &= \frac{1}{3} (\text{Area of } \Delta ABC) \\ &= \frac{1}{3} (60) = 20 \text{ cm}^2. \end{aligned}$$



	
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