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## Solutions

### S1. Ans.(b)

**Sol.** Sum from PNB

$$= \frac{12}{100} \times 8844 \times \frac{550}{300} \text{ crores} = 1945.68 \text{ crores}$$

### S2. Ans.(c)

**Sol.** Average sum from SBI, ICICI and Axis bank together

$$= \frac{1}{3} \times \frac{(28 + 8 + x)}{100} \times 8844 \text{ crore}$$

$$\Rightarrow \frac{2948 \times (x + 36)}{10} = 1474$$

$$\Rightarrow x = 50 - 36$$

$$\Rightarrow x = 14\%$$

$$\therefore \text{Required sum} = \frac{14}{100} \times 8844 \text{ crores}$$

$$= 1238.16 \text{ crores}$$

### S3. Ans.(d)

**Sol.** Required total sum

$$= 8844 - \frac{(28 + 8 + 14)}{100} \times 8844$$

$$= 8844 - 4422 = 4,422 \text{ crores}$$

### S4. Ans.(c)

**Sol.** Sum from (PNB + UBI) together

$$= 8844 - \frac{62}{100} \times 8844$$

$$= 3360.72 \text{ crore}$$

$$\Rightarrow \frac{(2x + 6)}{100} \times 8844 = 3360.72$$

$$\Rightarrow 2x + 6 = 38$$

$$\Rightarrow x = 16\% = \text{sum from UBI}$$

$$\text{and sum from PNB} = 16 + 6 = 22\%$$

$$\therefore \text{Required ratio} = \frac{28 + 16}{22 + 14} = 11 : 9$$

### S5. Ans.(b)

**Sol.** Required average of sum

$$= \frac{1}{3} \times \frac{(28 + 16 + 14)}{100} \times 8844$$

$$= 1709.84 \text{ crores}$$



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**S6. Ans.(b)****Sol.**

$$\text{Rate} = \frac{10230 \times 100}{27500 \times 3} = 12.4$$

$$\begin{aligned} \therefore \text{C.I.} &= 27500 \left( \frac{112.4}{100} \right)^2 - 27500 \\ &= 34742.84 - 27500 \approx \text{Rs. } 7243 \end{aligned}$$

**S7. Ans.(a)**

$$\begin{aligned} \text{Sol. Required no. Of ways} &= {}^4C_1 \times {}^5C_3 + {}^4C_2 \times {}^5C_2 + {}^4C_3 \times {}^5C_1 + {}^5C_4 \\ &= 40 + 60 + 20 + 5 = 125 \end{aligned}$$

**S8. Ans.(c)****Sol.** Let A takes  $x$  and B takes  $3x$  days to finish the work

$$\therefore 3x - x = 30 \Rightarrow x = 15$$

B's time to finish the work =  $3 \times 15 = 45$  days

$$\therefore (A + B)'s \text{ 1 days work} = \frac{1}{15} + \frac{1}{45}$$

$$= \frac{4}{45}$$

$$\therefore (A+B) \text{ will finish the work in } \frac{45}{4} \text{ days}$$

i.e.  $11\frac{1}{4}$  days.**S9. Ans.(d)****Sol.** Let the price of B per kg be Rs. X. Then, the price of A per kg = Rs. 3X1kg of C contains  $\frac{2}{7}$  kg of A and  $\frac{5}{7}$  kg of B

$$\text{Price of 1 kg of C} = \left(\frac{2}{7}\right) \times 3X + \left(\frac{5}{7}\right)X = \left(\frac{11}{7}\right)X$$

By the given condition,  $\frac{11X}{7}$ 

$$= 5.20 - 0.80$$

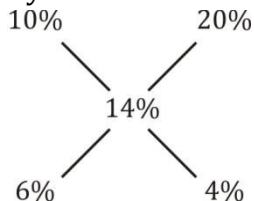
$$= \text{Rs. } 4.40$$

$$\Rightarrow X = 4.40 \times \left(\frac{7}{11}\right) = \text{Rs. } 2.80$$

Hence the price of B per kg = Rs. 2.80.

**S10. Ans.(c)****Sol.** Let amount invested at 20% per annum =  $x$  Rs.

By mixture and allegation method



Ratio of amount = 3 : 2

$$\therefore \text{Total amount invested} = \frac{12000}{3} \times 5 = 20,000 \text{ Rs.}$$

**S11. Ans.(e)**

**Sol.**



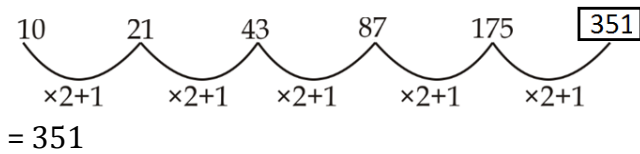
**S12. Ans.(b)**

**Sol.**

$$1^3 - 1, 2^3 - 1, 3^3 - 1, 4^3 - 1, 5^3 - 1, 6^3 - 1$$
$$= 215$$

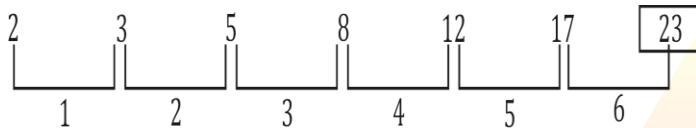
**S13. Ans.(c)**

**Sol.**



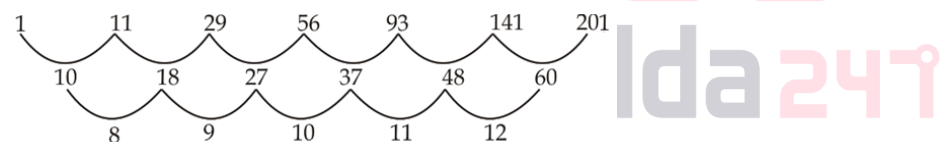
**S14. Ans.(b)**

**Sol.**



**S15. Ans.(b)**

**Sol.**



**S16. Ans.(a)**

**Sol.**

$$11 + 1^2 + 12$$
$$12 + 2^2 = 16$$
$$16 + 3^2 = 25$$
$$25 + 4^2 = 41$$
$$41 + 5^2 = 66$$
$$66 + 6^2 = 102$$

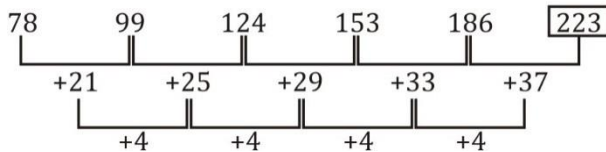
**S17. Ans.(d)**

**Sol.**

$$7 \times 3 - 1 = 20$$
$$20 \times 3 - 1 = 59$$
$$59 \times 3 - 1 = 176$$
$$176 \times 3 - 1 = 527$$
$$527 \times 3 - 1 = 1580$$

**S18. Ans.(e)**

**Sol.**



**S19. Ans.(b)**

**Sol.**

$$\begin{aligned}1^3 - 1 &= 0 \\3^3 - 1 &= 26 \\5^3 - 1 &= 124 \\7^3 - 1 &= 342 \\9^3 - 1 &= 728 \\11^3 - 1 &= 1330.\end{aligned}$$

**S20. Ans.(e)**

**Sol.**

$$\begin{aligned}18 + (1 \times 13) &= 31 \\31 + (2 \times 13) &= 57 \\57 + (3 \times 13) &= 96 \\96 + (4 \times 13) &= 148 \\148 + (5 \times 13) &= 213\end{aligned}$$

**S21. Ans.(b)**

**Sol.** No. of male in E = 1800

$$\text{So total population of E} = \frac{1800}{60} \times 100 = 3000$$

$$\text{So male population of city A} = 3000 \times \frac{15}{30} \times \frac{70}{100} = 1050$$

**S22. Ans.(d)**

**Sol.** Since we have to calculate percent

So, we will not use 80000

Let total population of state is 100x

Total population of D = 25x

$$\text{Female population of B} = 20x \times \frac{60}{100} = 12x$$

$$\text{Required \%} = \frac{25x - 12x}{12x} \times 100 = 108\frac{1}{3}\%$$

**S23. Ans.(a)**

**Sol.** Total female population of A, B and C city

$$= 250000 \times \frac{15}{100} \times \frac{30}{100} + 250000 \times \frac{10}{100} \times \frac{40}{100} + 250000 \times \frac{30}{100} \times \frac{40}{100}$$

$$= 11250 + 10000 + 30000$$

$$= 51250$$

So Average female population of A, C and E

$$= \frac{51250}{3} = 17083\frac{1}{3}$$

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**S24. Ans.(c)****Sol.** Total population of state in 2017 = 100000

$$\text{Population of city B in 2017} = 100000 \times \frac{20}{100} = 20000$$

$$\text{Population of city B in 2018} = 20000 \times \frac{120}{100} = 24000$$

$$\text{Population of city D in 2017} = 100000 \times \frac{25}{100} = 25000$$

$$\text{Population of city D in 2018} = 25000 \times \frac{110}{100} = 27500$$

$$\text{Required difference} = 27500 - 24000 = 3500$$

**S25. Ans.(b)****Sol.** Let total population of the state is 100x

$$\text{Required ratio} = \frac{100x \times \frac{20}{100} \times \frac{40}{100} + 100x \times \frac{25}{100} \times \frac{50}{100}}{100x \times \frac{30}{100} \times \frac{40}{100} + 100x \times \frac{10}{100} \times \frac{40}{100}} = \frac{41}{32}$$

**S26. Ans.(b)****Sol.** 45.15% of 759.96 ÷ 18.9 + ? = (17.99)<sup>2</sup>

$$45\% \text{ of } 760 \div 19 + ? = 324$$

$$? = 306$$

**S27. Ans.(d)****Sol.**  $\sqrt{728.83} \div 2.96 + 29.85 \div 5.99 = ? - 4 \times 10$ 

$$? = \sqrt{729} \div 3 + 30 \div 6 + 40$$

$$= 27 \div 3 + 5 + 40$$

$$= 9 + 5 + 40 = 54$$

**S28. Ans.(a)****Sol.**  $(1152.36 + 247.56) \div 6.95 + \sqrt{624.5} = (?)^2$ 

$$(1152 + 248) \div 7 + \sqrt{625} = (?)^2$$

$$(1400 \div 7) + 25 = ?^2$$

$$200 + 25 = ?^2$$

$$? = \sqrt{225} = 15$$

**S29. Ans.(b)****Sol.**  $(4444.13 \div 40.07) + (649 \div 49.87) + (3991 \div 24.97) = ?$ 

$$\Rightarrow (4444 \div 40) + (650 \div 50) + (3990 \div 25)$$

$$= 111.1 + 13 + 159.6$$

$$= 283.7 \sim 284$$

**S30. Ans.(b)**

**Sol.**

$$86.02\% \text{ of } 249.87 + \frac{\sqrt[3]{1727.6}}{\sqrt{3.87}} = ? + \sqrt{120.78}$$

$$\Rightarrow 86\% \text{ of } 250 + \frac{\sqrt[3]{1728}}{\sqrt{4}} = ? + \sqrt{121}$$

$$\Rightarrow 215 + \frac{12}{2} = ? + 11$$

$$\Rightarrow 215 + 6 = ? + 11$$

$$? = 210$$

**S31. Ans.(b)**

**Sol.**  $? = 109.62 + 123.75 = 233.37$

$$? \approx 233$$

**S32. Ans.(c)**

**Sol.**

$$? \approx \frac{8400}{375} \times 15 = 336$$

$$? \approx 335$$

**S33. Ans.(c)**

**Sol.**

$$\frac{6\sqrt{2} + 14.275}{176} = ?$$

$$? \approx \frac{8+14}{176}$$

$$? = \frac{1}{8}$$



**S34. Ans.(b)**

**Sol.**

$$? \approx 1600 \times \frac{200}{50} - 1400 + 3880$$

$$\Rightarrow 6400 - 1400 + 3880 = 8880$$

$$? \approx 9000$$

**S35. Ans.(a)**

**Sol.**

$$\frac{2}{5} \times 440 + \frac{?}{100} \times 650 = 228$$

$$\Rightarrow 176 + 6.5 \times ? = 228$$

$$\Rightarrow ? = \frac{228-176}{6.5}$$

$$? \approx 8$$

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**S36. Ans.(b)****Sol.** Total male students participating in seminar in 2014

$$\text{from all streams} = \left(\frac{5}{8} \times 40 + \frac{5}{7} \times 35 + \frac{7}{10} \times 20\right) \text{ thousands}$$

$$= 64 \text{ thousand}$$

Total female students who participated in 2013 from all streams

$$= \left(\frac{1}{5} \times 30 + \frac{1}{5} \times 25 + \frac{1}{5} \times 15\right) \text{ thousands}$$

$$= 14 \text{ thousand}$$

$$\therefore \text{Required percentage} = \frac{64}{14} \times 100 \approx 457\%$$

**S37. Ans.(c)****Sol.** Total students (both male and female) from banking who asked questions in seminar in 2015

$$= \left(\frac{10}{100} \times \frac{7}{10} \times 50 + \frac{5}{100} \times \frac{3}{10} \times 50\right) \text{ thousand}$$

$$= (3.5 + 0.75) = 4.25 \text{ thousands}$$

Total students from SSC who asked question in 2015

$$= \frac{10}{100} \times 45000 = 4.5 \text{ thousands}$$

$$\therefore \text{Required percentage} = \frac{4.25}{4.5} \times 100 = 94.44\%$$

**S38. Ans.(c)**

$$\text{Sol. Required average} = \frac{1}{5} \times \left(\frac{4}{5} \times 15 + \frac{7}{10} \times 20 + \frac{6}{7} \times 35 + \frac{3}{4} \times 30 + \frac{3}{5} \times 40\right)$$

$$= \frac{1}{5} \times 102.5 = 20.5 \text{ thousands}$$

**S39. Ans.(b)****Sol.** Total no of male students from banking in 2016 and 2017 together

$$= \frac{3}{5} \times 50 + \frac{2}{3} \times 60 = 70 \text{ thousands}$$

Total no. of female students from SSC in 2016 and 2017 together

$$= \frac{3}{8} \times 40 + \frac{3}{10} \times 50 = 30 \text{ thousands}$$

$$\therefore \text{Required percentage} = \frac{40}{30} \times 100 = 133\frac{1}{3}\%$$

**S40. Ans.(d)****Sol.** In 2012,

Total students who participated in seminar from Banking

$$= 30 \times \frac{90}{100} = 27,000$$

$$\text{From SSC} = \frac{80}{100} \times 25,000 = 20,000$$

$$\text{From Railway} = \frac{75}{100} \times 15,000 = 11,250.$$

No. of boys who participated in seminar in 2012

$$\text{From Banking} = \frac{4}{5} \times 30,000 - 1000 = 23,000$$

$$\text{From SSC} = \frac{4}{5} \times 25,000 - 1500 = 18,500$$

$$\text{From Railway} = \frac{4}{5} \times 15,000 - 2000 = 10,000$$

$$\therefore \text{Required no. of girls} = (27,000 - 23,000) + (20,000 - 18,500) + (11,250 - 10,000) = 6,750$$



**S41. Ans.(b)****Sol.** Series is

$$+9, -18, +27, -36, +45$$

$$\text{so, } 25 - 36 = -11$$

**S42. Ans.(e)****Sol.**  $6 \times 1 + 1, 7 \times 3 + 3, 24 \times 5 + 5, 125 \times 7 + 7, 882 \times 9 + 9$ 

$$\text{so, } 24 \times 5 + 5 = 125$$

**S43. Ans.(c)****Sol.** Series is

$$2 + (1^2 + 1^3), 4 + (2^2 + 2^3), 16 + (3^2 + 3^3), 52 + (4^2 + 4^3)$$

$$\text{so, } 16 + (3^2 + 3^3) = 52$$

**S44. Ans.(a)****Sol.** Series is

$$\times 1 + 1, \times 1.5 + 1.5, \times 2 + 2, \times 2.5 + 2.5, \times 3 + 3$$

$$\text{So, } 30 \times 3 + 3 = 93$$

**S45. Ans.(a)****Sol.** Series is

$$1^3 + 1, 2^3 - 1, 3^3 + 1, 4^3 - 1, 5^3 + 1$$

$$\text{So, } 125 + 1 = 126$$

**S46. Ans.(e)****Sol.** Let present ages of all the three are X, Y and Z respectively.

$$X = 3Y + 3 \quad \dots(i)$$

$$Z = 2Y \quad \dots(ii)$$

$$X = Z + 12 \quad \dots(iii)$$

From equations (i), (ii) and (iii)

$$X - 3Y = 3 \text{ and } X - 2Y = 12$$

After solving these two resultant equations, we get

$$Y = 9 \text{ years}$$

$$\therefore Z\text{'s present age} = 18 \text{ years.}$$

**S47. Ans.(c)****Sol.** Let in both schemes he invested Rs. P and 2P respectively

$$\text{ATQ, } \left| P \left[ \left( 1 + \frac{10}{100} \right)^2 - 1 \right] - \frac{2P \times 8 \times 2}{100} \right| = 990$$

$$\Rightarrow \left| \frac{21P}{100} - \frac{32P}{100} \right| = 990$$

$$\Rightarrow P = \frac{99000}{11}$$

$$\Rightarrow P = 9000$$

**S48. Ans.(b)**

**Sol.** (Profit of A) : (Profit of B) = 12,500 : 8,500  
 = 125 : 85  
 = 25 : 17

40% of total profit =  $240 \times \frac{(25 + 17)}{(25 - 17)} = 1260$

$\therefore$  100% profit =  $\frac{1260}{40} \times 100 = 3150$

**S49. Ans.(c)**

**Sol.** Required probability =  $\frac{{}^5C_2}{{}^{14}C_2} + \frac{{}^3C_2}{{}^{14}C_2}$   
 =  $\frac{10}{91} + \frac{3}{91} = \frac{13}{91} = \frac{1}{7}$

**S50. Ans.(c)**

**Sol.** Required probability =  $\frac{{}^6C_2 \times {}^5C_1}{{}^{15}C_3} = \frac{15}{91}$

**S51. Ans.(a)**

**Sol.** Required difference

=  $\left[ \left( \frac{40 + 55 + 45 + 65 + 50 + 60}{6} \right) - \left( \frac{55 + 50 + 60 + 55 + 60 + 55}{6} \right) \right]$   
 =  $\frac{315}{6} - \frac{335}{6}$   
 =  $52.5 - 55.833 = 3.333$  lakhs

**S52. Ans.(c)**

**Sol.** Percentage increase

=  $\frac{50 - 40}{40} \times 100$   
 =  $\frac{10}{40} \times 100 = 25\%$

**S53. Ans.(a)**

**Sol.** B, F & D shows no growth

Growth percentage of A =  $\frac{55-40}{40} \times 100 = 37.5\%$

Growth percentage of C =  $\frac{60-45}{45} \times 100 = 33\frac{1}{3}\%$

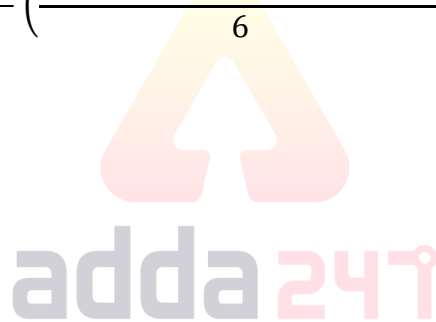
Growth percentage of E =  $\frac{60-50}{50} \times 100 = 20\%$


$\therefore$  A shows maximum percentage of growth

**S54. Ans.(b)**

**Sol.** Required percentage

=  $\frac{50 + 60}{50} \times 100$   
 =  $\frac{110}{50} \times 100$   
 = 220%



  
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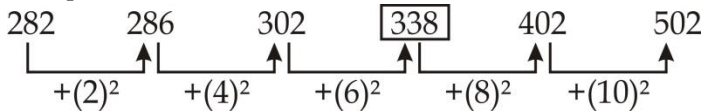
**S55. Ans.(e)**

**Sol.** Required ratio

$$= \frac{45 + 45}{55 + 55} = \frac{90}{110} = 9 : 11$$

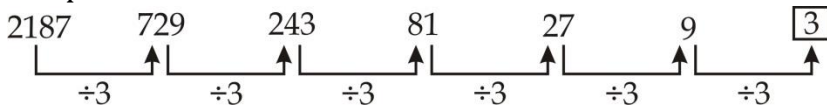
**S56. Ans.(d)**

**Sol.** pattern is



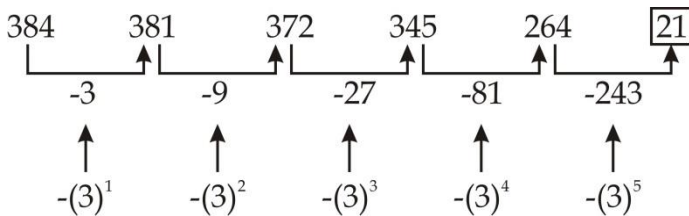
**S47. Ans.(b)**

**Sol.** pattern is



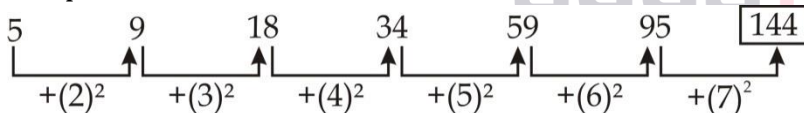
**S58. Ans.(e)**

**Sol.** Pattern is



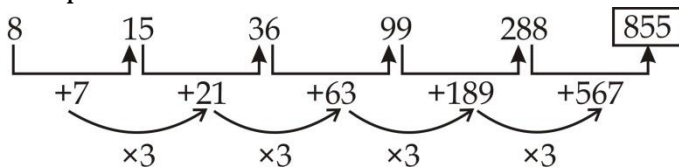
**S59. Ans.(a)**

**Sol.** pattern is



**S60. Ans.(d)**

**Sol.** pattern is



**S61. Ans.(b)**

**Sol.** Required Percentage =  $\frac{980-780}{980} \times 100 \approx 20.4\%$

**S62. Ans.(c)**

**Sol.** Required average =  $\frac{1}{5} (750 + 280 + 510 + 760 + 640) = 588$

**S63. Ans.(e)**

$$\text{Sol. Required ratio} = \frac{560+780}{460+450} = \frac{1340}{910} = \frac{134}{91}$$

**S64. Ans.(b)**

$$\text{Sol. Required percentage} = \frac{2970}{5810} \times 100 \approx 51\%$$

**S65. Ans.(a)**

$$\text{Sol. Total profit earned} = 5810 \times \frac{45}{5} = \text{Rs. } 52,290$$

**S66. Ans.(c)**

$$\text{Sol. } 580 + 6 - 3 = 583$$

**S67. Ans.(b)**

$$\begin{aligned} \text{Sol. } & \frac{75}{100} \times 1228 + \frac{45}{100} \times 400 \\ & = \frac{3}{4} \times 1228 + 45 \times 4 \\ & = 3 \times 307 + 180 \\ & = 921 + 180 = 1101. \end{aligned}$$

**S68. Ans.(e)**

$$\begin{aligned} \text{Sol. } & 1520 + 18420 + \frac{1680}{80} \\ & = 19940 + 21 = 19961 \end{aligned}$$

**S69. Ans.(c)**

$$\begin{aligned} \text{Sol. } & \frac{?}{100} \times 6300 = 225 - \frac{44}{100} \times 225 \\ ? \times 63 & = 225 - 11 \times 9; ? = \frac{126}{63} \\ ? & = 2 \end{aligned}$$

**S70. Ans.(b)**

$$\begin{aligned} \text{Sol. } & 18 \times 19 = \frac{18}{100} \times 190 \times ? \\ ? & = 10 \end{aligned}$$

**S71. Ans.(c)**

$$\text{Sol. } A + 2B + C = 59 \dots(i)$$

$$3A + B + C = 68 \dots(ii)$$

$$A + 3B + 3C = 108 \dots(iii)$$

Solving these equations together

A = 12 years, B = 15 years, C = 17 years



**S72. Ans.(b)****Sol.** Ruby's annual income

$$= 12 \times 3 \times \frac{115}{100} \times 32,000$$

$$= \text{Rs. } 13,24,800$$

**S73. Ans.(c)****Sol.** Gross collection per day will increased by

$$= \frac{1,68,000}{7}$$

$$= \text{Rs. } 24,000$$

**S74. Ans.(b)****Sol.** Let C.P. to man per article = x $\therefore$  S.P. of 800 articles = 864x

and S.P. of 64 articles

$$= \frac{864x}{800} \times 64$$

$$= 69.12x$$

$$\therefore \% \text{ profit} = \frac{933.12-864}{864} \times 100 = 8\%$$

**S75. Ans.(c)****Sol.** Let investment made by Rashmi in scheme A= Rs. x $\therefore$  Investment made by her in scheme B = (4200 - x)

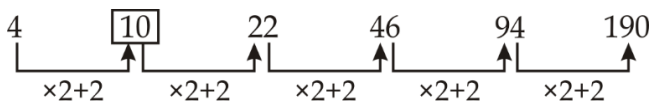
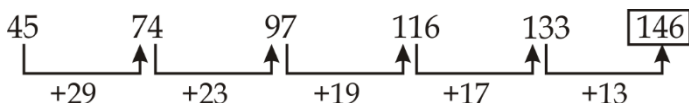
ATQ,

$$\frac{x \times 22 \times 4}{100} - (4200 - x) \left[ \left( 1 + \frac{10}{100} \right)^2 - 1 \right] = 1516$$


$$\Rightarrow \frac{88x}{100} - \frac{(4200 - x) \times 21}{100} = 1516$$

$$\Rightarrow 109x - 88,200 = 1,51,600$$

$$\Rightarrow x = 2200$$

**S76. Ans.(b)****Sol.****S77. Ans.(d)****Sol.**

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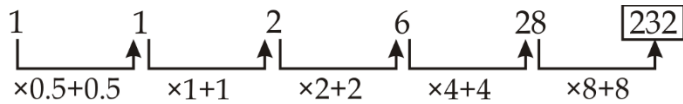
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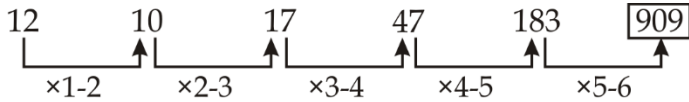
**S78. Ans.(a)**

**Sol.**



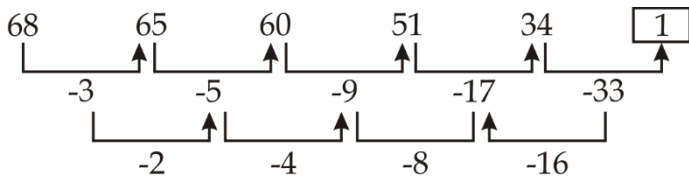
**S79. Ans.(c)**

**Sol.**



**S80. Ans.(e)**

**Sol.**



**S81. Ans.(b)**

**Sol.** Required %

$$= \frac{\left(\frac{10+35}{2}\right) - \left(\frac{10+20}{2}\right)}{\left(\frac{10+20}{2}\right)} \times 100 = 50\%$$

**S82. Ans.(d)**

**Sol.** Total quantity of water available =  $7000 \times \frac{8}{7}$  liter = 8000 liter

$$\text{Required ratio} = \frac{1000}{(35-20) \times \frac{7000}{100}} = \frac{1000}{1050} = \frac{20}{21}$$

**S83. Ans.(a)**

$$\text{Sol. Required ratio} = \frac{(35+20)}{(10+10)} = \frac{55}{20} = \frac{11}{4}$$

**S84. Ans.(e)**

**Sol.**  $3\frac{1}{7}\%$  of Quantity of water consumed by S =  $\frac{22}{7 \times 100} \times \frac{35}{100} \times 7000 = 77$  liter

$$\text{Required percentage} = \frac{77}{\frac{10 \times 7000}{100}} \times 100 = 11\%$$

**S85. Ans.(a)**

$$\begin{aligned} \text{Sol. Required quantity} &= \frac{(35-20) \times 7000}{100} - \frac{(20-10)}{100} \times 7000 \\ &= \frac{5}{100} \times 7000 = 350 \text{ liter} \end{aligned}$$

**S86. Ans.(d)**

**Sol.** Let daughter's present age be x years.

Then, Shalini's present age = 5x years

Ratio of present age of

Daughter : Shalini : Father

$$2x \quad 10x \quad 25x$$

ATQ,

$$2x + 10x + 25x = 43 \times 3 - 18$$

$$\Rightarrow x = 3$$

$$\text{Required ratio} = \frac{2x}{25x-10x} = \frac{2 \times 3}{15 \times 3} = 2 : 15$$

**S87. Ans.(c)**

**Sol.** Required probability =  $\frac{1}{7} \times \frac{4}{5} + \frac{6}{7} \times \frac{1}{5}$

$$= \frac{4+6}{35} = \frac{10}{35} = \frac{2}{7}$$

**S88. Ans.(c)**

**Sol.** let the radius of the outer circle be R m.

And the radius of the inner circle be r m.

Then, according to the question

$$2\pi R - 2\pi r = 88$$

$$\text{or, } R - r = \frac{88 \times 7}{2 \times 22} = 14$$

$$\text{Or, } R = 14 + r = 14 + 3.5 = 17.5 \text{ m}$$

$$\text{Now, area of the road} = \pi (17.5^2 - 3.5^2)$$

$$= \frac{22}{7} \times 21 \times 14 = 924 \text{ m}^2$$

**S89. Ans.(a)**

**Sol.** Required number of 5 digit number =  $\begin{matrix} - & - & - & - & - \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \\ 6 & \times & 6 & \times & 5 & \times & 4 & \times & 3 \end{matrix}$

$$= 2160$$

**S90. Ans.(e)**

**Sol.** Let initially chiru has Rs. x with him.

ATQ,

$$\frac{x}{8} + 9 = \frac{x}{5} \text{ (he saves Rs. 9 per dozen)}$$

$$\Rightarrow \frac{x}{5} - \frac{x}{8} = 9 \Rightarrow \frac{3x}{40} = 9$$

$$\Rightarrow x = \text{Rs. } 120$$

**S91. Ans.(d)**

**Sol.** Number of males in city K =  $\frac{40}{100} \times 20,000 = 8000$

Number of males who left city K =  $\frac{40}{100} \times 8000 = 3200$

Number of males in city L =  $\frac{60}{100} \times 25,000 = 15000$

Total number of males in city L after Males who joined city L  
=  $15000 + 3200 = 18200$

**S92. Ans.(c)**

**Sol.** Literate people from city L

$$= \frac{7}{10} \times 25,000 = 175,00$$

Illiterate people from city M

$$= \frac{8}{10} \times 35,000 = 28000$$

$$\therefore \text{Percentage} = \frac{17500}{28000} \times 100 = 62.5\%$$

**S93. Ans.(a)**

**Sol.** 30 percent of male from city M

$$= \frac{20}{100} \times 35,000 \times \frac{30}{100}$$

$$= 2100$$

$\therefore$  2100 male from city M are illiterate

Female from city M who are illiterate

$$= \frac{4}{5} \times 35,000 - 2100$$

$$= 28000 - 2100 = 25900$$

$$\therefore \text{Ratio} = \frac{2100}{25900} = 21 : 259$$

**S94. Ans.(b)**

**Sol.** Required average

$$= \frac{15000 + 7500 + 28000 + 24000 + 27500}{5} = 20400$$

**S95. Ans.(d)**

**Sol.** Since the illiterate males from city K and city L cannot be determined.

**S96. Ans.(d)**

**Sol.** The distance between them 1 minute before they collide is equal to the distance covered by them towards each other in 1 minute.

$$\text{Hence, req. answer} = \left(\frac{1}{60}\right) \times 15 = \frac{1}{4} = 0.25 \text{ km}$$

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**S97. Ans.(c)****Sol.** ATQ,

$$\frac{2000 \times x}{100} + \frac{2000 \times (x + 2)}{100} + \frac{2000 \times (x + 4)}{100} + \frac{2000 \times (x + 6)}{100} + \frac{2000 \times (x + 8)}{100} = 1500$$

$$\text{or, } \frac{2000}{100} (x + x + 2 + x + 4 + x + 6 + x + 8) = 1500$$

$$\text{or, } 5x + 20 = \frac{150}{2}$$

$$\text{or, } x = 11$$

**S98. Ans.(b)****Sol.** Average C. P. of all three varieties =  $30 \times \frac{5}{6} = \text{Rs. } 25$ Let,  $x$  kgs of first variety $y$  kys of second variety

are taken,

then,

$$(x + y + 2)25 = 20x + 24y + 30 \times 2$$

$$\text{or, } 5x + y = 10$$

$$x = 1 \text{ \& } y = 5$$

are the only possible values.

Hence, 5 kgs of second variety are taken.

**S99. Ans.(c)****Sol.** Total ways of arranging the four letters =  $\frac{4!}{2!2!} = 6$ 

$$\text{No. of arrangements where vowels are together} = \frac{(4 - 2 + 1)!}{2!} = 3$$

$$\text{Req. no. of ways} = 6 - 3 = 3$$

**S100. Ans.(d)****Sol.** Let, the distance between X and Y be ' $x$ ' km.When B covers ' $x - 11$ ' km, A covers ' $x + 11$ ' kmWhen B covers ' $x + 9$ ' km, C covers ' $x - 9$ ' km

ATQ,

$$\frac{(x+11)}{(x-11)} \times (x+9) = \frac{3}{2}$$

$$\text{or, } 2(x^2 + 20x + 99) = 3(x^2 - 20x + 99)$$

$$\text{or, } x^2 - 100x + 99 = 0$$

$$\text{or, } x = 99, 1$$

Hence, answer is  $x = 99$ , as  $x = 1$  is not acceptable.**S101. Ans.(a)****Sol.**

$$? = \frac{144 \times 12 \times 36 \times 36}{432} = 5184$$

**S102. Ans.(d)**

**Sol.**  $(?)^2 = 121$

$? = 11$

**S103. Ans.(d)****Sol.**

$$\begin{aligned}
? &= \frac{7}{3} + \frac{17}{5} \times \frac{5}{4} - \frac{8}{3} \\
&= \frac{7}{3} + \frac{17}{4} - \frac{8}{3} \\
&= \frac{17}{4} - \frac{1}{3} \\
&= \frac{51-4}{12} \\
&= \frac{47}{12}
\end{aligned}$$

**S104. Ans.(c)****Sol.**

$$\begin{aligned}
\frac{1898}{73} \times 72 &= (?)^2 \times 13 \\
\Rightarrow 26 \times 72 &= (?)^2 \times 13 \\
\Rightarrow (?)^2 &= \frac{26 \times 72}{13} = 144 \\
\therefore ? &= \sqrt{144} = 12
\end{aligned}$$

**S105. Ans.(d)****Sol.**

$$\begin{aligned}
\{(0.9)^2\}^2 \div \{(0.9)^3\}^3 \times (0.9)^2 &= (0.9)^{? - 3} \\
\Rightarrow (0.9)^4 \div (0.9)^9 \times (0.9)^2 &= (0.9)^{? - 3} \\
\Rightarrow (0.9)^{4-9+2} &= (0.9)^{? - 3} \\
\Rightarrow ? &= 3 - 3 = 0
\end{aligned}$$

**S106. Ans.(b)****Sol.** Series is  $\times 1.5+1, \times 3+2, \times 6+3, \times 12+4 \dots$ 

$\therefore ? = 60 \times 12 + 4 = 724$

**S107. Ans.(c)****Sol.** Series is  $+8, +16, +32, +64, +128 \dots$ 

$\therefore ? = 122 + 128 = 250$

**S108. Ans.(d)****Sol.**

13	42	73	108	151	210	301
	↑	↑	↑	↑	↑	↑
	+29	+31	+35	+43	+59	+91
	↑	↑	↑	↑	↑	↑
	+2	+4	+8	+16	+32	



**S109. Ans.(a)****Sol.** Series is  $\times 1+2, \times 3+4, \times 5+6, \times 7+8, \times 9+10 \dots$ 

$$\therefore ? = 715 \times 9 + 10$$

$$= 6445$$

**S110. Ans.(b)****Sol.** Series is  $+13, +26, +39, +52, +65$ 

$$\therefore ? = 261 + 65 = 326$$

**S111. Ans.(b)****Sol.** Required percentage

$$= \frac{20 \times 25 - 22 \times 20}{20 \times 25} \times 100 = 12\%$$

**S112. Ans.(c)****Sol.** Required average =  $\frac{(18 + 16) \times 20}{(18 + 14) \times 25} = \frac{17}{20}$ **S113. Ans.(a)****Sol.** No. of missiles purchased by India

$$= \frac{(32 \times 25 - 32 \times 20)}{25} \text{ lakhs}$$

$$= 6.4 \text{ lakhs}$$

**S114. Ans.(b)****Sol.** Required answer

$$= \frac{1}{3} \times \frac{48}{100} \times 25 - \frac{1}{3} \times \frac{46}{100} \times 20$$

$$= 93333 \frac{1}{3} \text{ crore}$$

**S115. Ans.(d)****Sol.** Budget allotted for health sector in 2018

$$= \frac{125}{100} \times \frac{16}{100} \times 20,000,00$$

$$= 4,00,000 \text{ crore}$$

$$\therefore \text{Required answer} = \frac{4}{25} \times 100 = 16\%$$

**S116. Ans.(a)****Sol.** One minute's work of third tap

$$= \left( \frac{1}{10} + \frac{1}{12} \right) - \frac{1}{15} = \frac{7}{60}$$

 $\therefore$  time taken by third tap to empty the filled tank

$$= \frac{60}{7} \text{ min or } 8 \text{ min } 34 \text{ sec.}$$

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**S117. Ans.(b)****Sol.** Time taken by both pipes X and Y to fill  $\frac{1}{3}$ rd of the tank

$$= \frac{1}{3} \times \left( \frac{10 \times 15}{25} \right) = 2 \text{ hrs.}$$

 $\therefore$  Total time to fill the tank

$$= 2 + \frac{(10 \times 15)}{25}$$

$$= 8 \text{ hrs.}$$

**S118. Ans.(b)****Sol.** Let required length is x metres.

$$\frac{300 \times 1}{(405 \times 5.5 \times 4)} = \frac{2000 \times 6}{20 \times 16 \times x}$$

$$\Rightarrow x = 1113.75 \text{ m}$$

**S119. Ans.(a)****Sol.** 2 days work by given no. of persons

$$= \frac{4 \times 2}{6 \times 12} + \frac{12 \times 2}{8 \times 18} + \frac{20 \times 2}{18 \times 10}$$

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

$$\text{Remaining work} = 1 - \frac{1}{2} = \frac{1}{2}$$

$$\therefore \text{Required number of men} = \frac{1}{2} \times 72$$

$$= 36$$

**S120. Ans.(a)**

$$\text{Sol. Required ratio} = \frac{30}{28 \times 15} : \frac{18}{15 \times 24}$$

$$= 10 : 7$$

**Solution (121-125):**

$$\text{Number of Medical books} = \frac{24000 \times 7}{16} = 10,500$$

$$\text{Number of Non-Medical books} = 24,000 - 10,500 = 13,500$$

$$\text{Number of books for MBBS} = \frac{10,500}{210} \times 110 = 5500$$

$$\text{Number of books for BDS} = 10500 - 5500 = 5000$$

$$\text{Number of books for BSC} = 13,500 \times \frac{36}{100} \times \frac{4}{9} = 2160.$$

$$\text{Number of books for Diploma} = 13,500 \times \frac{36}{100} - 2160 = 2700$$

$$\text{Total number of books for management and engineering} = 13,500 - (2160 - 2700) = 8640$$

$$\text{Number of books for management} = 8640 \times \frac{21}{48} = 3780.$$

$$\text{Number of books for engineering} = 8640 - 3780 = 4860$$

**S121. Ans.(b)****Sol.** Required difference =  $5000 - 4860 = 140$ **S122. Ans.(a)****Sol.** Required ratio =  $\frac{(5500+2700)}{(3780+4860)} = \frac{205}{216}$ **S123. Ans.(d)****Sol.** Required % =  $\frac{(5500-3780)}{5500} \times 100 = 31\frac{3}{11}\%$ **S124. Ans.(a)****Sol.** Required % =  $\frac{8640}{10500} \times 100 = \frac{576}{7}\% = 82\frac{2}{7}\%$ **S125. Ans.(c)****Sol.** Required difference =  $(4860 + 2160 + 2700) - (5000 + 3780) = 9720 - 8780 = 940$ **S126. Ans.(c)****Sol.**

$$\frac{40}{100} \times ? - \frac{50}{100} \times 36 \approx \frac{40}{100} \times 260$$

$$\Rightarrow ? \approx \frac{284}{40} \times 100$$

$$\Rightarrow ? \approx 710$$

**S127. Ans.(a)****Sol.**

$$? = \frac{3}{4} \times \frac{7}{5} \times 100 + \frac{3}{4} \times 432$$

$$? \approx 105 + 324$$

$$? \approx 429$$

**S128. Ans.(d)****Sol.**

$$? \approx 224 + 369 + 460 - 381$$

$$? \approx 1053 - 381$$

$$? \approx 672$$

**S129. Ans.(a)****Sol.**

$$? \approx \sqrt{\frac{30}{100} \times 450 + \frac{20}{100} \times 170}$$

$$? \approx \sqrt{135 + 34}$$

$$? \approx \sqrt{169}$$

$$? \approx 13$$



**S130. Ans.(b)****Sol.**

$$? \approx 110 \div 22 \times 60 + 315 - 220$$

$$? \approx 615 - 220$$

$$? \approx 395$$

**S131. Ans.(a)****Sol.** Let radius of cylinder = x

And height of cylinder is 8x

$$\text{Total surface area} = 2\pi \cdot x \cdot 8x + 2\pi x^2$$

$$= 2\pi \cdot 9x^2$$

$$= 18\pi x^2$$

If height of cylinder is reduced by  $12\frac{1}{2}\%$ 

Then new total surface area

$$= 2\pi x \cdot 7x + 2\pi x^2$$

$$= 2\pi \cdot 8x^2$$

$$= 16\pi x^2$$

So, percentage change in area

$$= \frac{18\pi x^2 - 16\pi x^2}{18\pi x^2} \times 100$$

$$= \frac{2}{18} \times 100$$

$$= \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$

**S132. Ans.(b)****Sol.** ATQ,

$$\frac{2}{3}\pi R^3 = 4 \times \frac{4}{3}\pi r^3$$

$$R^3 = 8r^3$$

$$R = 2r$$

**S133. Ans.(d)****Sol.** Let radius of circle be r cm.

$$\therefore r = a = \sqrt{144} = 12 \text{ cm}$$

ATQ,

Let radius of hemisphere be R.

$$3\pi R^2 + 3\pi R^2 = \pi r^2$$

$$6\pi R^2 = \pi \times 12 \times 12$$

$$R = \sqrt{24}$$

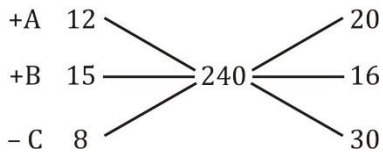
$$= 2\sqrt{6} \text{ cm}$$

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**S134. Ans.(c)**

**Sol.** Let A, B are inlet pipe and C are outlet pipe



Let total volume = 240 L

$$\begin{aligned} \text{Work done on 3 hours} &= 3(20 + 16) - 30 \\ &= 108 - 30 = 78 \end{aligned}$$

So,  $78 \times 3 = 234$  L can be filled in 9 hours.

Now 6 unit are still remaining

$$= \frac{6}{36} \times 60 \text{ min} = 10 \text{ min}$$

So total time = 9 hours 10 min

**S135. Ans.(e)**

**Sol.** Let speed of stream =  $y$  kmph

$$\text{ATQ, } \frac{12}{5.5-y} = \frac{21}{5.5+y}$$

$$\Rightarrow y = 1.5 \text{ kmph}$$

$$\text{Required percent} = \frac{(5.5-1.5)}{1.5} \times 100$$

$$= \frac{40}{15} \times 100 = 266\frac{2}{3}\%$$

**S136. Ans.(d)**

**Sol.** Number of children who are attending school from M, L and O =  $(32\% + 14\% + 20\%)$  of 1450

$$= \frac{66}{100} \times 1450 = 957$$

Number of children who are not attending school from L, N and P =  $55\%$  of 2040 –  $48\%$  of 1450 =  $1122 - 696 = 426$

$$\text{Required ratio} = \frac{957}{426} = \frac{319}{142}$$

**S137. Ans.(a)**

**Sol.** Total number of children who are attending school from M, N and O =  $(32\% + 12\% + 20\%)$  of 1450

$$= 464 + 174 + 290 = 928$$

Number of children who are attending school from P and L =  $36\%$  of 1450 = 522

Number of children who are not attending school from village O =  $408 - 290 = 118$

$$\text{Required percentage} = \frac{928 - (522 + 118)}{522 + 118} \times 100 = 45\%$$

**S138. Ans.(e)**

**Sol.** Number of students who attended school from M, L, N =  $(32\% + 14\% + 12\%)$  of 1450 = 841

Number of students who have not attend school from N =  $\frac{10}{100} \times 2040 - \frac{12}{100} \times 1450 = 30$

Number of students who have not attended school from O =  $408 - 290 = 118$

Hence, percentage increase in number of children who have attended school from M, L, and N

$$= \frac{118 + 30}{841} \times 100 = 17.6\%$$

**S139. Ans.(c)****Sol.** Average of children who are attending school from L, M, N and O

$$= \frac{1450 - \frac{22}{100} \times 1450}{4} = \frac{1131}{4} = 282.75$$

Total children who are not attending school from village P, N and M = 65% of 2040 - 66% of 1450 = 369

$$\text{Average} = \frac{369}{3} = 123$$

$$\text{Difference in Average} = 282.75 - 123 = 159.75 \approx 160$$

**S140. Ans.(d)****Sol.** Children who are going school from P, L and O = (22% + 14% + 20%) of 1450

$$= \frac{56}{100} \times 1450 = 812$$

Children who are from village O, P and M = (20% + 30% + 25%) of 2040

$$= \frac{75}{100} \times 2040 = 1530$$

$$\text{Required difference} = 1530 - 812 = 718$$

**S141. Ans.(e)****Sol.** Using both the statements, since Rahul got less than 83% in Science and still got admission, he must have got more than 88% in Mathematics.

Hence both the statements are necessary to answer the question

**S142. Ans.(c)****Sol. From I.**

$$\therefore 32 \text{ boys} = 32 \times \frac{3}{4} = 24 \text{ men}$$

Let 20 men do the work in  $x$  days.

$$\therefore 20x = 24(x - 10)$$

$$\therefore x = 60 \text{ days}$$

20 men can do the job in 60 days

$$\therefore 10 \text{ men will do the same job in } 60 \times 2 = 120 \text{ days}$$

Hence, statement I alone is sufficient to answer the question.

**From statement II.**

$$\therefore 1 \text{ woman} = 1 \text{ boy}$$

$$\therefore 1 \text{ man, 1 woman and 1 boy} = 1 \text{ man and 2 boys}$$

$$\therefore 1 \text{ boy completes the work in 70 days.}$$

$$\therefore 2 \text{ boys complete the work in 35 days.}$$

And 1 man and 2 boys work for 7 days.

$$1 \text{ man will take } \left( \frac{35 \times 7}{35 - 7} \right) \text{ days, ie } \frac{35}{4} = 8 \frac{3}{4} \text{ days.}$$

$$\therefore 10 \text{ men will do the same job in } \frac{35}{10}$$

$$= \frac{35}{40} \text{ days.}$$

Therefore, statement II alone also can give the answer.

Hence, either I alone or II alone can answer the question.

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## NIACL AO 2019

### (Generalists)

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### PHASE-I

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**S143. Ans.(e)**

**Sol.** Let the labeled price be Rs.  $x$ .

Then, **from I.**  $CP = \frac{x \times 75}{100} = \frac{3x}{4}$

**From II.**  $SP = \frac{x \times 115}{100} = \frac{23x}{20}$

Now,  $\frac{23x}{20} = 34500$

$\therefore x = \frac{34500 \times 20}{23} = \text{Rs. } 30000$

$\therefore CP = \frac{3x}{4} = \frac{3 \times 30000}{4} = \text{Rs. } 22500$

Hence, Mr. Gupta's cost price = Rs. 22500

Thus, both statements are necessary to answer the question.

**S144. Ans.(e)**

**Sol. From I and II.** Let the speed of A be  $4x$  km/hr and speed of B be  $5x$  km/hr respectively.

Then  $5x - 4x = 20$  kmph

or,  $x = 20$  kmph

Now, speed of A =  $4 \times 20 = 80$  kmph

Speed of B =  $5 \times 20 = 100$  kmph

$\therefore$  Distance between P and Q =  $D$  km

Now,  $\frac{D}{80} - \frac{D}{100} = 1$

or,  $\frac{5D - 4D}{400} = 1$

$\therefore D = 400$  km

**S145. Ans.(a)**

**Sol. From I:**

Number of children = 42

**S146. Ans.(e)**

**Sol. I.**  $\sqrt{x + 18} = \sqrt{144} - \sqrt{49}$

$\Rightarrow \sqrt{x + 18} = 5$

$\Rightarrow x + 18 = 25$

$\Rightarrow x = 7$

**II.**  $y^2 + 409 = 473$

$\Rightarrow y^2 = 64$

$\Rightarrow y = \pm 8$

No relation between  $x$  and  $y$ .

**S147. Ans.(a)**

**Sol. I.**  $y^2 - x^2 = 32$

$\Rightarrow (x + 2)^2 - x^2 = 32$

$\Rightarrow x^2 + 4 + 4x - x^2 = 32$

$\Rightarrow 4x = 28$

$\Rightarrow x = 7$

$$\begin{aligned} \text{II. } y - x &= 2 \\ \Rightarrow y - 7 &= 2 \\ \Rightarrow y &= 9 \\ \therefore x &< y \end{aligned}$$

**S148. Ans.(e)**

$$\begin{aligned} \text{Sol. I. } \sqrt{x} - \frac{\sqrt{5}}{\sqrt{x}} &= 0 \\ \Rightarrow \frac{x - \sqrt{5}}{\sqrt{x}} &= 0 \\ \Rightarrow x - \sqrt{5} &= 0 \\ \Rightarrow x &= \sqrt{5} \end{aligned}$$

$$\begin{aligned} \text{II. } y^3 - 5\left(\frac{3}{2}\right) &= 0 \\ \Rightarrow y &= 5^{\frac{1}{2}} = \sqrt{5} \\ \therefore x &= y \end{aligned}$$

**S149. Ans.(a)**

$$\begin{aligned} \text{Sol. I. } 8x^2 + 78x + 169 &= 0 \\ \Rightarrow 8x^2 + 52x + 26x + 169 &= 0 \\ \Rightarrow 4x(2x + 13) + 13(2x + 13) &= 0 \\ \Rightarrow (4x + 13)(2x + 13) &= 0 \\ \Rightarrow x &= -\frac{13}{4}, -\frac{13}{2} \end{aligned}$$


$$\begin{aligned} \text{II. } 20y^2 - 117y + 169 &= 0 \\ \Rightarrow 20y^2 - 65y - 52y + 169 &= 0 \\ \Rightarrow 5y(4y - 13) - 13(4y - 13) &= 0 \\ \Rightarrow (5y - 13)(4y - 13) &= 0 \\ \Rightarrow y &= \frac{13}{5}, y = \frac{13}{4} \\ \therefore x &< y \end{aligned}$$

**S150. Ans.(b)**

$$\begin{aligned} \text{Sol. I. } \frac{15}{\sqrt{x}} + \frac{9}{\sqrt{x}} &= 11\sqrt{x} \\ \Rightarrow \frac{15 + 9}{\sqrt{x}} &= 11\sqrt{x} \\ \Rightarrow 11x &= 24 \\ \Rightarrow x &= \frac{24}{11} \end{aligned}$$

$$\begin{aligned} \text{II. } \frac{\sqrt{y}}{4} + \frac{5\sqrt{y}}{12} &= \frac{1}{\sqrt{y}} \\ \Rightarrow \frac{3\sqrt{y} + 5\sqrt{y}}{12} &= \frac{1}{\sqrt{y}} \\ \Rightarrow 3y + 5y &= 12 \\ \Rightarrow y &= \frac{12}{8} = \frac{3}{2} \\ \therefore x &> y \end{aligned}$$





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