Section-wise Grand Test – Quantitative Aptitude – SWGTQ-180105

HINTS & SOLUTIONS

ANSWER KEY

1.(3)	11. (4)	21. (4)	31. (4)	41. (1)
2.(1)	12. (2)	22. (2)	32.(1)	42. (3)
3.(3)	13. (1)	23. (2)	33. (4)	43. (2)
4.(1)	14. (3)	24. (3)	34. (3)	44. (5)
5.(2)	15. (4)	25. (2)	35. (2)	45. (4)
6. (5)	16. (1)	26. (3)	36. (2)	46. (1)
7. (3)	17. (3)	27. (4)	37. (2)	47. (4)
8. (4)	18. (4)	28. (2)	38. (5)	48. (3)
9. (1)	19. (5)	29. (4)	39.(4)	49. (4)
10. (3)	20. (2)	30. (1)	40. (1)	50. (5)

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1.(3) Let speed of man be x km/hr and that of current be r kmph.

Let speed of man be x km/hr and that of current be r kmph.

$\frac{2}{x-r} = \frac{15}{60}$ or, $x - r = 8$ ....(i)

$\frac{2}{x+r} = \frac{10}{60}$ or, $x + r = 12$ ......(ii)

Solving (i) and (ii),

$x = 10, r = 2$

Required time $= \frac{2}{10-4} = \frac{2}{6} = \frac{1}{3}$ hr. $= \frac{1}{3}$ hr = 20 minutes

2.(1) Let speed of longer train be x and that of shorter train be y.

Then, $\frac{x+y}{x-y} = \frac{42}{21}$

or, $x + y = 2x - 2y$

or, $x = 3y$

or, $\frac{x}{y} = \frac{3}{1}$

3.(3) No. of ways $= {}^8C_5 \times {}^4C_2 + {}^8C_6 \times {}^4C_1 + {}^8C_7$

$= \frac{8\times7\times6}{3\times2} \times \frac{4\times3}{2} + \frac{8\times7}{2} \times 4 + 8$

= 456

4.(1) Area leveled by roller $= 400 \times 2 \times \frac{22}{7} \times \frac{0.42}{2} \times 1$

$= 528\ m^2$

Total cost = 528×100 = Rs. 52800

5.(2) For the biggest cube, face diagonal of cube = diameter of cylinder

$\sqrt{2}a = 30$

or, $a = 15\sqrt{2} \approx 21.2cm$

But, the side of the cube cannot be more than 20 cm

Therefore ; $a = 20cm$

Volume $= a^3 = 8000\ cm^3$

6. (5) Let time taken to complete the work by a man and a woman are 'M' and 'W' days respectively.

A → $\frac{2}{M} + \frac{3}{W} = \frac{1}{6}$

B → $\frac{W}{9} - \frac{M}{3} = 5$

C → $\frac{8/W}{4/M} = \frac{1}{3}$

Ratio of efficiencies is required to answer the question which can be obtained from either C alone or A and B together.

Hence, the question can be answered by using either C alone or A and B together.

7. (3) Length of train B is 20% less than that of train A.

A → Train A crosses another train B moving in same direction in 72 sec.

∴ Time taken = 72 sec

B → Speed of train A is 25km/h more than that of train B.

∴ Speed of train A – Speed of train B = 25km/h.

C → Length of train B is 20% less than that of train A.

∴ Let the lengths of trains A and B be 5x and 4x meters respectively.

From all the three statements,

Since the trains are moving in the same directions,

∴ Relative speed = Speed of train A – Speed of train B = 25km/h

Sum of lengths of trains = 5x + 4x = 9x

Time taken $= \frac{\text{Sum of lengths of trains}}{\text{Relative speed}}$

$\Rightarrow 72 = \frac{9x}{25}$

Hence, the question can be answered by using all the three statements together.

8. (4) A → Cone has same base as that of the cylinder (same radius) and height 30 cm.

Volume of cone = Volume of cylinder

$\Rightarrow \frac{1}{3} \times \pi \times (r_{cone})^2 \times h_{cone} = \pi \times (r_{cylinder})^2 \times h_{cylinder}$

$\Rightarrow \frac{1}{3} \times h_{cone} = h_{cylinder}$ $(\because r_{cone} = r_{cylinder})$

$\Rightarrow h_{cylinder} = 10$ cm

B → Circumference of base of the cylinder = 132 cm

$\Rightarrow 2 \times \pi \times r_{cylinder} = 132$ cm

$\Rightarrow r_{cylinder} = 21$ cm

C → Volume of cylinder = 13860 cm^3

$\Rightarrow \pi \times (r_{cylinder})^2 \times h_{cylinder} = 13860\ cm^3$

Radius and height of the cylinder can be obtained from any two statements.

Hence, the question can be answered by using any two of the three statements together.

9. (1) A → Let the number of green and blue balls in the bag be 4x and 3x respectively.

B → Numbers of red balls + 2 = Number of green balls

⟹ R + 2 = G

C → Number of green balls + Number of blue balls = 2 × Number of red balls

⟹ G + B = 2R

Probability of getting a red ball $= \frac{\text{Number of red balls}}{\text{Total number of balls}}$

$= \frac{R}{G+B+R}$

$= \frac{R}{3R}$

From statements A and B,

Number of red balls = Number of green balls – 2 = 4x – 2

Probability of getting a red ball $= \frac{\text{Number of red balls}}{\text{Total number of balls}}$

$= \frac{4x-2}{4x+3x+4x-2}$

$= \frac{4x-2}{11x-2}$

Hence, C alone is sufficient to answer the question.

10. (3) A → 6 × SP = 7 × CP

$\Rightarrow CP = \frac{6}{7}$ of SP

B → SP – 40 = CP + 10% of CP

$\Rightarrow$ SP – 40 = 1.1 of CP

C → $\left(100 - 14\frac{2}{7}\right)$% of SP = CP

$\Rightarrow CP = \frac{6}{7}$ of SP

Hence, either A and B together or B and C together are sufficient to answer the question.

11. (4) Let the height of water in vessel D be h cm.

Volume of vessel E =Volume of water in vessel D

$\Rightarrow \frac{2}{3} \times \Pi \times 21^3 = \Pi \times 28^2 \times h$

$\Rightarrow h = \frac{63}{8} = 7\frac{7}{8}$ cm

12. (2) Capacity of vessel A = (length)³ = 35³ = 42875 cm^2

Capacity of vessel B = Area of bottom × height = 1260 × 25 = 31500 cm^2

Required Percentage = $\frac{42875 - 31500}{31500} \times 100$

$= 36\frac{1}{9}\%$

13. (1) $\frac{\text{Radius of vessel C}}{\text{Height of vessel C}} = \frac{3}{4}$

$\Rightarrow \frac{\text{Radius}}{28} = \frac{3}{4}$

Radius of vessel C = 21 cm

Slant height of vessel C = $\sqrt{\text{Radius}^2 + \text{Height}^2}$

$= \sqrt{21^2 + 28^2}$

= 35 cm

Ratio of lateral surface areas of vessel C and vessel E:

$\frac{\text{Lateral Surface Area of vessel C}}{\text{Lateral Surface Area of vessel E}}$

$= \frac{\Pi \times \text{Radius} \times \text{Slant Height}}{2 \times \Pi \times \text{Radius}^2}$

$= \frac{\Pi \times 21 \times 35}{2 \times \Pi \times 21^2}$

$= \frac{5}{6} = 5:6$

14. (3) Let the radius of vessel F be r cm

Capacity of cylindrical vessel F = 10% more than capacity of vessel A

$\frac{22}{7} \times r^2 \times 49 = 1.1 \times 35 \times 35 \times 35$

$\Rightarrow r = 17.5$ cm

Required Percentage = $\frac{21 - 17.5}{21} \times 100$

$= 16\frac{2}{3}\%$

15. (4) Total Area to be painted = Lateral Surface Area of vessel D + (Lateral Surface Area + Area of the bottom) of vessel A

$= 2 \times \frac{22}{7} \times 28 \times 20 + 5 \times 35 \times 35$

= 3520 + 6125 = 9645 cm^2

Total expenditure = 0.2 × 9645 = Rs.1929.

16. (1) Time taken by Shyam on Tuesday = 4 h

Let distance covered by Shyam on Monday and Tuesday be and respectively

And speed of Shyam on Monday and Tuesday be and respectively.

So, $\frac{4x}{4y} = 4 \Rightarrow x = 4y$

Let distance covered by Meena on Monday and Tuesday be 13 m and 11 m

And speed of Meena on Monday and Tuesday be 13n and 22n

$\frac{11m}{22n} = 4 \Rightarrow m = 8n$

According to question,

$4x = \left(1 + \frac{5}{11}\right)11m \Rightarrow 4x = \frac{16}{11} \times 11m \Rightarrow x = 4m$

Or

$x = 4 \times 8n$

$x = 32$ n

Required ratio = $y : 22n = \left(\frac{x}{4}\right) : \left(22 \times \frac{x}{32}\right) = \frac{x}{4} : \frac{11x}{16} = 4 : 11$

17. (3) Let speed of Ram and Tinku on Tuesday is 4y and 7n respectively

So,

$\frac{600}{4y + 7n} = 4$

$4y + 7n = 150$ ...(i)

Let distance covered by Ram on Monday and Tuesday be 3x and 4x

$\frac{4x}{4y} = 5$

x = 5y ...(ii)

But 3x = 300

x = 100

Putting x in eq. (ii)

$y = \frac{x}{5}$

$= \frac{100}{5} \Rightarrow y = 20$

Putting value of y in (i)

$4 \times 20 + 7n = 150$

$7n = 150 - 80$

n = 10

Distance covered by Tinku on Tuesday = 7 × 10 × 4 = 280 km

Distance covered by Tinku on Monday = $\frac{280}{7} \times 9 = 360$ km

18. (4) Let Distance covered by Tina on Monday & Tuesday = 7x and 9x

And speed of Tina on Monday and Tuesday be 2y and 3y

so $\frac{9x}{3y} = 6$

x = 2y

Time taken by Tina on Monday = $\frac{7x}{2y} = \frac{7 \times 2y}{2y} = 7$ hours

Similarly time taken by Meena on Monday = 8 hour

Required percentage = $\frac{8 - 7}{8} \times 100 = \frac{100}{8}\% \Rightarrow 12\frac{1}{2}\%$

19. (5) Speed of Ram on Monday and Tuesday will be 60 km/hr, 80 km/hr respectively

Distance covered by Ram on Tuesday = 80 × 5 = 400 km

Distance covered by Ram on Monday = $\frac{400}{4} \times 3 = 300$

According to question

(400 + 300) difference, distance covered by Shyam on both days = 740

Distance covered by Shyam on Monday

$= \frac{740 + 700}{9} \times 5$

$= \frac{1440}{9} \times 5$

= 800 km

Required ratio = 3 : 8

20. (2) Distance travelled by Shyam on Tuesday

$= \frac{800}{5} \times 4$

= 640 km

$\frac{640}{4} = 4y$ when (4y is speed of Shyam on Tuesday)

y = 40

Distance travelled by Tinku on Tuesday = $\frac{360}{9} \times 7 = 280$ km

$\frac{280}{4} = 7y$ (where 7y speed of Tinku on Tuesday)

y = 10

Speed of Tinku on Monday = 9y = 90 km/hr

Required ratio = 4 : 9

21. (4) B requires twice the time A requires to do the work.
∴ Ratio of efficiencies of A and B = 2 : 1
Let, A and B do 2x units and x units of work per day respectively.
Work done by A = 10 × 2x = 20x units
Work done by B = (10 + 4) × x = 14x units
Ratio of the efficiencies of C and D = 5 : 3
Let, C and D do 5y units and 3y units of work per day respectively.
2 days' work of C and D = 5y + 3y = 8y units
30 days' work of C and D = $\frac{30}{2} \times 8y = 120y$ units
Now,
32% of the total work is done by C and D.
32% of total work = 120y units
Total work = $\frac{100}{32} \times 120y = 375y$
68% of total work = 20x + 14x = 34x
∴ Total work = $\frac{100}{32} \times 120y = \frac{100}{68} \times 34x$
$\Rightarrow x = \frac{15}{2}y$
So, the efficiencies of A, B, C and D per day are
$15y, \frac{15}{2}y$, 5y and 3y units respectively.
Time taken by A to complete twice the work
$= \frac{2 \times 375y}{15y} = 50$ days

22. (2) 10 days' work of A and B
$= 10 \times (15y + \frac{15}{2}y) = 225y$ units
Work done by E and F
= 375y – 225y = 150y units
Time taken by E and F to complete the whole work
$= \frac{12}{150y} \times 375y = 30$ days
Per day work done by E and F = $\frac{1}{30}$
Ratio of efficiencies of E and F is 3 : 2.
Diff. b/w part of work done by E alone and work done by F alone $= \frac{3-2}{3+2} = \frac{1}{5}$
Diff. b/w part of work done by E alone and work done by F alone in one day $= \frac{1}{5} \times \frac{1}{30} = \frac{1}{150}$

23. (2) Clearly, at the beginning of a year and at the end of first quarter, the investment made by B is half of the total investment made by all the three till the end of first quarter
If they invest additional amount at the end of each quarter in the same ratio as they invested at the end of the first quarter, then the total investment made by B will be half of the total investment made by all the three for the whole year.
∴ Profit of B = $\frac{1}{2} \times 17500$ = Rs.8750

24. (3) Let, the amounts invested by A, B and C:

	A	B	C
At the beginning of the year	400	900	500
At the end of first quarter	5x	9x	4x
At the end of second quarter	5y	4y	10y
At the end of third quarter	z	z	2z

Now,
9x = 4x + 500
$\Rightarrow x = 100$
$\frac{z + z + 2z}{3} = 1200 \Rightarrow z = 900$
$5x = 5y \Rightarrow x = y = 100$
So, the actual investments:

	A	B	C
At the beginning of the year	400	900	500
At the end of first quarter	500	900	400
At the end of second quarter	500	400	1000
At the end of third quarter	900	900	1800

Ratio of profit sharing among A, B and C
= (400 × 12 + 500 × 9 + 500 × 6 + 900 × 3) : (900 × 12 + 900 × 9 + 400 × 6 + 900 × 3) : (500 × 12 + 400 × 9 + 1000 × 6 + 1800 × 3)
= 15000 : 24000 : 21000
= 5 : 8 : 7

25. (2) If each works 2 days at a time alternately starting with A, the work is completed in exactly 10 days.
∴ A works for 6 days and B worked for 4 days.
$\frac{6}{a} + \frac{4}{b} = 1$ ....(i)
If B starts, the work is completed in 10.5 days.
∴ B works for 6 days and A worked for 4.5 days.
$\frac{6}{b} + \frac{4.5}{a} = 1$ ....(ii)
By solving (i) and (ii)
a = 9 days
And, b = 12 days
Time taken by A and B working together to complete the work $= \frac{1}{\frac{1}{a} + \frac{1}{b}} = \frac{1}{\frac{1}{9} + \frac{1}{12}} = \frac{36}{7} = 5\frac{1}{7}$ days

26. (3) Number of unsold Honda City cars in year 2012
$= \left(\left(20 \times \frac{(100-70)}{100}\right) + 50\right) \times \frac{(100-90)}{100}$
= 5.6 thousand
Number of unsold Honda City cars in year 2013
$= (5.6 + 60) \times \frac{(100-100)}{100} = 0$
Number of unsold Honda City cars in year 2014
$= 50 \times \frac{(100-80)}{100} = 10$ thousand
Number of unsold Honda City cars in year 2015
$= (10 + 30) \times \frac{(100-50)}{100} = 20$ thousand
Number of unsold Honda City cars in year 2016
$= (20 + 40) \times \frac{(100-75)}{100} = 15$ thousand
Required Average = $\frac{5.6+0+10+20+15}{5} = \frac{50.6}{5}$
= 10.12 thousand = 10120

27. (4) Number of Honda Civic cars sold in year 2012
$= \left(\left(80 \times \frac{(100-75)}{100}\right) + 70\right) \times \frac{60}{100} = 54$ thousand
Number of Honda City cars sold in year 2012
$= \left(\left(20 \times \frac{(100-70)}{100}\right) + 50\right) \times \frac{90}{100} = 50.4$ thousand
Total Revenue = 54000×1500000 + 50400×1200000
= (8100 + 6048) crore = Rs.14148 crores

28. (2) Number of Honda Civic cars sold in year 2013
$= \left(\left(\left(\left(80 \times \frac{(100-75)}{100}\right) + 70\right) \times \frac{(100-60)}{100}\right) + 20\right) \times \frac{80}{100} = 44.8$ thousand
100% of Honda City cars sold in year 2013. Therefore, No unsold Honda City car left at the beginning of year 2014.
Number of Honda City cars sold in year 2014 = $50 \times \frac{80}{100} = 40$ thousand
Required percentage = $\frac{44.8 - 40}{40} \times 100 = 12\%$

29. (4) 100% of Honda City cars sold in year 2013. Therefore, No unsold Honda City car left at the beginning of year 2014.
Number of Honda City cars sold in year 2014

$= 50 \times \frac{80}{100} = 40$ thousand

Number of Honda City cars sold in year 2015

$= \left(\left(50 \times \frac{(100-80)}{100}\right) + 30\right) \times \frac{50}{100} = 20$ thousand

Number of unsold Honda Civic cars in year 2011

$= 80 \times \frac{(100-75)}{100} = 20$ thousand

Number of unsold Honda Civic cars in year 2012

$= (20 + 70) \times \frac{(100-60)}{100} = 36$ thousand

Required Ratio $= \frac{40+20}{20+36} = \frac{60}{56} = 15 : 14$

30. (1) Number of Honda Civic cars available for sale:

In 2011 = 80 thousand

In 2012 $= \left(80 \times \frac{(100-75)}{100}\right) + 70 = 90$ thousand

In 2013 $= \left(90 \times \frac{(100-60)}{100}\right) + 20 = 56$ thousand

In 2014 $= \left(56 \times \frac{(100-80)}{100}\right) + 30 = 41.2$ thousand

In 2015 $= \left(41.2 \times \frac{(100-100)}{100}\right) + 60 = 60$ thousand

In 2016 $= \left(60 \times \frac{(100-75)}{100}\right) + 50 = 65$ thousand

Hence, minimum number of Honda Civic cars available for sale was in year 2014.

31. (4) Let the speed of both the buses be x km/h

$\therefore$ Total Distance = 3x + 3x = 6x km

Speed of first bus = 20% less than previous day's speed $= \frac{4}{5}x$ km/h

Speed of second bus = 20% more than previous day's speed $= \frac{6}{5}x$ km/h

First bus leaves 40 minutes earlier than the second.

Let the time taken by the first bus be y hours.

Total distance $= \frac{4}{5}xy + \frac{6}{5}x\left(y - \frac{2}{3}\right) = 6x$

$\Rightarrow y = \frac{17}{5}$ hours

Distance travelled by the first bus $= \frac{17}{5} \times \frac{4}{5}x = \frac{68}{25}x$ km

Distance travelled by second bus $= \left(\frac{17}{5} - \frac{2}{3}\right) \times \frac{6}{5}x = \frac{82}{25}x$ km

According to the question,

Distance travelled by second bus $= \frac{82}{25}x = 3x + 21$

$\Rightarrow \frac{7}{25}x = 21$

$\Rightarrow x = 75$ km/h

$\therefore$ Total Distance = 6x = 450 km

32.(1) Let the distance between city X and Y; and city Y and Z be x km each.

And speeds of bus, stream and boat in still water be b, a and 5a km/h.

Downstream speed = 5a + a = 6a km/h

Upstream speed = 5a – a = 4a km/h

According to the question,

$\frac{x}{6a} + \frac{x}{b} = \frac{2x}{b} + 1$

$\Rightarrow \frac{x}{6a} = \frac{x}{b} + 1$ ....(i)

And, $\frac{2x}{4a} = 12 \Rightarrow x = 24a$

Putting value of x in equation (i),

$4 = \frac{24a}{b} + 1 \Rightarrow \frac{24a}{b} = 3 \Rightarrow \frac{a}{b} = \frac{1}{8}$

Ratio of speed of bus to the speed of boat in still water

$= \frac{\text{Speed of bus}}{\text{Speed of boat in still water}} = \frac{b}{5a} = \frac{8}{5} = 8 : 5$

33. (4) Project team can be formed with following two combinations:

1 project manager, 3 project leads, 2 software tester and 2 software developers

Or 1 project manager, 3 project leads, 1 software tester and 3 software developers

No. of ways of forming the required project team

$= {}^3C_1 . {}^5C_3 . {}^8C_2 . {}^{12}C_2 + {}^3C_1 . {}^5C_3 . {}^8C_1 . {}^{12}C_3$

= 108240

34. (3) Number of ways of forming a team with 2 project leads, 3 software testers and x-2 software developers

$= {}^3C_1 . {}^5C_2 . {}^8C_3 . {}^xC_{x-2} = 35280$

$\Rightarrow 3 \times 10 \times 56 \times \frac{x(x-1)}{2} = 35280$

$\Rightarrow x(x-1) = 42$

Since, x is a positive integer.

$\Rightarrow x = 7$

Number of software developers need to be included in the team = x – 2 = 5

35. (2) Number of software developers recruited = 8 + 1 = 9

Number of male software developers recruited = 9 – 3 = 6

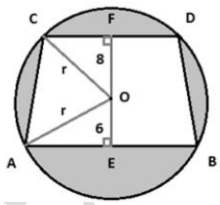
Number of male software developers need to be included in the team = 5 – 2 = 3

Number of ways of forming the required team

$= {}^3C_1 . {}^5C_1 . {}^8C_2 . {}^6C_3 . {}^3C_2$

$= 3 \times 5 \times 28 \times 20 \times 3 = 25200.$

36. (2) Quantity I:



Let O be the center and r be the radius of the circle.

Now,

Radius of the circle:

$r^2 = \frac{AB^2}{4} + 6^2$ .... (i)

Also,

$r^2 = \frac{CD^2}{4} + 8^2$ .... (ii)

From equations (i) and (ii)

$\frac{AB^2}{4} + 6^2 = \frac{CD^2}{4} + 8^2$

$\frac{AB^2 - CD^2}{4} = 8^2 - 6^2$

$\frac{(AB + CD)(AB - CD)}{4} = 28$

$\because$ AB – CD = 4 cm ....(iii)

$\therefore$ AB + CD = 28 cm ....(iv)

From equations (iii) and (iv)

AB = 16 cm

From equation (i)

$r^2 = \frac{16^2}{4} + 6^2 \Rightarrow r = 10$ cm

Radius of the circle = 10 cm

Sum of parallel sides of trapezium = AB + CD = 28 cm

Height of trapezium = OE + OF = 6 + 8 = 14 cm

Area of shaded region = Area of circle – Area of trapezium ABCD

$= \pi \times 10^2 - \frac{1}{2} \times 28 \times 14$

$= 100\pi - 196$

$\approx 118.16\ cm^2$

Quantity II > Quantity I

37. (2) Quantity I:

Time taken by the trains to meet for the first time

$= \frac{\text{Total Distance}}{\text{Relative Speed}}$

$= \frac{360}{40 + 50}$

= 4 hours

Distance between point R and Q
= Distance travelled by train B in 4 hours
= 50 × 4
= 200 km
Quantity II:
Time taken by the train A to reach Q = $\frac{360}{40}$ = 9 hours
Time taken by the train B to reach P = $\frac{360}{50}$ = 7.2 hours
So, at the time when train A reached Q, train B already travelled for 1.8 hours (9 – 7.2 hours) of return journey.
Distance travelled by train B in 1.8 hours = 1.8 × 50 = 90 km
Sum of distances travelled by both the trains to meet for the second time
= 360 – 90 = 270 km
Time taken by the trains to meet for the second time
$= \frac{\text{Total Distance}}{\text{Relative Speed}}$
$= \frac{270}{40+50}$
= 3 hours
Distance between point P and S
= Distance travelled by train B before train A started return journey + Distance travelled by train B in 3 hours
= 90 + 50 × 3
= 240 km
Quantity II > Quantity I

38. (5) Quantity I:
Let vessel A contains 3x litres milk and x litres water and initial quantity of mixture in vessel A be 4x litres.
Half of the content of vessel A is first poured into vessel B, then content of vessel B is poured into vessel C and finally contents of vessel C is poured into vessel A.
So, vessel A finally contains contents of all the three vessels.
Final ratio of milk and water in vessel A:
$\frac{\text{Quanity of milk in all three vessels}}{\text{Quanity of water in all three vessels}} = \frac{9}{4}$
$\frac{3x + 30}{x + 20} = \frac{9}{4}$
$\Rightarrow$ x = 20
Initial quantity of mixture in vessel A = 4x = 80 litres
Quantity I = Quantity II

39.(4) 20 men can complete the work in 12 days. So, 1 man can complete the same work in 240 days.
Efficiency of 5 women = Efficiency of 3 men
5W = 3M
Ratio of efficiencies:
$\frac{M}{W} = \frac{5}{3}$
Let, a man does 5 units and a woman does 3 units of work per day & total units of work are 1200 units.
8 days' work of 4 men and 10 women = 8 × (4 × 5 + 10 × 3) = 400 units
Remaining work = 1200 – 400 = 800 units
Quantity I:
Let the additional number of women required be x.
There are 4 men and 10 + x women now.
Per day work of 4 men and 10 + x woman = 4 × 5 + (10 + x) × 3 = 50 + 3x units
No. of day required to complete the remaining work
$= \frac{800}{50 + 3x}$
$\frac{800}{50 + 3x} = 10$
x = 10
10 additional women are required to complete the remaining work in 10 days.
Quantity II:
Let the additional number of men required be y.
There are 4 + y men and 10 women now.
Per day work of 4 + y men and 10 woman = (4 + y) × 5 + 10 × 3 = 50 + 5y units
No. of day required to complete the remaining work
$= \frac{800}{50 + 5y}$
$\frac{800}{50 + 5y} \leq 8$
y ≥ 10
At least 10 additional men are required to complete the remaining work in either 8 or less than 8 days.
Quantity II ≥ Quantity I

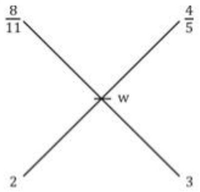
40. (1) Quantity I:
Probability of not more than one person telling a lie
= Probability of all telling the truth + Probability of two persons telling the truth
$= P(A).P(B).P(C) + P(A).P(B).\overline{P(C)} + P(A).\overline{P(B)}.P(C) + \overline{P(A)}.P(B).P(C)$
= 0.6 × 0.4 × 0.5 + 0.6 × 0.4 × 0.5 + 0.6 × 0.6 × 0.5 + 0.4 × 0.4 × 0.5
= 0.12 + 0.12 + 0.18 + 0.08
= 0.5
Quantity II:
Probability of at least two persons lying with B being one of them
= Probability of all lying + Probability of two persons lying with B being one of them
$= \overline{P(A)}.\overline{P(B)}.\overline{P(C)} + P(A).\overline{P(B)}.\overline{P(C)} + \overline{P(A)}.\overline{P(B)}.P(C)$
= 0.4 × 0.6 × 0.5 + 0.6 × 0.6 × 0.5 + 0.4 × 0.6 × 0.5
= 0.12 + 0.18 + 0.12
= 0.42
Quantity I > Quantity II

41. (1) Let total quantity of milk = 200x L
And total quantity of water = 100x L
Total milk in A and B = (20% + 15%) 200x
= 35 × 2x
= 70x L
Total water in A and B = 35 × x
Total water in F = 35x + $\frac{25}{100} \times \frac{25}{100} \times 100x$
= 35x + 6.25x
= 41.25x L
Let cost price of milk per liter be Rs.10
So, cost price of (70x + 41.25x) L of mixture = 70x × 10
= Rs.700x
Selling price of (70x + 41.25x) L of mixture = 111.25x × 10
= Rs.1112.5x
% profit = $\frac{1112.5x - 700x}{700x} \times 100$
$= \frac{412.5}{7}$
$= \frac{825}{14}$
$= 58\frac{13}{14}\%$
Or we can say that profit in due the quantity of water in the mixture.
So we can directly write
% profit = $\frac{41.25x}{70x} \times 100$
$= 58\frac{13}{14}\%$

42. (3) Milk in vessel A and C = $\frac{50}{100}$ × 2x = x
Water in vessel A and C = $\frac{55}{100}$ × x
= 0.55x
Ratio of milk and water in M = x : 0.55x
= 20 : 11
According to question,
$\Rightarrow \frac{x - \frac{20}{31} \times 62}{55x - \frac{11}{31} \times 62 + 17} = \frac{6}{5}$
$\Rightarrow \frac{x - 40}{55x - 5} = \frac{6}{5}$
⇒ 5x – 200 = 3.30x – 30
x = 100
Quantity of milk in vessel B = $\frac{20}{100}$ × 2 × 100
= 40 L

43. (2) Let total milk in all 5 vessel = 200x
And total water in all 5 vessel = 100x
So,
Total milk in all vessel except C = $\frac{65}{100}\times 200x$
= 130x
Total water in all vessel except C = $\frac{55}{100}\times 100x$
= 55x
And
Ratio of milk and water in vessel C = 35 × 2x : 45x
= 70x : 45x
= 14 : 9
According to question,
$\frac{130x+\frac{14}{23}\times 115}{55x+\frac{9}{23}\times 115}=\frac{9}{4}$
$\frac{130x+70}{55x+45}=\frac{9}{4}$
520x + 280 = 495x + 405
25x = 125
x = 5
Total quantity of water in all five vessel = 100x = 500 L

44. (5) Ratio of milk to water in vessel D = $\frac{10}{100}\times 2x : \frac{5}{100}\times x$
= 4 : 1
Ratio of milk to water in vessel E = $\frac{20}{100}\times 2x : \frac{15}{100}\times x$
= 8 : 3
From allegation



$\frac{2}{3}=\frac{\frac{4}{5}-w}{w-\frac{8}{11}}$
$2w-\frac{16}{11}=\frac{12}{5}-3w$
$5w=\frac{12}{5}+\frac{16}{11}$
$5w=\frac{132+80}{5\times 11}$
$w=\frac{212}{275}$
Required ratio = $\frac{212}{63}$

45. (4) Quantity of milk and water in vessel C ⇒
$=\frac{35}{100}\times 2x+\frac{45}{100}\times x$
= 0.7x + 0.45x
= 1.15x
1.15x = 115
x = 100
Milk and water in B = $\frac{20}{100}\times 200+\frac{25}{100}\times 100$
= 40 + 25
= 65
Milk and water in E = $\frac{20}{100}\times 200+\frac{15}{100}\times 100$
= 40 + 15
= 55
Required % = $\frac{65-55}{55}\times 100$
$=\frac{10}{55}\times 100$
$=18\frac{2}{11}\%$

46. (1) After selling ¼th of mixture,
The quantity of water = $\frac{3}{4}\times 20=15$ litres
Quantity of milk = $\frac{3}{4}\times 80=60$ litres
Added water = $\frac{1}{4}\times 100=25$ litre
Total water = 15 + 25 = 40 litre
Required ratio = 40 : 60
= 2 : 3

47. (4) If sum of money = P
$\frac{P\times 4.5\times 7}{100}-\frac{P\times 4\times 7}{100}=31.50$
$\frac{P\times 3.5}{100}=31.50$
P = $\frac{3150}{3.5}$
P = Rs. 900

48. (3) Let original price of gasoline = $100x$
Increased price = $125x$
And let original consumption = y
Original expenditure = $100xy$
New expenditure = $100xy+100xy\times\frac{15}{100}=115xy$
New consumption = $\frac{115xy}{125x}=\frac{115}{125}y$
Reduction in comsumption = $\frac{y-\frac{115y}{125}}{y}\times 100=8\%$

49. (4) Total work done by 20 men = 20 × 15 = 300 units
Now, in 5 days work done by 20 men = 20 × 5 = 100 units
∴ Remaining work = 300 – 100 = 200 units
According o the question, suppose x men left the work.
Then, $(20-x)\times\frac{50}{3}=200$
or, $1000-5x=600$
or, $50x=400$
∴ $x=8$ men

50. (5) Let the speed of the car be x kmph.
So, $x-38=\left(\frac{40+60}{20}\right)\times\frac{18}{5}$ kmph
or, $x-38=18$
∴ $x=56$ kmph