Solutions – Difficult Test

1. (b) : When S1 runs 1900 metres, S3 would run 1862 metres. Hence, the start given is $\frac{38}{1900} \times 2000 = 40$ metres.

2. (c) : Suppose the hound catches the rabbit in t minutes
Number of jumps by the rabbit = $35t$ & distance covered = $20 \times 35t = 700\,t$ cm.
Similarly Distance covered by hound = $25t \times 60 = 1500t$ cm.

   Now, $1500\,t - 700t = 7000$ cm or $t = \frac{35}{4}$ min.

3. (c) : Let there be x litres of wine in the beginning

   $\left(\frac{x-8}{x}\right)^2 = \frac{81}{100}$

   $\Rightarrow x = 80$ litres

4. (c) : Let $A = abc$ and $B = cba$
Therefore, $B - A = 100c + 10b + a - (100a + 10b + c) = 99(c - a)$. $B - A$ is a multiple of 7.
Therefore, $c - a = 7$ (a, c) (1, 8) or (2, 9).

   Hence, number is between 108 to 198 or 209 to 299.

5. (a) : Total S.P. will be

   $8 \times [2.36x] + \frac{16}{100}\left[\frac{x}{4} + 1\right]120 = 18.88x + 4.8x + 19.2$

   $\text{C.P.} = \left[\frac{x}{8}\right]216 = 27x$

   Profit = $23.68x + 19.2 - 27x = 19.2 - 3.32x$

6. (d)
Px=(P-0.2)(x+100)=(P+0.3)(x-120)
Solving x=1000

7. (b) : Volume of smaller cone

   $= \frac{1}{3}\pi(3)^2 \times 9 = 27\pi$

   Volume of large cone $= \frac{1}{3}\pi(5)^2 \times 15 = 125\pi$

   $\Rightarrow$ Volume of the solid = $125\pi - 27\pi = 98\,\pi$

8. (c) : Let the speed of A be x km/hr and speed of B be y km/hr, then:

   $\frac{55}{x} = \frac{55}{y} - \frac{1}{2}$ ..... (1)

   Also, $\frac{55}{x} = \frac{51}{y} - \frac{1}{10}$ ..... (2)

On solving both equation (1) & (2) we get x = 11 km/hr and y = 10 km/hr.

9. (a) : Let the distance be x km and speed be y km/hr and t be the time in hours. Then the equation will be $x = yt$ ….. (1),

Therefore, $\frac{50}{y}+\frac{[x-50]}{3y/5}=t+3$ ..... (2)

Also, $\frac{100}{y}+\frac{[x-100]}{3y/5}=t+2$ ..... (3)

On solving the above equations, we get speed is $\frac{100}{3}$ km/hr time is 6 hrs, and distance is 200 km.

10. (b) :

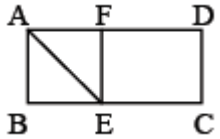
I	II	III
2 : 5	3 : 4	4 : 5

Hence new ratio

$$\frac{\left(\frac{2}{7}+\frac{3}{7}+\frac{4}{9}\right)}{\left(\frac{5}{7}+\frac{4}{7}+\frac{5}{9}\right)}$$

= 73 : 116

11. (d) :



Area of ΔABE = 7 cm^2
Area of $ABEF$ = 14 cm^2
Area of $ABCD$ = 14 × 4 = 56 cm^2
(As $CE = 3 \times BE$) = 56 cm^2

12. (a) : Let oil in containers be A & B.
After 1st operation
Container A = 0.4 A
Container B = 0.6 A + B
After 2nd operation
Container A = 0.4 A + 0.3 A + 0.5 B
Container B = 0.3 A + 0.5 B

$= \frac{(0.7A + 0.5B)}{11} = \frac{(0.3A + 0.5B)}{7}$

$1.6A = 2B \Rightarrow \frac{A}{5}=\frac{B}{4}$

Volume of $A : B = 5 : 4$.

13. (b) : Let n = the number of terms.

Then, $25\frac{7}{16} = \frac{n}{2}\left[17 + \left(-12\frac{3}{8}\right)\right] = \frac{n}{2} \times 4\frac{5}{8}$

$\Rightarrow \frac{407}{16} = 37\frac{n}{16} \Rightarrow n = \frac{407}{37} = 11$

Let d be the common difference.

Then $-12\frac{3}{8}$ (= the eleventh term) = 17 + 10d

$\Rightarrow 10d = -12\frac{3}{8} - 17 = -\frac{235}{8}$

$\Rightarrow d = \frac{-235}{8 \times 10} = -\frac{47}{16}$

14. (d) : Since M is the midpoint of side PQ, the length of MQ is 2.

Hence, the area of $\Delta MQR = \frac{1}{2} \times 2 \times 4 = 4$.

Also area of $\Delta NSR = 4$. Thus, the unshaded area of the figure = 4 + 4 = 8.
Hence, the area of quadrilateral $PMRN$
= Area of the square $PQRS$ – The unshaded area of the figure
= 16 – 8 = 8

15. (b) : Let speeds of P, Q & R be P, Q & R km/hr respectively.
Thus $4P = 2R$

$= \frac{P}{R} = \frac{1}{2}$ ..... (1)

$= 5Q = 4R = \frac{Q}{R} = \frac{4}{5}$ ..... (2)

From (1) & (2),

$= \frac{P/R}{Q/R} = \frac{1/2}{4/5}$

$= \frac{P}{Q} = \frac{5}{8}$

16. (a) : We have $(A - 20) = 0.4\,(B + 20)$, i.e. $A - 0.4B = 28$
And $(B - 40) = 0.4(A + 40)$, i.e. $B - 0.4A = 56$
Solving we get, A = Rs. 60

17. (a) : Given quadratic equation $x^2 + ax + b = 0$
Then product of roots $\alpha\beta = b$
Sum of roots $\alpha + \beta = -a$
Next quadratic equation $bx^2 + ax + 1 = 0$

Then product of roots = $\frac{1}{b} = \frac{1}{\alpha\beta}$

Hence, clearly by visualising options

New roots we will be $\frac{1}{\alpha}$ and $\frac{1}{\beta}$

18. (b) : Average salary of each temporary employee is 600.

1000 temporary employee,
Total salary = 6,00,000
let teaching departement = Rs. x / staff and cleaning department salary = $x + 100$
Now, $600\ (x + 100) + 400(x) = 6,00,000$
$x=540$

Hence answer, $x+100= 540+100$

$=640$

19. (c) : 81! when divided by 83 leaves a remainder +1 (as 83 is prime) Hence the total remainder is $+1 \times 81 = 81$.

20. (c) : Let the number of men be 100.
Then, Men × Time = Work
$100 \times 1 = 100$ unit
Amount of work increased by 50%.
So, New work = 150 unit
as the planned time remains same *i.e.* 1
Then men required will be 150 *i.e.*, 50 more workers but since new workers are 25% more efficient i.e. $\frac{5}{4}$ times efficient as existing workers.

$\therefore$ Actual number of workers $= \frac{50}{5/4} = 40$ men

$\therefore$ Required percent $= \frac{40}{100} \times 100 = 40\%$