

# Answers and Explanations

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

1. c Let the marks scored in five subjects be  $6x$ ,  $7x$ ,  $8x$ ,  $9x$  and  $10x$  (on a scale of 1).  
Average score = 60%  
$$\Rightarrow \frac{6x + 7x + 8x + 9x + 10x}{5} = \frac{60}{100} \Rightarrow 8x = 0.6$$
  
$$\Rightarrow x = 0.075$$
  
So the marks are 0.45, 0.525, 0.6, 0.675 and 0.75.  
Number of times the marks exceed 50% is 4.

2. d Work done in one day by A, B, C and D are  
 $\frac{1}{4}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$  and  $\frac{1}{32}$  respectively.  
Using answer choices, we note that the pair of B and C does  $\frac{3}{16}$  of work in one day; the pair of A and D does  $\frac{1}{4} + \frac{1}{32} = \frac{9}{32}$  of the work in one day.  
Hence, A and D take  $\frac{32}{9}$  days.  
B and C take  $\frac{16}{3} = \frac{32}{6}$  days.  
Hence, the first pair must comprise of A and D.

3. a Amount of money given to X  
 $= 12 \times 300 + 12 \times 330 + \dots + 12 \times 570$   
 $= 12[300 + 330 + \dots + 540 + 570]$   
 $= 12 \times \frac{10}{2} [600 + 9 \times 30] = 52200$   
Amount of money given to Y is  
 $6 \times 200 + 6 \times 215 + 6 \times 230 + 6 \times 245 + \dots$  to 20 terms  
 $= 6[200 + 215 + 280 \dots 485]$   
 $= 6 \times \frac{20}{2} [400 + 19 \times 15]$   
 $= 6 \times 10[400 + 285]$   
 $= 60 \times 685 = 41100$   
 $\therefore$  Total amount paid =  $52200 + 41100 = \text{Rs. } 93,300$ .

4. a Let  $x$  be the total number of people the college will ask for donations.  
 $\therefore$  People already solicited =  $0.6x$   
Amount raised from the people solicited  
 $= 600 \times 0.6x = 360x$   
Now  $360x$  constitutes 75% of the amount.  
Hence, remaining 25% =  $120x$   
 $\therefore$  Average donation from remaining people  
 $= \frac{120x}{0.4x} = 300$ .

5. d Let there be  $x$  mints originally in the bowl.  
Sita took  $\frac{1}{3}$ , but returned 4. So now the bowl has  
 $\frac{2}{3}x + 4$  mints.  
Fatima took  $\frac{1}{4}$  of the remainder, but returned 3.  
So the bowl now has  $\frac{3}{4} \left( \frac{2}{3}x + 4 \right) + 3$  mints.  
Eshwari took half of remainder that is  
 $\frac{1}{2} \left[ \frac{3}{4} \left( \frac{2}{3}x + 4 \right) + 3 \right]$   
She returns 2, so the bowl now has  
 $\frac{1}{2} \left[ \frac{3}{4} \left( \frac{2}{3}x + 4 \right) + 3 \right] + 2 = 17 \Rightarrow x = 48$

## Short cut:

Since Sita was the first person to pick and she picks up  $\frac{1}{3}$  of the mint, but if you see the options, none of the option is a multiple of 3.

6. d In 30 years from 1971 to 2001, number of odd days  
 $= 30 + (8 \text{ from leap years}) = 38$  and  $38 \equiv 3 \pmod{7}$   
So December 9, 1971 is Sunday - 3 days  
 $= \text{Thursday}$

7. d Let  $x$  be rate of Rahul, and  $y$  be the rate of current in mph.

$$\frac{12}{x-y} - \frac{12}{x+y} = 6 \Rightarrow \frac{y}{x^2 - y^2} = \frac{1}{4}$$

$$\Rightarrow y = \frac{x^2 - y^2}{4} \quad \dots (i)$$

When Rahul doubles his rowing rate, then we have

$$\frac{12}{2x-y} - \frac{12}{2x+y} = 1 \Rightarrow \frac{2y}{4x^2 - y^2} = \frac{1}{12}$$

$$\Rightarrow y = \frac{4x^2 - y^2}{24} \quad \dots (ii)$$

Hence, from (i) and (ii), we have  $2x^2 = 5y^2$

$$\text{Putting } x^2 = \frac{5}{2}y^2 \text{ in (i), we get } y = \frac{\frac{3}{2}y^2}{4} \Rightarrow y = \frac{8}{3}.$$

8. b If Shyam takes 1 min for every 3 steps, then he takes  $\frac{1}{3}$  min for every step.

For 25 steps, he takes  $\frac{25}{3}$  min, i.e. 8.33 min.

So Vyom takes  $\frac{1}{2}$  min for every step.

For 20 steps, he takes  $\frac{20}{2}$  min, i.e. 10 min.

Difference between their time = 1.66 min.

Escalator takes 5 steps in 1.66 min and difference in number of steps covered = 5

Speed of escalator is 1 step for 0.33 min, i.e. 3 steps per minute.

If escalator is moving, then Shyam takes 25 steps and escalator also takes 25 steps.

Hence, total number of steps = 50.

9. c Let ' $t$ ' be the time taken for all three together, then

$$\frac{1}{t+6} + \frac{1}{t+1} + \frac{1}{2t} = \frac{1}{t}$$

Solving the above equation, we get

$$3t^2 + 7t - 6 = 0 \text{ or } t = \frac{2}{3} \text{ hr}$$

$$= 40 \text{ min}$$

10. c Fresh grapes contain 10% pulp.  
 $\therefore$  20 kg fresh grapes contain 2 kg pulp.  
 Dry grapes contain 80% pulp.  
 $\therefore$  2 kg pulp would contain

$$\frac{2}{0.8} = \frac{20}{8} = 2.5 \text{ kg dry grapes}$$

11. a Total time taken by B to cover 60 km

$$= \frac{60}{50} \text{ hr} = \frac{6}{5} \text{ hr}$$

It stops at station C for  $\frac{1}{4}$  hr.

Now in  $\left(\frac{6}{5} + \frac{1}{4}\right)$  hr train X travels

$$70 \times \frac{29}{20} = 101.5 \text{ km}$$

This means they do not cross each other by the time train Y finishes its stop at station C.

Let they meet after  $t$  hr.

$$\text{Then } 70t + 50\left(t - \frac{1}{4}\right) = 180 \Rightarrow t = \frac{192.5}{120} \text{ hr}$$

$$\text{Distance from A will be } \left(70 \times \frac{192.5}{120}\right) \text{ km}$$

$$= 112 \text{ km approximately}$$

12. a In first updown cycle, the reduction price is Rs. 441. According to this, (b) and (d) are removed. Now we have to analyse (c), if the original price is Rs. 2,500, then after first operation, the price will be  $2500 - 441 = \text{Rs. } 2,059$ . In second operation, it will come down to around Rs. 400. So the value is not equivalent to Rs. 1,944.81. Hence, option (a) is the answer.

13. b Let  $L$  be length in metres of the race which A finishes in  $t$  seconds.

$$\text{Speed of A} = \frac{L}{t} \text{ m/s}$$

$$\text{Speed of B} = \frac{L-12}{t} \text{ m/s}$$

$$\text{Speed of C} = \frac{L-18}{t} \text{ m/s}$$

$$\text{Time taken by B to finish the race} = \frac{L}{(L-12)/t} \text{ s}$$

$$= \left(\frac{L}{L-12}\right)t \text{ s}$$

In this time, C covers  $(L-8)$  m

$$\left(\frac{L-18}{t}\right)\left(\frac{L}{L-12}\right)t = L-8$$

$$\Rightarrow L = 48 \text{ m}$$

14. d Number of one-rupee coins = 158.  
 Possible arrangements of coins are listed as 1, 2, 4, 8, 16, 32, 64 and 31.  
 $\therefore$  Number of arrangements = 8.  
 So the least number of bags required = 8.

15. b Let the number of five-rupee, two-rupee and one-rupee coins be  $x$ ,  $y$  and  $z$  respectively.  
 $x + y + z = 300$   
 $5x + 2y + z = 960$   
 $5x + y + 2z = 920$   
 $y - z = 40$   
And  $x + 2y = 340$   
Use the answer choices now.  
If  $x = 140$ ,  $y = 100$  and  $z = 60$ , this satisfies all the given conditions.

16. d Every trip will need more than 180 m and there are  $4\frac{1}{2}$  trips. Hence, the distance covered will be greater than 750 m, for which there is only one option = 860.

**Alternative method:**

For the first stone, he will cover 100 m.  
For second,  $200 - 4 = 196$   
For third,  $200 - 8 = 192$   
For fourth,  $200 - 12 = 188$   
For fifth,  $200 - 16 = 184$   
Hence, total distance = 860 m

17. d If speed of N = 4, speed of S = 1,

$$\Rightarrow \text{Average speed} = \frac{2 \times 4 \times 1}{4 + 1} = 1.6$$

Because time available is  $\frac{2}{3}$ , speed =  $\frac{3}{2}$

Now average speed = 2.4

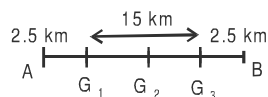
Now speed of N = 8

Now speed of S =  $y$

$$\frac{2 \times 8 \times y}{8 + y} = 2.4 \Rightarrow y = 1.3$$

Required ratio =  $1.3 : 8 \approx 1 : 6$

18. c



$AG_1 = 5$  min at 30 km/hr = 2.5 km

$G_1G_3 = 15$  km

Time for  $AG_1 = 5$  min

Time for

$G_1G_3 + G_3B = 32.5$  min = total of 37.5 mins

1 min is taken for transferring the patient into and out of the ambulance.

Hence,  $(40 - 37.5 - 1) = 1.5$  min is remaining.

19. b Since thief escaped with 1 diamond,  
Before 3<sup>rd</sup> watchman he had  $(1 + 2) \times 2 = 6$   
Before 2<sup>nd</sup> watchman he had  $(6 + 2) \times 2 = 16$   
Before 1<sup>st</sup> watchman he had  $(16 + 2) \times 2 = 36$

**Alternative method:**

Check with choices.

20. b Mayank paid  $\frac{1}{2}$  of what others paid.

$$\Rightarrow \text{Mayank paid } \frac{1}{3} \text{ rd of the total amount} = \$20.$$

Similarly,

Mirza paid \$15 and little paid \$12.

Remaining amount of  $\$60 - \$20 - \$15 - \$12 = \$13$  is paid by Jaspal.

21. d Let the number of gold coins =  $x + y$

$$48(x - y) = X^2 - Y^2$$

$$48(x - y) = (x - y)(x + y) \Rightarrow x + y = 48$$

Hence the correct choice would be none of these.

22. c Let's assume that

$p$  days : they played tennis

$y$  days : they went for yoga

$T$  days : total duration for which Ram and Shyam stayed together.

$$\Rightarrow p + y = 22$$

$$(T - y) = 24$$

$$\& (T - p) = 14$$

Adding all of them,

$$2T = 22 + 24 + 14 \Rightarrow T = 30 \text{ days.}$$

23. c By trial and error:

$$30 \times 12 = 360 > 300$$

$$30 \times 7.5 = 225 < 300$$

$50 \times 6 = 300$ . Hence, he rented the car for 6 hr.

24. b Because each word is lit for a second,

$$\text{LCM} \left( \frac{5}{2} + 1, \frac{17}{4} + 1, \frac{41}{8} + 1 \right) = \text{LCM} \left( \frac{7}{2}, \frac{21}{4}, \frac{49}{8} \right)$$

$$\frac{\text{LCM}(7, 21, 49)}{\text{HCF}(2, 4, 8)} = \frac{49 \times 3}{2} = 73.5 \text{ s}$$

25. d  $\text{HCF} \left( \frac{9}{2}, \frac{27}{4}, \frac{36}{5} \right) = \frac{\text{HCF}(9, 27, 36)}{\text{LCM}(2, 4, 5)} = \frac{9}{20} \text{ lb}$

= Weight of each piece

Total weight = 18.45 lb

$$\text{Maximum number of guests} = \frac{18.45 \times 20}{9} = 41$$

26. d Number of oranges at the end of the sequence  
= Number of 2s - Number of 4s =  $6 - 4 = 2$

27. c Number of  $(1s + 2s + 3s) - 2(\text{Number of } 4s) = 19 - 8 = 11$

28. a Let tunnel = 8 km and speed of cat = 1 km/hr  
Time taken to reach entrance of tunnel by cat = 3 hr  
Time taken to reach exit of tunnel by cat = 5 hr  
Train will cover the sum (length of tunnel) = 2 hr  
Therefore, ratio of speeds of train and cat =  $4 : 1$   
 $\Rightarrow$  Speed of the train is greater by  $3 : 1$  than that of the cat.

29. b Each traveller had  $\frac{8}{3}$  loaves.
- $\Rightarrow$  First traveller has given  $5 - \frac{8}{3}$  loaves to the third.
- Second traveller sacrificed only  $3 - \frac{8}{3} = \frac{1}{3}$ rd of a loaf.
- So, first should get 7 coins.
30. d Total amount of work = 60 man-hours  
 From 11 am to 5 pm, 6 technicians = 36 man-hours  
 From 5 pm to 6 pm, 7 technicians = 7 man-hours  
 From 6 pm to 7 pm, 8 technicians = 8 man-hours  
 From 7 am to 8 pm, 9 technicians = 9 man-hours  
 Total = 60 man-hours
31. b Number of samosas =  $200 + 20n$ ,  
 $n$  is a natural number.  
 Price per samosa = Rs.  $(2 - 0.1n)$   
 Revenue =  $(200 + 20n)(2 - 0.1n) = 400 + 20n - 2n^2$   
 For maxima  $20 - 4n = 0$ ; by differentiation  $n = 5$   
 $\Rightarrow$  Maximum revenue will be at  $(200 + 20 \times 5)$   
 = 300 samosas
32. b Three small pumps = Two large pumps  
 Three small + One large pumps  
 = Three large pump  $\Rightarrow \frac{1}{3}$

**For questions 33 to 34:**

S, M and R in all spend 1248 bahts.  
 Initially M pays 211 bahts and R pays 92 bahts.  
 Remaining is paid by S i.e. 945 bahts  
 If 1248 is divided equally among S, M & R and each has to spend 415 bahts  
 Hence M has to pay S 205 bahts which is 5 Dollars.  
 And R has to pay 324 bahts to S.

33. d

34. c

35. c Let the number of correct answers be 'x', number of wrong answers be 'y' and number of questions not attempted be 'z'.  
 Thus,  $x + y + z = 50$  ... (i)

$$\text{And } x - \frac{y}{3} - \frac{z}{6} = 32$$

The second equation can be written as,  
 $6x - 2y - z = 192$  ... (ii)  
 Adding the two equations we get,

$$7x - y = 242 \text{ or } x = \frac{242}{7} + y$$

Since, x and y are both integers, y cannot be 1 or 2.  
 The minimum value that y can have is 3.

36. c The ratio of the speeds of the fastest and the slowest runners is 2 : 1. Hence they should meet at only one point on the circumference i.e. the starting point (As the difference in the ratio in reduced form is 1). For the

two of them to meet for the first time, the faster should have completed one complete round over the slower one. Since the two of them meet for the first time after 5 min, the faster one should have completed 2 rounds (i.e. 2000 m) and the slower one should have completed 1 round. (i.e. 1000 m) in this time. Thus, the faster one would complete the race (i.e. 4000 m) in 10 min.

37. c The number of goats remain the same.  
 If the percentage that is added every time is equal to the percentage that is sold, then there should be a net decrease. The same will be the case if the percentage added is less than the percentage sold.  
 The only way, the number of goats will remain the same is if  $p > q$ .

38. a Consider a square of side x.  
 Therefore, its area =  $x^2$

$$\text{Therefore, area of the largest circle} = \pi \left( \frac{x}{2} \right)^2,$$

$$\text{which can be cut from square} = \frac{\pi x^2}{4}.$$

$$\text{Therefore, area scrapped} = x^2 - \frac{\pi}{4}x^2 = x^2 \left( 1 - \frac{\pi}{4} \right)$$

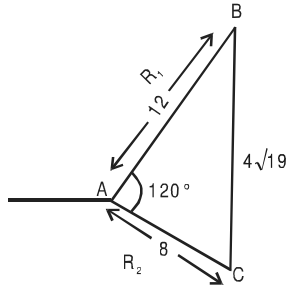
$$\therefore \frac{\text{Area scrapped}}{\text{Area of square}} = \frac{x^2 \left( 1 - \frac{\pi}{4} \right)}{x^2} = 1 - \frac{\pi}{4} = \text{Contant}$$

As this ratio is constant whether we cut a circle from small square or larger square, scrapped area will be a fixed percentage of square. Therefore, in our problem as two squares are of the same size, the ratio will be 1 : 1.

39. a Let's make the given sum by using minimum number of coins as

Value of coin	No. of coins	No. of coins	No. of coins	Total no. of coins
50	1	1	1	3
25	—	—	1	1
10	1	2	2	5
5	1	—	—	1
2	2	4	3	9
Total amount	69	78	101	19

40. b



$$BC^2 = (12)^2 + 8^2 - 2 \times 12 \times 8 \times \cos 120^\circ$$

$$\therefore BC = 4\sqrt{19}$$

$$t_1 = \frac{4\sqrt{19} + 8}{3}$$

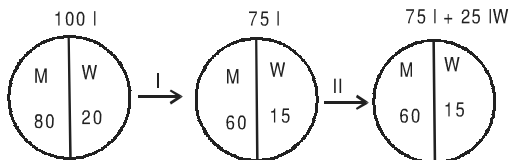
$$t_2 = \frac{4\sqrt{19} + 12}{2}$$

[Where  $t_1$  and  $t_2$  are time taken by Ram and Shyam to reach the starting point]

$$\begin{aligned} t_2 - t_1 &= \frac{4\sqrt{19} + 12}{2} - \frac{4\sqrt{19} + 8}{3} \\ &= \frac{12\sqrt{19} + 36 - 8\sqrt{19} - 16}{6} \\ &= \frac{4\sqrt{19} + 20}{6} = \frac{2\sqrt{19} + 10}{3} \end{aligned}$$

Therefore, choice (b).

41. a



The diagram is self explanatory. Removal of 25 litres at stage I will result in volume of milk being reduced by 80% of 25 lit i.e. 20 lit and volume of water being reduced by the remaining 5 lit. So  $M = 60$  lit and  $W = 15$  lit. Addition of 25 lit water will finally given  $M = 60$  lit and  $W = 40$  M. Hence the ratio of  $W$  and  $M = 40 : 60 = 2 : 3$ .

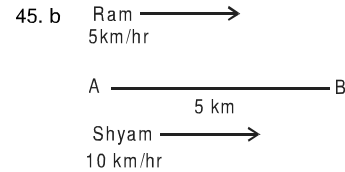
42. c

Machine I:  
Number of nuts produced in one minute = 100  
To produce 1000 nuts time required = 10 min  
Cleaning time for nuts = 5 min  
Over all time to produce 1000 nuts = 15 min.  
Over all time to produce 9000 = 135 min – 5 min  
= 130 min ... (1)  
Machine II:

To produce 75 bolts time required = 1 min  
To produce 1500 bolts time required = 20 min  
Cleaning time for bolts = 10 in.  
Effective time to produce 1500 bolts = 30 min  
Effective time to produce 9000 bolts =  $30 \times 6 - 10$   
= 170 min ... (2)  
From (1) and (2)  
Minimum time = 170 minutes

43. a Since Group (B) contains 23 questions, the marks associated with this group are 46.  
Now check for option (1). If Group (C) has one question, then marks associated with this group will be 3. This means that the cumulative marks for these two groups taken together will be 49. Since total number of questions are 100, Group (A) will have 76 questions, the corresponding weightage being 76 marks. This satisfies all conditions and hence is the correct option. It can be easily observed that no other option will fit the bill.

44. c Since Group (C) contains 8 questions, the corresponding weightage will be 24 marks. This figure should be less than or equal to 20% of the total marks. Check from the options. Option (3) provides 13 or 14 questions in Group (B), with a corresponding weightage of 26 or 28 marks. This means that number of questions in Group (A) will either be 79 or 78 and will satisfy the desired requirement.



In 1 hour Ram is at B, in that time Shyam covers

$$\frac{10}{4} = 2.5 \text{ km}$$

Remaining distance 2.5 km

$$\text{Time} = \frac{2.5}{5 + 10} \times 60 = 10 \text{ minutes}$$

Therefore they meet first time at 10:10 a.m. Hence option (b).

46. b At the time when Shyam over take Ram, let Ram travels for  $t$  minutes,  
Shyam till that time travel for  $t - 45$  minutes and both travel same distance  
 $\Rightarrow 5 \times t = 10(t - 45)$   
 $\Rightarrow t = 90$  minutes  
Hence Shyam over take Ram at 10:30 a.m  
Hence Option (b).

47. d There are two equations to be formed  $40m + 50f = 1000$   
 $250m + 300f + 40 \times 15m + 50 \times 10 \times f = A$

$$850m + 8000f = A$$

$m$  and  $f$  are the number of males and females  $A$  is amount paid by the employer.

Then the possible values of  $f = 8, 9, 10, 11, 12$

If  $f = 8$

$M = 15$

If  $f = 9, 10, 11$  then  $m$  will not be an integer while  $f = 12$  then  $m$  will be 10.

By putting  $f = 8$  and  $m = 15$ ,  $A = 18800$ . When  $f = 12$  and  $m = 10$  then  $A = 18100$

Therefore the number of males will be 10.