CLASS TEST

SL. 01_JP_ALL_11042023

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GENERAL APTITUDE

Duration : 1:00 hr. **Maximum Marks : 50**

Read the following instructions carefully

1. This question paper contains **30** objective questions. **Q.1-10** carry one mark each and **Q.11-30** carry two marks each.
2. Answer all the questions.
3. Questions must be answered on Objective Response Sheet (**ORS**) by darkening the appropriate bubble (marked **A**, **B**, **C**, **D**) using HB pencil against the question number. Each question has only one correct answer. In case you wish to change an answer, erase the old answer completely using a good soft eraser.
4. There will be **NEGATIVE** marking. For each wrong answer **1/3rd** of the full marks of the question will be deducted. More than one answer marked against a question will be deemed as an incorrect response and will be negatively marked.
5. Write your name & Roll No. at the specified locations on the right half of the **ORS**.
6. No charts or tables will be provided in the examination hall.
7. Choose the **Closest** numerical answer among the choices given.
8. If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that questions.
9. If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

Q.No. 1 to Q.No. 10 carry 1 mark each

Q.1 In order to fill a room of capacity 5040 m^3 with water, a water pump is used. The same water pump is used to remove the water from the room as well. To empty the room filled with water it takes 5 m^3 per minute more than its filling capacity. The pump needs 14 minutes less to empty the room than to fill it. If the same water pump is used to fill a container in 90 minutes, then capacity of the container is

(a) 3600 m^3 (b) 4200 m^3
(c) 5400 m^3 (d) 6400 m^3

Q.2 In right angled triangle ABC with angle B = 90°, lengths of the side AB = 3 cm and of $BC = 3\sqrt{3}$ cm. A point D is selected on side CA. What is ratio of DC : AD such that BD is perpendicular to CA?

(a) 3 : 2 (b) 3 : 1
(c) 5 : 2 (d) 2 : 1

Q.3 One fair coin is tossed four times, the probability that three heads and one tails will appear is

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$
(c) $\frac{2}{5}$ (d) $\frac{3}{4}$

Q.4 How many 3-digit numbers are divisible by 7?

(a) 108 (b) 112
(c) 116 (d) 128

Q.5 Four athletes are standing at the vertices of a square park. When a whistle is blown, each of the atheletes starts running along the sides of the park at a speed of 20 km/hr. The probability that they do not collide with each other is

(a) 0.125 (b) 0.16
(c) 0.25 (d) 0.50

Q.6 What would come in place of the question mark in the given number series?
64, 96, 240, 840, 3780, ?

(a) 12680 (b) 10840
(c) 20790 (d) 32090

Q.7 A group of 10 men and 12 women were going to New York to attend a United Nations conference. A week before their departure, equal number of men and women joined them and the ratio of the total number of men and women became 6 : 7. Also, just one day before their departure, equal number of men and women left them. The new ratio between the number of men and women was 4 : 5. The final strength of the group that went for the conference is

(a) 5 men and 6 women
(b) 6 men and 8 women
(c) 8 men and 10 women
(d) 10 men and 12 women

Q.8 Team Avengers can be formed by 20 boys and 10 girls of a school while team Guardians can be formed by 30 boys and 20 girls of the same school. If there are total of 1300 boys in the school and 800 girls in the school and from them 'm' number of team Avengers are formed and total 'n' number of team Guardians are formed, then find that 'm' is what percent of 'n'?

(a) 33.33% (b) 44.44%
(c) 55.55% (d) 66.67%

Q.9 There are two groups of persons Alpha and Beta, and each group has 5 persons. The average age of persons of group Alpha is 22 years while the average age of persons of group Beta is 19 years. Alpha person Max from group Alpha joins group Beta and then average age of group Alpha becomes 24 years. Then, Ross, a person from group Alpha joins group Beta and the average age of group Beta becomes 20 years. Now, a person John of group Beta joins group Alpha and the average age of group Alpha becomes 22 years then the ratio of age of John to the age of Max would be

(a) 7 : 16 (b) 14 : 23
(c) 16 : 7 (d) 23 : 14

Q.10 Sonam can travel at a speed of 60 km/hr. Ameesha can travel at a speed of 36 km/hr. Ankita can go from Agra to Kanpur in 2 hours. The distance between Agra and Kanpur is equal to the distance between Agra and Delhi. Ameesha takes the same time travelling from Agra to Kanpur as from Kanpur to Delhi at her speed which is twice the speed of Ankita. How much time will Sonam take to cover a distance from Agra to Delhi and back to Agra (consider that the route followed to reach Kanpur from Agra and Delhi from Agra is different but the length of the route is the same?

(a) 42 minutes (b) 60 minutes
(c) 72 minutes (d) 84 minutes

Q.No. 11 to Q.No. 30 carry 2 marks each

Q.11 In a family of 4 members, the eldest member expires after 5 years at the age of 88 and 10 years after that a baby is born in the family such that the difference of family's eldest to youngest member alive after 20 years from present is 57. At present, the age of youngest member is 14 years and the average age of remaining member is 54. The age of the two eldest members alive after 5 years would be

(a) 88, 47 (b) 42, 19
(c) 47, 42 (d) 37, 42

Q.12 Honda produces 400 cars in a month at 3 different places. At Chennai produces 200 cars a month. At Pune produces 120 cars a months and at Noida produces 80 cars a month. However 8% of the cars produced at Chennai are defective. 3% from Pune and 4% from Noida are defective. All the cars are exported to a showroom. If a car at the showroom is found defective, the ratio of probability that it was manufactured at Chennai and probability that it was manufactured at Pune is

(a) 4.4 (b) 5.8
(c) 7.4 (d) 6.4

Q.13 Paper X is in the form of a square of side 130 mm. Four quadrants of diameter 14 mm are cut from the four corners of the square. Paper Y is in the form of a rectangle whose one side is 150 mm and this side is 20% more than the shorter side. Two semicircles of diameter equal to the smaller side of the rectangle is cut from both the edges of the rectangle. The percent by which the remaining area of paper Y is more or less than that of paper X is

(a) 52.4% more (b) 61.3% less
(c) 61.3% more (d) 52.4% less

Q.14 Gatimaan express departed from Delhi for Agra which is 200 km away. However, in order to cope up with the delay due to rainy season, it departed 40 minutes earlier than the scheduled time of departure. With the speed of the train reduced by 50 km/hour as compared to the original speed, the train reached Agra as per original schedule. The original speed of the train will be

(a) 120 km/hr (b) 150 km/hr
(c) 170 km/hr (d) 210 km/hr

Q.15 $f(x)$ is a polynomial function of second degree such that $f(-4) = 8, f(1) = 8$ and $f(3) = 15$. What is the point at which the graph of this function intersects a line drawn parallel to y axis through $x = 2$?

(a) (2, 8) (b) (2, 10)
(c) (2, –11) (d) (2, 11)

Q.16 Sanjay and Mahesh are playing a game of bowling. Probability of Sanjay hitting the strike is 0.5 whereas Mahesh hitting the strike is 0.4. Sanjay wins if he hits the strike and Mahesh does not whereas Mahesh wins if he hits the strike and Sanjay does not. In the absence of these two happenings, the game ends in a tie. What is the probability on the tie?

(a) 0.40 (b) 0.45
(c) 0.50 (d) 0.55

Q.17 If $N = 1! + 3! + 5! + 7! \ldots\ldots\ldots\ldots 199!$ then remainder obtained when N is divided by 120 is
(a) 7 (b) 9
(c) 11 (d) 13

Q.18 A merchant marks his goods, such that the profit on sale of 500 articles is equal to the selling price of 300 articles. The profit percentage is
(a) 50% (b) 75%
(c) 100% (d) 150%

Q.19 Ankit can complete a work in 10 days, Bhanu in 12 days and Chinmoy in 15 days. All of them began the work together, but Ankit had to leave after 2 days and Bhanu 3 days before the completion of the work. The total number of days in which the work got finished is
(a) 2 (b) 7
(c) 9 (d) 12

Q.20 A packet of 20 batteries is known to include 4 batteries that are defective. If 8 batteries are randomly chosen and tested, the probability of finding among them not more than 1 defective battery is
(a) 0.5033 (b) 0.4905
(c) 0.5125 (d) 0.5205

Q.21 Jayesh gave Karan a 5 m head start in a 100 m race and Jayesh was beaten by 0.25 m. In how many meters more would Jayesh have overtaken Karan?
(a) 4.75 m (b) 5.00 m
(c) 5.25 m (d) 5.50 m

Q.22 Each of the tomatoes in 10 kg of tomatoes is composed of 99% water, by weight. After some of the water evaporates, the tomatoes are now 98% water by weight. What is the new weight of the tomatoes, in kg?
(a) 0.2 kg (b) 5 kg
(c) 9.2 kg (d) 9.6 kg

Q.23 Ram and Laxman have 194 pen drives between them. They sell at different prices but get the same amount. If Ram sells at Laxman's price and Laxman sells at Ram's price, they get ₹16875 and ₹1452 respectively. How many pen drives does Ram have?
(a) 48 (b) 150
(c) 96 (d) 124

Q.24 One third of a consignment was sold at a profit of 10% and remainder was sold at a profit of 4%. If total profit was ₹ 1200, then the value (in ₹) of consignment is
(a) 20,000 (b) 22,000
(c) 16,000 (d) 12,000

Q.25 The ratio of the ages between Sachin and Shikhar is 6 : 5. The difference between the ages of Ajinkya and Sachin is more than 5 years. The ages of Mahendra is a prime number between the ages of Sachin and Ajinkya. The ratio of the ages of Shikhar and Ajinkya is 2 : 3. If the ages of all four are integers, the minimum possible difference between the ages of Ajinkya and Mahendra is
(a) 3 (b) 2
(c) 1 (d) 0

Q.26 In a right angle triangle ABC with vertex B being the right angle, the mutually perpendicular sides AB and BC are p cm and q cm long respectively. If the length of the hypotenuse is $(p + q - 6)$ cm, the radius of the largest possible circle that can be inscribed in the triangle is
(a) 1.5 cm (b) 3 cm
(c) 6 cm (d) 3.3 cm

Q.27 Nine persons are standing in a 3 × 3 matrix arrangement. Reena is the tallest amongst the shortest persons of each row whereas Seema is the shortest amongst the tallest person in each column. Which of the following cannot be concluded based on these two statements?
(a) Reena is the 3rd shortest person.
(b) Seema is shorter than Reena.
(c) Seema is the third tallest person.
(d) Seema is taller than Reena.

Q.28 A sum of ₹ 45,000 is to be distributed amongst NOT more than 18 students as prize amount in denomination of ₹ 250, ₹ 1250, ₹ 6250 and ₹ 31250 such that there is at least one student getting a prize of each denomination and each student gets exactly one prize. The entire amount has to be distributed. The number of ways this amount can be distributed is

(a) 1 (b) 2
(c) 3 (d) more than 3

Q.29 A series of numbers are written using digits 1, 2, 3, 4 and 5 in the following pattern:

1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, 1, 1, 1, 1, 1, 1, (six 1's) and so on. Which of the following digits will come at the 100th position in this sequence?

(a) 1 (b) 2
(c) 3 (d) 4

Q.30 Consider the following matrix:

5	21	4
7	29	4
4	*A*	9
9	28	3

What is the value of 'A' in the above matrix?

(a) 25
(b) 37
(c) 36
(d) None of these

■■■■

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GENERAL APTITUDE

Date of Test : 11/04/2023

ANSWER KEY ➤

1.	(a)	7.	(c)	13.	(b)	19.	(b)	25.	(c)
2.	(b)	8.	(d)	14.	(b)	20.	(a)	26.	(b)
3.	(a)	9.	(d)	15.	(d)	21.	(c)	27.	(b)
4.	(d)	10.	(c)	16.	(c)	22.	(b)	28.	(b)
5.	(a)	11.	(c)	17.	(a)	23.	(b)	29.	(d)
6.	(c)	12.	(a)	18.	(d)	24.	(a)	30.	(b)

DETAILED EXPLANATIONS

1. (a)

Let the filling capacity of the pump = $x\ m^3/min$

Then the emptying capacity of the pump = $(x + 5)\ m^3/min$

$$\text{Time required for filling the tank} = \frac{5040}{x} \text{ minutes}$$

$$\text{Time required for emptying the tank} = \frac{5040}{(x+5)} \text{ minutes}$$

$$\frac{5040}{x} - \frac{5040}{(x+5)} = 14$$

$$\frac{360}{x} - \frac{360}{(x+5)} = 1$$

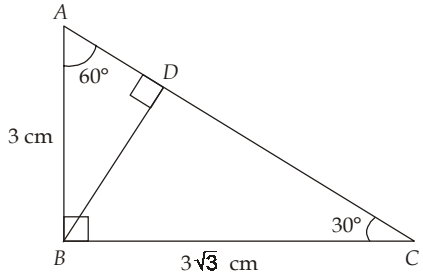
$$1800 = x^2 + 5x$$

$$(x + 45)(x - 40) = 0$$

$$x = 40\ m^3/min$$

$$\text{Capacity of the container} = 40 \times 90 = 3600\ m^3$$

2. (b)



In a right angled triangle if ratio of two perpendicular side is $1:\sqrt{3}$, then the triangle is a 30° – 60° – 90° triangle

$\Rightarrow$ $\angle BAC = 60°$

$\angle BCA = 30°$

Given: $BD \perp AC$

$\Rightarrow$ $\angle DBC = 60°$

and $\angle DAB = 60°$ and $\angle DBA = 30°$

Right Δs BAD and CBD are also 30° – 60° – 90° triangles.

$\Rightarrow$ $AD : BD : AB = 1 : \sqrt{3} : 2$

and $BD : DC : BC = 1 : \sqrt{3} : 2$

Which enables us to compute

$$AD = \frac{AB}{2} = \frac{3}{2}$$

and

$$CD = \frac{3\sqrt{3}}{2/\sqrt{3}} = \frac{9}{2}$$

$\Rightarrow$

$$DC : AD = \frac{9}{2} : \frac{3}{2} = 3 : 1$$

3. (a)

Sample space, S is {HHHH, HHHT, HHTH, HHTT, HTHH, HTHT, HTTH, HTTT, THHH, THHT, THTH, THTT, TTHH, TTHT, TTTH, TTTT} i.e. 16.

Favourable cases, P have been underlined above i.e. {HHHT, HHTH, HTHH, THHH} i.e. 4.

Required probability = $\frac{P}{S} = \frac{4}{16} = \frac{1}{4}$ i.e. (a)

4. (d)

The first 3 digit number divisible by 7 is 105 and last is 994.

This is an A.P. with $a = 105$, $d = 7$, $l = 994$

n^{th} term of A.P. $= t_n = a + (n-1)d$

$\Rightarrow \quad 994 = 105 + (n-1)7$

$\Rightarrow \quad 889 = 7(n-1)$

$\Rightarrow \quad n - 1 = 127$

$\therefore \quad n = 128$

5. (a)

We are given 2 specific inputs:

(a) the four atheletes are moving at the same speed and

(b) they are moving along the sides of the park only.

They will NOT collide if the direction of their movement is identical i.e. either all four of them move in clockwise direction OR all of them move in anticlockwise direction.

P(all move in clockwise direction) = $\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2} = \frac{1}{16}$

P(all move in anti clockwise direction) = $\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2} = \frac{1}{16}$

Required probability = P(clockwise) + P(anticlockwise) = $\frac{1}{16} + \frac{1}{16} = \frac{1}{8} = 0.125$

6. (c)

$$64\times\frac{3}{2} = 96$$

$$96\times\frac{5}{2} = 240$$

$$240\times\frac{7}{2} = 840$$

$$840\times\frac{9}{2} = 3780$$

$$3780\times\frac{11}{2} = 20790$$

7. (c)

Let x be the number of men who joined the group and y be the number of men who left the group.

Thus, $\frac{(10+x)}{(12+x)} = \frac{6}{7}$

So, $x = 2$

Now, the number of men and women become 12 and 14 respectively.

$$\frac{12+y}{14+y} = \frac{4}{5}$$

So, $y = 4$

Now, the number of men and women become 8 and 10 respectively.

8. (d)

Since 'm' number of team Avengers are formed. So, in team Avengers; total boys = 20 m and total girls = 10 m.

And 'n' number of team Guardians are formed. So, in team Guardians; total boys = 30 n and total girls = 20 n.

$$\text{Total boys} = 20\text{ m} + 30\text{ n} = 1300 \quad \ldots(i)$$

$$\text{Total girls} = 10\text{ m} + 20\text{ n} = 800 \quad \ldots(ii)$$

From equation (i) and (ii), we get

$2 \times (10\text{ m} + 20\text{ n}) - (20\text{ m} + 30\text{ n}) = 2 \times 800 - 1300$

$\Rightarrow 40\text{ n} - 30\text{ n} = 300$

$\Rightarrow \text{n} = 30$ and $\text{m} = 20$

$$\text{Required percent} = \left(\frac{m}{n}\right) \times 100 = \left(\frac{20}{30}\right) \times 100 = 66.67\%$$

9. (d)

Sum of total age of 5 persons of group Alpha = $22 \times 5 = 110$ years

Sum of total age of 5 persons of group Beta = $19 \times 5 = 95$ years

Case 1:

Max joins group Beta

Resultant total age of persons of group Alpha = $24 \times 4 = 96$ years

Age of Max = $110 - 96 = 14$ years

Case 2:

Ross joins group Beta from group Alpha

Sum of age of persons of group Beta = $20 \times 7 = 140$

Age of Ross = $140 - (95 + 40) = 31$ years

Sum of age of persons of group Alpha = $96 - 31 = 65$ years

Case 3:

Sum of total age of persons of group Alpha = $22 \times 4 = 88$ years

Age of John = $88 - 65 = 23$ years

Required ratio = 23 : 14

10. (c)

Speed of Sonam = 60 km/hr

Speed of Ameesha = 36 km/hr

Speed of Ankita = 18 km/hr (since Ameesha's speed is twice of Ankita)

Time taken to cover Agra to Kanpur by Ankita = 2 hours (since time is inversely proportional to speed)

Hence, distance between Agra and Kanpur = $2 \times 18 = 36$ km (since Ankita takes 2 hours to travel and her speed is 18 km/hr).

So, the distance between Agra and Delhi = 36 km

Sonam has to cover $36 \times 2 = 72$ km

$$\text{Time taken by Sonam} = \frac{72}{60} \times 60 = 72 \text{ minutes}$$

11. (c)

At present,

Let the members be M, N, O and P

Where age of P > O > N > M

Since P died after 5 years at the age of 88. So, present age of P = 88 – 5 = 83

Youngest member = M = 14 years

$$N + O + P = 54 \times 3$$

$$N + O = 162 - 83 = 79 \quad \text{...(i)} \qquad (O > N)$$

10 years after the death of P means 15 years hence from present, let Q be born.

20 years from present means at that time Q = 5 years and is youngest.

Eldest member at that time = O (age = O + 20)

$$(O + 20) - 5 = 57$$

$$O = 57 - 15 = 42 \text{ years}$$

So, $N = 79 - 42 = 37$ years

After 5 years, members alive are = M, N, O

$$M = 14 + 5 = 19 \text{ years}$$

$$N = 37 + 5 = 42 \text{ years}$$

$$O = 42 + 5 = 47 \text{ years}$$

Required ages of N and O are 42 and 47.

12. (a)

Let the defective car = D

Let the non defective car = D'

So, $$P\left(\frac{X}{D}\right) = \frac{200 \times (0.08)}{[200 \times 0.08 + 120 \times 0.03 + 80 \times 0.04]}$$

$$= \frac{16}{16 + 3.6 + 3.2} = 0.7$$

$$P\left(\frac{Y}{D}\right) = \frac{120 \times (0.03)}{[200 \times 0.08 + 120 \times 0.03 + 80 \times 0.04]}$$

$$= \frac{3.6}{16 + 3.6 + 3.2} = 0.158$$

$$\text{Ratio} = \frac{0.70}{0.158} = 4.430$$

13. (b)

For paper X:

Area = Area of square – 4 × Area of quadrant

$$\text{Radius} = \frac{14}{2} = 7 \text{ mm}$$

Required area = (130 × 130) – Area of circle of radius 7 mm

$$\text{Required area} = 16900 - \frac{22}{7} \times 7 \times 7$$

$$\text{Area} = 16746 \text{ mm}^2$$

For paper Y:

Length of paper = 150 mm

$$\text{Breadth of paper} = \frac{150}{1.2} = 125 \text{ mm}$$

$$\text{Radius of semi circle} = \frac{125}{2} = 62.5 \text{ mm}$$

$$\text{Remaining area} = 150 \times 125 - 62.5 \times 62.5 \times \frac{22}{7}$$
$$= 18750 - 12276.8$$
$$= 6473.2 \text{ mm}^2$$

$$\text{Required percentage} = \frac{(16746 - 6473.2) \times 100}{16746}$$
$$= 61.3\% \text{ less}$$

14. (b)

Let the original speed of the train be 's' km/hour and the reduced speed will be (s – 50) km/hr. As per the question, a distance of 200 km is covered in 40 minutes more than the regular time taken to complete the journey.We can write the equation as

$$\frac{200}{s-50} - \frac{200}{s} = \frac{2}{3} \text{ or } 300 \times 50 = s\,(s - 50) = 150 \times 100$$

which leads us to get s = 150 i.e. the original speed of the train is 150 km/hr i.e. option (b).

15. (d)

$$\text{Let, } f(x) = ax^2 + bx + c$$
$$f(-4) = 16a - 4b + c = 8$$
$$f(1) = a + b + c = 8$$
$$f(3) = 9a + 3b + c = 15$$

Solving, we get $a = \frac{1}{2}, b = \frac{3}{2}, c = 6$

This gives $f(x) = \frac{x^2}{2} + \frac{3x}{2} + 6$. We have to find the value of $f(x)$ at x = 2

We can compute it as $f(2) = \frac{4}{2} + \frac{6}{2} + 6 = 11$ which leads us to get the desired point as (2, 11) i.e. (d).

16. (c)

Probability of Sanjay hitting the strike, $P(S)$ = 0.5 gives probability of Sanjay NOT hitting the strike = $P(\overline{S}) = 1 - P(S) = 0.5$.

Similarly, Probability of Mahesh hitting the strike, $P(M)$ = 0.4 gives probability of Mahesh NOT hitting the strike = $P(\overline{M}) = 1 - P(M) = 0.6$

In case of tie, Sanjay as well as Mahesh hit the strike OR both DO NOT hit the strike.

Required probability = $P(S) \times P(M) + P(\overline{S}) \times P(\overline{M}) = 0.5 \times 0.4 + 0.5 \times 0.6 = 0.5$

17. (a)

5! onwards every factorial will be a multiple of 120. As 5! = 120

$$6! = 5! \times 6$$
$$7! = 5! \times 6 \times 7 \text{ and so on}$$

So, remainder will be 1! + 3! = 7

18. (d)

Let the selling price of an article be = ₹ (SP)

Let the cost price of an article be = ₹ (CP)

$$\text{Profit} = 300\,SP = 500\,(SP - CP)$$

$$300\,SP = 500\,SP - 500\,CP$$

$$500\,CP = 200\,SP$$

$$\frac{5}{2} = \frac{SP}{CP}$$

$$\text{Profit percentage} = \left(\frac{SP}{CP} - 1\right) \times 100 = 150\%$$

19. (b)

First 2 days, all three of them worked together, thus they did $2 \times \left(\frac{1}{10} + \frac{1}{12} + \frac{1}{15}\right) = \frac{1}{2}$ of the work.

Last 3 days, only Chinmoy worked, thus he did $\frac{3}{15} = \frac{1}{5}$ of the work.

$1 - \frac{1}{2} - \frac{1}{5} = \frac{3}{10}$ of the work was done by Bhanu and Chinmoy

Time × Combined rate = Job done

$$\Rightarrow \quad t \times \left(\frac{1}{12} + \frac{1}{15}\right) = \frac{3}{10}$$

$$\Rightarrow \quad t = 2 \text{ days}$$

So, Bhanu and Chinmoy worked together for 2 days.

Total days = 2 + 3 + 2 = 7

20. (a)

Probability of choosing a defective battery = $\frac{4}{20} = \frac{1}{5}$

Probability of choosing a non-defective battery = $1 - \frac{1}{5} = \frac{4}{5}$

p(not more than 1 out of 8) = p (0 defective out of 8) + p (1 defective out of 8)

$$= {}^8C_0 \left(\frac{1}{5}\right)^0 \left(\frac{4}{5}\right)^8 + {}^8C_1 \left(\frac{1}{5}\right)^1 \left(\frac{4}{5}\right)^7$$

$$= \frac{4^8}{5^8} + \frac{8.4^7}{5^8} = \frac{196608}{390625} = 0.5033$$

21. (c)

Jayesh covered 100 m – 0.25 m = 99.75 m and Karan covered 100 m – 5 m = 95 m (in the same time interval).

Initial distance between them was 5 m and final distance between Jayesh and Karan was 0.25 m.

Thus Jayesh gained 99.75 m – 95 m = 4.75 m over Karan in 99.75 m, hence Jayesh is gaining 1 m over Karan in every $\frac{99.75}{4.75} = 21$ m.

Hence, Jayesh in order to gain remaining 0.25 m over Karan should cover 21 × 0.25 = 5.25 m.

22. (b)

Before evaporation, 10 kg tomatoes = 9.9 kg water + 0.1 kg tomato matter

After evaporation, lets say the weight of tomatoes is x kg

$$x = \left(\frac{98}{100} \times x\right) \text{kg water} + 0.1 \text{ kg tomato matter}$$

Solving for x gives 5 kg.

23. (b)

Let Ram have 'a' number of Pen drives and the price be ₹ x/unit.

Let Laxman have have 'b' number of pen drives and the price be ₹ y/unit.

$$ax = by$$

$$\Rightarrow \quad \frac{x}{y} = \frac{b}{a}$$

$$ay = 16875 \text{ and } bx = 1452$$

$$\Rightarrow \quad \left(\frac{b}{a}\right)\left(\frac{x}{y}\right) = \frac{1452}{16875} = \left(\frac{22}{75}\right)^2$$

$$\Rightarrow \quad \left(\frac{b}{a}\right)^2 = \left(\frac{22}{75}\right)^2 \qquad \text{(Given } a + b = 194\text{)}$$

$$\Rightarrow \quad b = 44,\ a = 150$$

24. (a)

Let 'x' be the value of consignment

$$\Rightarrow \quad \text{Profit} = \frac{x}{3} \times \frac{10}{100} + \frac{2x}{3} \times \frac{4}{100} = 1200$$

$$\Rightarrow \quad x = ₹\ 20{,}000$$

25. (c)

Suppose the ages of Sachin, Shikhar, Ajinkya and Mahendra be a, b, c and d respectively.

$$a : b = 6 : 5$$

$$c - a > 5;$$

$$d = \text{prime number between the ages of Sachin and Ajinkya}$$

Also, $b : c = 2 : 3$

So, $a : b : c = 12 : 10 : 15$

To satisfy the condition required, multiply the ratio by 2.

Thus, $a : b : c = 24 : 20 : 30$

Let Sachin's age be 24 years, Shikhar's age be 20 years and Ajinkya's age be 30 years.

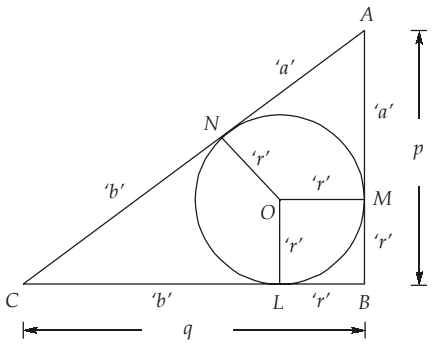
Now, the difference in the ages of Sachin and Ajinkya is greater than 5.

Now, the age of Mahendra is a prime number between the ages of Sachin (a = 24) and Ajinkya (c = 30)

It means, $d = 29$

Hence, required difference between c and d = 30 – 29 = 1 year

26. (b)



The largest possible circle that can be inscribed in the triangle is the one which touches the 3 sides. Since A is an external point from where AN and AM are tangents to this circle, we have $AM = AN = a$ (say)

Similarly, $CN = CL = b$ (say)

If O is the centre of the circle, then $OM = OL = r$ (radius of this circle)

$BC = q = b + r$ and $AB = p = a + r$

We are given the hypotenuse $CA = AN + NC$

$= p + q - 6 = a + b$

Or using the values of p and q,

$b + r + a + r - 6 = a + b$

We get $r = 3$ cm

27. (b)

We can have three possible scenarios:

(I) : Reena and Seema are in the same row. Since Reena is the shortest person in the row, Seema is taller than Reena.

(II) : Reena and Seema are in the same column; once again Seema is taller than Reena since Seema is tallest in the column.

(III) : Reena and Seema are neither in the same row nor in the same column. In this case, there has to a person 'X' who is in the same row as Reena and in the same column as Seema. Now, Reena is shorter than 'X' who is shorter than Seema; which again leads us to conclude that Seema is taller than Reena.

28. (b)

We will start with one student each being recipient of one prize value. This implies that 31250 + 6250 + 1250 + 250 = ₹ 39000 has been used up leaving a sum of ₹ 6,000 to be distributed among NOT more than 18 – 4 = 14 students. Since the amount remaining is less than ₹ 6250, this amount has to be distributed as prizes of denomination ₹ 1250 and/or ₹ 250 only.

We can start with four students receiving ₹ 250 each and the remaining ₹ 5,000 can be given to four more students @ ₹ 1250 leading to total number of 12 students receiving the prizes.

Alternately, we can have 4 + 5 = 9 students receiving ₹ 250 each and the remaining ₹ 3750 can be given to three more students @ ₹ 1250 leading to total number of 16 students receiving the prizes.

Any more options are ruled out since we have to increase in steps of 5 – 1 = 4 students only which means that the next option will lead to 20 students getting the prize money which is not possible since there are only 18 students in all.

29. (d)

We will be required to get the value of n such that $\frac{n(n+1)}{2} = 100$. If $n = 13$, $\frac{n(n+1)}{2} = 91$ which means that 100^{th} digit will be occupied by 14^{th} set of digits or it will be equal to 4.

30. (b)

Because in each row first × third + 1 = second.
So 9 × 4 + 1 = 37

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