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# ARITHMETIC

## CSAT PYQs 2011-24

*with*

ANSWER KEY

1. Percentage, Profit & Loss.
2. TSD, Trains, Boats & Streams.
3. Ratio & Proportion, Partnership, Mixture & Alligation, Ages, Average.
4. Time & Work, Pipes & Cisterns.
5. Permutation & Combination, Probability.

UPSC CSE PRELIMS 2026

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PRELIMS 2026

Ram Mohan Pandey

# PERCENTAGE, PROFIT & LOSS

CSAT (GS PAPER II)

## PREVIOUS YEAR QUESTIONS

*with*

ANSWER KEY

## 2011-2024

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# CSAT 2026

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# Previous Year Questions

## Percentage

1. In a group of persons, 70% of the persons are male and 30% of the persons are married. If two-sevenths of the males are married, what fraction of the females is single ?
   (a) 2/7 (b) 1/3
   (c) 3/7 (d) 2/3 **[CSAT 2011]**

2. The tank-full petrol in Arun's motor-cycle lasts for 10 days. If he starts using 25% more everyday, how many days will the tank-full petrol last ?
   (a) 5 (b) 6
   (c) 7 (d) 8 **[CSAT 2013]**

3. A and B decide to travel from place X to place Y by bus. A has Rs. 10 with him and he finds that it is 80% of the bus fare for two persons. B finds that he has Rs. 3 with him and hands it over to A. In this context, which one of the following statements is correct ?
   (a) Now the money A has just enough to buy two tickers.
   (b) A still needs Rs. 2 for buying the tickets.
   (c) After buying the two tickets A will be left with 50 paise.
   (d) The money A now has is still not sufficient to buy two tickets. **[CSAT 2014]**

4. A gardener increased the area of his rectangular garden by increasing its length by 40% and decreasing its width by 20%. The area of the new garden
   (a) has increased by 20%.
   (b) has increased by 12%.
   (c) has increased by 8%.
   (d) is exactly the same as the old area.
   **[CSAT 2014]**

5. As per agreement with a bank, a businessman had to refund a loan in some equal installments without interest. After paying 18 installments he found that 60 percent of his loan was refunded. How many installments were there in the agreement ?
   (a) 22
   (b) 24
   (c) 30
   (d) 33 **[CSAT 2014]**

6. An automobile owner reduced his monthly petrol consumption when the prices went up. The price-consumption relationship is as follows:

| Price (in Rs. per litre) | 40 | 50 | 60 | 75 |
|---|---|---|---|---|
| Monthly consumption (in litres) | 60 | 48 | 40 | 32 |

   If the price goes up to Rs. 80 per litre, his expected consumption (in litres) will be
   (a) 30
   (b) 28
   (c) 26
   (d) 24 **[CSAT 2015]**

7. In a test, a candidate attempted only 8 questions and secured 50% marks in each of the questions. If the obtained a total of 40% in the test and all questions in the test carried equal marks, how many questions were there in the test ?
   (a) 8
   (b) 10
   (c) 15
   (d) 16 **[CSAT 2015]**

8. Candidates in a competitive examination consisted of 60% men and 40% women. 70% men and 75% women cleared the qualifying test and entered the final test where 80% men and 70% women were successful. Which of the following statements is correct ?
   (a) Success rate is higher for women.
   (b) Overall success rate in below 50%.
   (c) More men cleared the examination than women.
   (d) Both (a) and (b) above are correct.
   **[CSAT 2015]**

9. There is an order of 19000 quantity of a particular product from a customer. The firm produces 1000 quantity of that product per day out of which 5% are unfit for sale. In how many days will the order be completed ?
   (a) 18 (b) 19
   (c) 20 (d) 22 **[CSAT 2016]**

10. Two numbers X and Y are respectively 20% and 28% less than a third number Z. By what percentage is the number Y less than the numbers X ?
   (a) 12% (b) 10%
   (c) 9% (d) 8% **[CSAT 2016]**

11. The total emoluments of two persons are the same, but one gets allowances to the extent of 65% of his basic pay and the other gets allowances to the extent of 80% of his basic pay. The ratio of the basic pay of the former to the basic pay of the latter is
   (a) 16 : 13 (b) 5 : 4
   (c) 7 : 5 (d) 12 : 11
   **[CSAT 2016]**

12. If there is a policy that 1/3$^{rd}$ of a population of a community has migrated every year from one place to some other place, what is the leftover population of that community after the sixth year, if there is no further growth in the population during this period ?
   (a) $\frac{16}{243}$ rd part of the population.
   (b) $\frac{32}{243}$ rd part of the population.
   (c) $\frac{32}{729}$ th part of the population.
   (d) $\frac{64}{729}$ th part of the population.
   **[CSAT 2017]**

13. P = (40% of A) + (65% of B) and Q = (50% of A) + (50% of B), where A is greater than B. In this context, which of the following statements is correct ?
   (a) P is greater than Q. **[CSAT 2017]**
   (b) Q is greater than P.
   (c) P is equal to Q.
   (d) None of the above can be concluded with certainty.

14. In a city, 12% of households earn less than Rs. 30,000 per year, 6% households earn more than Rs. 2,00,000 per year, 22% households earn more than Rs. 1,00,000 per year and 990 households earn between Rs. 30,000 and Rs. 1,00,000 per year. How many households earn between Rs. 1,00,000 and Rs. 2,00,000 per year ?
   (a) 250
   (b) 240
   (c) 230
   (d) 225 **[CSAT 2017]**

15. A student has to get 40% marks to pass in an examination. Suppose he gets 30 marks and fails by 30 marks, then what are the maximum marks in the examination ?
   (a) 100
   (b) 120
   (c) 150
   (d) 300 **[CSAT 2018]**

16. A person bought a refrigerator worth Rs. 22,800 with 12.5% interest compounded yearly. At the end of first year he paid Rs. 8,650 and at the end of second year Rs. 9,125. How much will he have to pay at the end of third year to clear the debt ?
(a) Rs. 9,990
(b) Rs. 10,000
(c) Rs. 10,590
(d) Rs. 11,250 **[CSAT 2018]**

17. A and B are two heavy steel blocks. If B is placed on the top of A, the weight increases by 60%. How much weight will reduce with respect to the total weight of A and B, if B is removed from the top of A?
(a) 60%
(b) 45.5%
(c) 40%
(d) 37.5% **[CSAT 2019]**

18. When a runner was crossing the 12 km mark, she was informed that she had completed only 80% of the race. How many kilometers was the runner supposed to run in this event ?
(a) 14 (b) 15
(c) 16 (d) 16.5 **[CSAT 2019]**

19. Raju has Rs. 9000 with him and he wants to buy a mobile handset; but he finds that he has only 75% of the amount required to buy the handset. Therefore, he borrows Rs. 2000 from a friend. Then
(a) Raju still does not have enough amount to buy the handset.
(b) Raju has exactly the same amount as required to buy the handset.
(c) Raju has enough amount to buy the handset and he will have 500 with him after buying the handset.
(d) Raju has enough amount to buy the handset and he will have 1000 with him after buying the handset.
**[CSAT 2019]**

20. In an examination, A has scored 20 marks more than B. If B has scored 5% less marks than A, how much has B scored?
(a) 360 (b) 380
(c) 400 (d) 420 **[CSAT 2019]**

21. Rakesh had money to buy 8 mobile handsets of a specific company. But the retailer offered very good discount on that particular handset. Rakesh could buy 10 mobile handsets with the amount he had. What was the discount the retailer offered?
(a) 15%
(b) 20%
(c) 25%
(d) 30% **[CSAT 2019]**

22. A shop owner offers the following discount options on an article to a customer:
1. Successive discounts of 10% and 20%, and then pay a service tax of 10%.
2. Successive discounts of 20% and 10%, and then pay a service tax of 10%.
3. Pay a service tax of 10% first, then successive discounts of 20% and 10%.

Which one of the following is correct ?
(a) 1 only is the best option for the customer.
(b) 2 only is the best option for the customer.
(c) 3 only is the best option for the customer.
(d) All the options are equally good for the customer.
**[CSAT 2020]**

23. In adult population of a city, 40% men and 30% women are married. What is the percentage of married adult population if no man marries more than one woman and no woman marries more than one man; and there are no widows and widowers ?
(a) $33\frac{1}{7}\%$ (b) 34%
(c) $34\frac{2}{7}\%$ (d) 35% **[CSAT 2020]**

24. A bottle contains 20 litres of liquid *A*. 4 litres of liquid *A* is taken out of it and replaced by same quantity of liquid *B*. Again 4 litres of the mixture is taken out and replaced by same quantity of liquid *B*. What is the ratio of quantity of liquid *A* to that of liquid *B* in the final mixture ?
(a) 4 : 1 (b) 5 : 1
(c) 16 : 9 (d) 17 : 8 **[CSAT 2020]**

25. As a result of 25% hike in the price of rice per kg, a person is able to purchase 6 kg less rice for Rs. 1,200. What was the original price of rice per kg ?
(a) Rs. 30 (b) Rs. 40
(c) Rs. 50 (d) Rs. 60
**[CSAT 2020]**

26. In a class, 60% of students are from India and 50% of the students are girls. If 30% of the Indian students are girls, then what percentage of foreign students are boys ?
(a) 45% (b) 40%
(c) 30% (d) 20% **[CSAT 2021]**

27. A student appeared in 6 papers. The maximum marks are the same for each paper. His marks in these papers are in the proportion of 5 : 6 : 7 : 8 : 9 : 10. Overall he scored 60%. In how many number of papers did he score less than 60% of the maximum marks ?
(a) 2 (b) 3
(c) 4 (d) 5 **[CSAT 2021]**

28. P scored 40 marks more than Q in an examination. If Q scored 10% less marks than P, then how much did Q score ?
(a) 360 (b) 380
(c) 400 (d) 420 **[CSAT 2021]**

29. If the price of an article is decreased by 20% and then the new price is increased by 25%, then what is the net change in the price ?
(a) 0%
(b) 5% increase
(c) 5% decrease
(d) Can't be determined due to insufficient data.
**[CSAT 2021]**

30. The increase in the price of a certain item was 25%. Then the price was decreased by 20% and then again increased by 10%. What is the resultant increase in the price ?
(a) 5% (b) 10%
(c) 12.5% (d) 15% **[CSAT 2022]**

31. When 70% of a number $x$ is added to another number $y$, the sum becomes 165% of the value of $y$. When 60% of the number $x$ is added to another number $z$, then the sum becomes 165% of the value of $z$. Which one of the following is correct ?
(a) $z < x < y$ (b) $x < y < z$
(c) $y < x < z$ (d) $z < y < x$
**[CSAT 2022]**

32. Two candidates X and Y contested an election. 80% of voters cast their vote and there were no invalid votes. There was no NOTA (None of the above) option. X got 56% of the votes cast and won by 1440 votes. What is the total number of voters in the voters list ?
(a) 15,000
(b) 12,000
(c) 9,600
(d) 5,000 **[CSAT 2022]**

33. A principal $P$ becomes $Q$ in 1 year when compounded half-yearly with $R$% annual rate of interest. If the same principal $P$ becomes $Q$ in 1 year when compounded annually with $S$% annual rate of interest, then which one of the following is correct ?
(a) $R = S$ (b) $R > S$
(c) $R < S$ (d) $R \leq S$
**[CSAT 2023]**

34. What percent of water must be mixed with honey so as to gain 20% by selling the mixture at the cost price of honey ?
(a) 20% (b) 10%
(c) 5% (d) 4% **[CSAT 2024]**

35. P's salary is 20% lower than Q's salary which is 20% lower than R's salary. By how much percent is R's salary more than P's salary ?
(a) 48.75% (b) 56.25%
(c) 60.50% (d) 62.25%
**[CSAT 2024]**

36. A number is mistakenly divided by 4 instead of multiplying by 4. What is the percentage change in the result due to this mistake ?
(a) 25% (b) 50%
(c) 72.75% (d) 93.75%
**[CSAT 2024]**

37. A person buys three articles P, Q and R for Rs. 3,330. If P costs 25% more than R and R costs 20% more than Q, then what is the cost of P ?
(a) Rs. 1,000 (b) Rs. 1,200
(c) Rs. 1,250 (d) Rs. 1,350
**[CSAT 2024]**



## ANSWER KEY

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | (d) | 6. | (a) | 11. | (d) | 16. | (d) | 21. | (b) | 26. | (d) | 31. | (a) | 36. | (d) |
| 2. | (d) | 7. | (b) | 12. | (d) | 17. | (d) | 22. | (d) | 27. | (b) | 32. | (a) | 37. | (d) |
| 3. | (c) | 8. | (c) | 13. | (d) | 18. | (b) | 23. | (c) | 28. | (a) | 33. | (c) | | |
| 4. | (b) | 9. | (c) | 14. | (b) | 19. | (a) | 24. | (c) | 29. | (a) | 34. | (a) | | |
| 5. | (c) | 10. | (b) | 15. | (c) | 20. | (b) | 25. | (b) | 30. | (b) | 35. | (b) | | |

# Previous Year Questions

## Profit & Loss

1. If Sohan, while selling two goats at the same price, makes a profit of 10% on one goat and suffers a loss of 10% on the other
   (a) he make no profit and no loss.
   (b) he makes a profit of 1%.
   (c) he suffers a loss of 1%.
   (d) he suffers a loss of 2%. **[CSAT 2014]**

2. A person allows a 10% discount for cash payment from the marked price of a toy and still he makes a 10% gain. What is the cost price of the toy which is marked Rs. 770 ?
   (a) Rs. 610 (b) Rs. 620
   (c) Rs. 630 (d) Rs. 640
   **[CSAT 2016]**

3. Gopal bought a cell phone and sold it to Ram at 10% profit. Then Ram wanted to sell it back to Gopal at 10% loss. What will be Gopal's position if he agreed ?
   (a) Neither loss nor gain
   (b) Loss 1%
   (c) Gain 1%
   (d) Gain 0.5% **[CSAT 2017]**

4. A shopkeeper sells an article at Rs. 40 and gets X% profit. However, when he sells it at Rs. 20, he faces same percentage of loss. What is the original cost of the article ?
   (a) Rs. 10 (b) Rs. 20
   (c) Rs. 30 (d) Rs. 40
   **[CSAT 2018]**

5. A person bought a car and sold it for Rs. 3,00,000. If he incurred a loss of 20%, then how much did he spend to buy the car ?
   (a) Rs. 3,60,000 (b) Rs. 3,65,000
   (c) Rs. 3,70,000 (d) Rs. 3,75,000
   **[CSAT 2020]**

6. A Question is given followed by two Statements 1 and 2. Consider the Question and the Statements.
   A person buys three articles $p$, $q$ and $r$ for Rs. 50. The price of the article $q$ is Rs. 16 which is the least.
   Question: What is the price of the article $p$ ?
   Statement-1: The cost of $p$ is not more than that of $r$.
   Statement-2: The cost of $r$ is not more than that of $p$.
   Which one of the following is correct in respect of the above Question and the Statements ?
   (a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other Statement alone.
   (b) The Question can be answered by using either Statement alone.
   (c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.
   (d) The Question cannot be answered even by using both the Statements together.
   **[CSAT 2024]**

## ANSWER KEY

1. (c) 2. (c) 3. (c) 4. (c) 5. (d) 6. (c)

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PRELIMS 2026

Ram Mohan Pandey

# TSD, TRAINS, BOATS & STREAMS

CSAT (GS PAPER II)

# PREVIOUS YEAR QUESTIONS

*with*

ANSWER KEY

# 2011-2024

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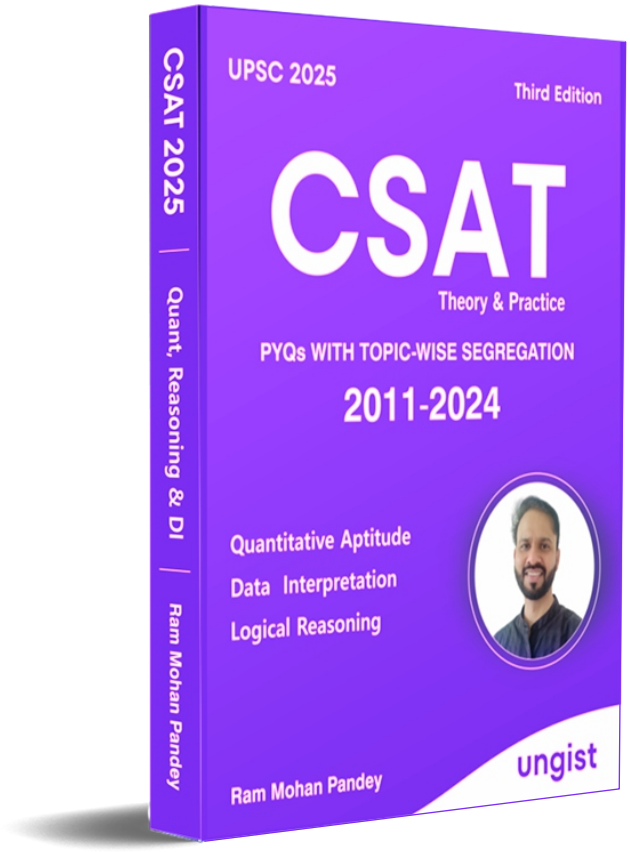
*for* UPSC CSE PRELIMS

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# Previous Year Questions

## Time, Speed and Distance

1. If a bus travels 160 km in 4 hours and a train travels 320 km in 5 hours at uniform speeds, then what is the ratio of the distances travelled by them in one hour ?
   (a) 8 : 5 (b) 5 : 8
   (c) 4 : 5 (d) 1 : 2
   **[CSAT 2011]**

2. Mr. Kumar drives to work at an average speed of 48 km/h. The time taken to cover the first 60% of the distance is 10 minutes more than the time taken to cover the remaining distance. How far is his office ?
   (a) 30 km
   (b) 40 km
   (c) 45 km
   (d) 48 km **[CSAT 2012]**

3. A thief running at 8 km/hr is chased by a policeman who speed is 10 km/hr. If the thief is 100 m ahead of the policeman, then the time required for the policemen to catch the thief will be
   (a) 2 minutes
   (b) 3 minutes
   (c) 4 minutes
   (d) 6 minutes **[CSAT 2013]**

4. A person can walk a certain distance and drive back in six hours. He can also walk both ways in 10 hours. How much time will he take to drive both ways ?
   (a) Two hours
   (b) Two and a half hours
   (c) Five and a half hours
   (d) Four hours **[CSAT 2013]**

5. A worker reaches his factory 3 minutes late if his speed from his house to the factory is 5 km/hr. If he walks at a speed of 6 km/hr, then he reaches the factory 7 minutes early the distance of the factory from his house is
   (a) 3 km (b) 4 km
   (c) 5 km (d) 6 km
   **[CSAT 2014]**

6. Two cars start towards each other, from two places A and B which are at a distance of 160 km. They start at the same time 08 : 10 am. If the speeds of the cars are 50 km and 30 km/h respectively, they will meet each other at
   (a) 10 : 10 am
   (b) 10 : 30 am
   (c) 11 : 10 am
   (d) 11 : 20 am **[CSAT 2014]**

7. In a 500 metres race, B starts 45 meters ahead of A, but A wins the race while B is still 35 metres behind. What is the ratio of the speed of A to B assuming that both start at the same time ?
   (a) 25 : 21 (b) 25 : 20
   (c) 5 : 3 (d) 5 : 7
   **[CSAT 2015]**

8. Two cities A and B are 360 km apart. A car goes from A to B with a speed of 40 km/hr and returns to A with a speed of 60 km/hr. What is the average speed of the car ?
   (a) 45 km/hr
   (b) 48 km/hr
   (c) 50 km/hr
   (d) 55 km/hr
   **[CSAT 2015]**

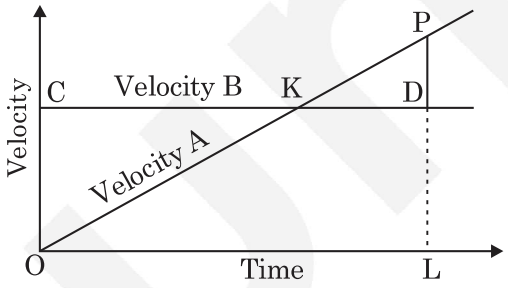
9. A daily train is to be introduced between station A and station B starting from each end at 6 am and the journey is to be completed in 42 hours. What is the number of trains needed in order to maintain the shuttle service ?

(a) 2 (b) 3
(c) 4 (d) 7 **[CSAT 2016]**

10. A and B walk around a circular park. They start at 8 am from the same point in the opposite directions. A and B walk at a speed of 2 rounds per hour and 3 rounds per hour respectively. How many times shall they cross each other after 8:00 am and before 9:30 am ?

(a) 7 (b) 6
(c) 5 (d) 8 **[CSAT 2016]**

11. The figure drawn below gives the velocity graphs of two vehicles A and B. The straight line OKP represents the velocity of vehicle A at any instant, whereas the horizontal straight line CKD represents the velocity of vehicle B at any instant. In the figure, D is the point where perpendicular from P meets the horizontal line CKD such that $PD = \frac{1}{2}LD$




What is the ratio between the distances covered by vehicles A and B in the time interval OL ?

(a) 1 : 2
(b) 2 : 3
(c) 3 : 4
(d) 1 : 1 **[CSAT 2018]**

12. Two persons, A and B are running on a circular track. At the start, B is ahead of A and their positions make an angle of 30° at the centre of the circle. When A reaches the point diametrically opposite to his starting point, he meets B. What is the ratio of speeds of A and B, if they are running with uniform speeds ?

(a) 6 : 5 (b) 4 : 3
(c) 6 : 1 (d) 4 : 2 **[CSAT 2018]**

13. X, Y and Z are three contestants in a race of 1000 m. Assume that all run with different uniform speeds. X gives Y a start of 40 m and X gives Z a start of 64 m. If Y and Z were to compete in a race of 1000 m, how many meters start will Y give to Z ?

(a) 20
(b) 25
(c) 30
(d) 35 **[CSAT 2019]**

14. Let x, y be the volumes; m, n be the masses of two metallic cubes P and Q respectively. Each side of Q is two times that of P and mass of Q is two times that of P. Let u = m/x and v = n/y. Which one of the following is correct ?

(a) u = 4v
(b) u = 2v
(c) v = u
(d) v = 4u **[CSAT 2020]**

15. A car travels from a place X to place Y at an average speed of v km/hr, from Y to X at an average speed of 2v km/hr, again from X to Y at an average speed of 3v km/hr and again from Y to X at an average speed of 4v km/hr. Then the average speed of the car for the entire journey

(a) is less than v km/hr
(b) lies between v and 2v km/hr
(c) lies between 2v and 3v km/hr
(d) lies between 3v and 4v km/hr

**[CSAT 2020]**

16. A person X from a place A and another person Y from a place B set out at the same time to walk towards each other. The places are separated by a distance of 15 km. X walks with a uniform speed of 1.5 km/h and Y walks with a uniform speed of 1 km/h in the first hour, with a uniform speed of 1.25 km/h in the second hour and with a uniform speed of 1.5 km/h in the third hour and so on.

Which of the following is/are correct ?

1. They take 5 hours to meet.
2. They meet midway between A and B.

Select the correct answer using the code given below:

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2 **[CSAT 2021]**

17. Two friends X and Y start running and they run together for 50 m in the same direction and reach a point. X turns right and runs 60 m, while Y turns left and runs 40 m. Then X turns left and runs 50 m and stops, while Y turns right and runs 50 m and then stops. How far are the two friends from each other now ?

(a) 100 m (b) 90 m
(c) 60 m (d) 50 m
**[CSAT 2022]**

18. X and Y run a 3 km race along a circular course of length 300 m. Their speeds are in the ratio 3 : 2. If they start together in the same direction, how many times would the first one pass the other (the start-off is not counted as passing) ?

(a) 2
(b) 3
(c) 4
(d) 5 **[CSAT 2022]**

19. A man started from home at 14:30 hours and drove to village, arriving there when the village clock indicated 15:15 hours. After staying for 25 minutes, he drove back by a different route of length 1.25 times the first route at a rate twice as fast reaching home at 16:00 hours. As compared to the clock at home, the village clock is

(a) 10 minutes slow (b) 5 minutes slow
(c) 10 minutes fast (d) 5 minutes fast
**[CSAT 2022]**

20. On one side of a 1.01 km long road, 101 plants are planted at equal distance from each other. What is the total distance between 5 consecutive plants ?

(a) 40 m (b) 40.4 m
(c) 50 m (d) 50.5 m
**[CSAT 2022]**

## ANSWER KEY

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | (b) | 4. | (a) | 7. | (a) | 10. | (a) | 13. | (b) |
| 2. | (b) | 5. | (c) | 8. | (b) | 11. | (c) | 14. | (a) |
| 3. | (b) | 6. | (a) | 9. | (c) | 12. | (a) | | |

| | | | |
|---|---|---|---|
| 15. | (b) | 17. | (a) |
| 16. | (c) | 18. | (b) |
| | | 19. | (d) |
| | | 20. | (b) |

# Previous Year Questions

## Trains

1. A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is the original speed of the train in km/h ?

   (a) 24 (b) 33
   (c) 42 (d) 66

   **[CSAT 2013]**

2. A freight train left Delhi for Mumbai at an average speed of 40 km/h. Two hours later, an express train left Delhi for Mumbai, following the freight train on a parallel track at an average speed of 60 km/h. How far from Delhi would the express train meet the freight train ?

   (a) 480 km (b) 260 km
   (c) 240 km (d) 120 km

   **[CSAT 2017]**

3. A train 200 metres long is moving at the rate of 40 km/h. In how many seconds will it cross a man standing near the railway line?

   (a) 12
   (b) 15
   (c) 16
   (d) 18

   **[CSAT 2018]**

**ANSWER KEY**

1. (c) 2. (c) 3. (d)

# Previous Year Questions

## Boats and Streams

1. A man takes half time in rowing a certain distance downstream than upstream. What is the ratio of the speed in still water to the speed of current ?
   (a) 1 : 2
   (b) 2 : 1
   (c) 1 : 3
   (d) 3 : 1 **[CSAT 2020]**

**ANSWER KEY**

1. (d)

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PRELIMS 2026

Ram Mohan Pandey

# RATIO & PROPORTION, PARTNERSHIP, MIXTURE & ALLIGATION, AGES,

# AVERAGE

## CSAT (GS PAPER II)

## PREVIOUS YEAR QUESTIONS

*with*

## ANSWER KEY

## 2011-2024

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# Previous Year Questions

## Ratio and Proportion

1. In a rare coin collection, there is one gold for every three non-gold coins. 10 more gold coins are added to the collection and the ratio of gold coins to non-gold coins would be 1 : 2. Based on the information, the total number of coins in the collection now becomes
   (a) 90 (b) 80
   (c) 60 (d) 50 **[CSAT 2013]**

2. The monthly incomes of Peter and Paul are in the ratio of 4 : 3. Their expenses are in the ratio of 3 : 2. If each save Rs. 6000 at end of the month, their monthly incomes respectively are (in Rs.)
   (a) 24000 and 18000
   (b) 28000 and 21000
   (c) 32000 and 24000
   (d) 34000 and 26000 **[CSAT 2015]**

3. The monthly incomes of X and Y are in the ratio of 4 : 3 and their monthly expenses are in the ratio of 3 : 2. However, each saves Rs. 6,000 per month. What is their total monthly income ?
   (a) Rs. 28,000 (b) Rs. 42,000
   (c) Rs. 56,000 (d) Rs. 84,000
   **[CSAT 2017]**

4. A sum of Rs. 2,500 is distributed among X, Y and Z in the ratio $\frac{1}{2}:\frac{3}{4}:\frac{5}{6}$. What is the difference between the maximum share and the minimum share ?
   (a) Rs. 300 (b) Rs. 350
   (c) Rs. 400 (d) Rs. 450
   **[CSAT 2020]**

5. An amount of money was distributed among A, B and C in the ratio p : q : r.
   Consider the following statements:
   1. A gets the maximum share if p is greater than (q + r).
   2. C gets the minimum share if r is less than (p + q).
   Which of the above statements is/are correct ?
   (a) 1 only (b) 2 only
   (c) Both 1 and 2 (d) Neither 1 nor 2
   **[CSAT 2021]**

6. A Question is given followed by two Statements 1 and 2. Consider the Question and the Statements.
   A certain amount was distributed among X, Y and Z.
   Question: Who received the least amount ?
   Statement-1: X received 4/5 of what Y and Z together received.
   Statement-2: Y received 2/7 of what X and Z together received.
   Which one of the following is correct in respect of the above Question and the Statements ?
   (a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other Statement alone.
   (b) The Question can be answered by using either Statement alone.
   (c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.
   (d) The Question cannot be answered even by using both the Statements together.
   **[CSAT 2024]**

## ANSWER KEY

1. (a) 2. (a) 3. (b) 4. (c) 5. (a) 6. (c)

# Previous Year Questions

## Partnership

1. Two persons P and Q enter into a business. P puts Rs. 14,000 more than Q, but P has invested for 8 months and Q has invested for 10 months. If P's share is Rs. 400 more than Q's share out of the total profit of Rs. 2,000, what is the capital contributed by P ?
   (a) Rs. 30,000
   (b) Rs. 26,000
   (c) Rs. 24,000
   (d) Rs. 20,000 **[CSAT 2024]**

## ANSWER KEY

1. (a)

# Previous Year Questions

## Mixture and Alligation

1. Two glasses of equal volume are respectively half and three-fourths filled with milk. They are then filled to the brim by adding water. Their contents are then poured into another vessel. What will be the ratio of milk to water in this vessel ?
   (a) 1 : 3
   (b) 2 : 3
   (c) 3 : 2
   (d) 5 : 3

   **[CSAT 2012]**

2. Two equal glasses of same type are respectively $\frac{1}{3}$ and $\frac{1}{4}$ full of milk. They are then filled up with water and the contents are mixed in a pot. What is the ratio of milk and water in the pot ?
   (a) 7 : 17
   (b) 1 : 3
   (c) 9 : 21
   (d) 11 : 23

   **[CSAT 2015]**

3. 30 g of sugar was mixed in 180 ml water in a vessel A, 40 g of sugar was mixed in 280 ml of water in vessel B and 20 g of sugar was mixed in 100 ml of water in vessel C. The solution in vessel B is
   (a) sweeter than that in C.
   (b) sweeter than that in A.
   (c) as sweet as that in C.
   (d) less sweet than that in C.

   **[CSAT 2016]**

4. The monthly average salary paid to all the employees of a company was Rs. 5000. The monthly average salary paid to male and female employees was Rs. 5200 and Rs. 4200 respectively. Then the percentage of males employed in the company is
   (a) 75% (b) 80%
   (c) 85% (d) 90%

   **[CSAT 2016]**

5. There is a milk sample with 50% water in it. If 1/3 rd of this milk is added to equal amount of pure milk, then water in the new mixture will fall down to
   (a) 25% (b) 30%
   (c) 35% (d) 40%

   **[CSAT 2017]**

6. Consider the following data:

| | Average marks in English | Average marks in Hindi |
|---|---|---|
| Girls | 9 | 8 |
| Boys | 8 | 7 |
| Overall average marks | 8.8 | $x$ |

   What is the value of $x$ in the above table ?
   (a) 7.8 (b) 7.6
   (c) 7.4 (d) 7.2

   **[CSAT 2020]**

7. A bottle contains 20 litres of liquid A. 4 litres of liquid A is taken out of it and replaced by same quantity of liquid B. Again 4 litres of the mixture is taken out and replaced by same quantity of liquid B. What is the ratio of quantity of liquid A to that of liquid B in the final mixture ?
   (a) 4 : 1 (b) 5 : 1
   (c) 16 : 9 (d) 17 : 8

   **[CSAT 2020]**

8. A vessel full of water weighs 40 kg. If it is one-third filled, its weight becomes 20 kg. What is the weight of the empty vessel ?
(a) 10 kg
(b) 15 kg
(c) 20 kg
(d) 25 kg

**[CSAT 2020]**

9. There are two containers X and Y. X contains 100 ml of milk and Y contains 100 ml of water. 20 ml of milk from X is transferred to Y. After mixing well, 20 ml of the mixture in Y is transferred back to X. If m denotes the proportion of milk in X and n denotes the proportion of water in Y, then which one of the following is correct ?
(a) m = n
(b) m > n
(c) m < n
(d) Cannot be determined due to insufficient data

**[CSAT 2022]**



## ANSWER KEY

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | (d) | 3. | (d) | 4. | (b) | 5. | (a) | 6. | (a) | 7. | (c) | 8. | (a) | 9. | (a) | 2. | (a) | | |

# Previous Year Questions

## Problems Based on Ages

1. A father is nine times as old as his son and the mother is eight times as old as the son. The sum of the father's and the mother's age is 51 years. What is the age of the son ?
   (a) 7 years (b) 5 years
   (c) 4 years (d) 3 years
   **[CSAT 2015]**

2. The monthly incomes of Peter and Paul are in the ratio of 4 : 3. Their expenses are in the ratio of 3 : 2. If each save Rs. 6000 at end of the month, their monthly incomes respectively are (in Rs.)
   (a) 24000 and 18000
   (b) 28000 and 21000
   (c) 32000 and 24000
   (d) 34000 and 26000 **[CSAT 2015]**

3. The monthly incomes of X and Y are in the ratio of 4 : 3 and their monthly expenses are in the ratio of 3 : 2. However, each saves Rs. 6,000 per month. What is their total monthly income ?
   (a) Rs. 28,000 (b) Rs. 42,000
   (c) Rs. 56,000 (d) Rs. 84,000
   **[CSAT 2017]**

4. In 2002, Meenu's age was one-third of the age of Meera, whereas in 2010, Meenu's age was half the age of Meera. What is Meenu's year of birth ?
   (a) 1992 (b) 1994
   (c) 1996 (d) 1998
   **[CSAT 2019]**

5. Ena was born 4 years after her parents' marriage. Her mother is three years younger than her father and 24 years older than Ena, who is 13 years old. At what age did Ena's father get married ?
   (a) 22 years (b) 23 years
   (c) 24 years (d) 25 years
   **[CSAT 2019]**

6. Consider the Question and two Statements given below:
   Question: What is the age of Manisha ?
   Statement-1: Manisha is 24 years younger than her mother.
   Statement-2: 5 years later, the ages of Manisha and her mother will be in the ratio 3 : 5.
   Which one of the following is correct in respect of the Question and the Statements ?
   (a) Statement-1 alone is sufficient to answer the Question.
   (b) Statement-2 alone is sufficient to answer the Question.
   (c) Both Statement-1 and Statement-2 are sufficient to answer the Question.
   (d) Both Statement-1 and Statement-2 are not sufficient to answer the question.
   **[CSAT 2022]**

7. A father said to his son, "$n$ years back I was as old as you are now. My present age is four times your age $n$ years back". If the sum of the present ages of the father and the son is 130 years, what is the difference of their ages?
   (a) 30 years (b) 32 years
   (c) 34 years (d) 36 years
   **[CSAT 2024]**

## ANSWER KEY

1. (d) 2. (a) 3. (b) 4. (b) 5. (b) 6. (c) 7. (a)

# Previous Year Questions

## Average

1. A student on her first 3 tests received an average score of $N$ points. If she exceeds her previous average score by 20 points on her fourth test, then what is the average score for the first 4 tests ?
   (a) $N + 20$ (b) $N + 10$
   (c) $N + 4$ (d) $N + 5$
   **[CSAT 2011]**

2. The sum of the ages of 5 members comprising a family, 3 years ago was 80 years. The average age of the family today is the same as it was 3 years ago, because of an addition of a baby during the intervening period. How old is the baby ?
   (a) 6 months
   (b) 1 year
   (c) 2 years
   (d) 2 years and 6 months **[CSAT 2016]**

3. The average monthly income of a person in a certain family of 5 is Rs. 10,000. What will be the average monthly income of a person in the same family if the income of one person increased by Rs. 1,20,000 per year ?
   (a) Rs. 12,000 (b) Rs. 16,000
   (c) Rs. 20,000 (d) Rs. 34,000
   **[CSAT 2016]**

4. Suppose the average weight of 9 persons is 50 kg. The average weight of the first 5 persons is 45 kg, whereas the average weight of the last 5 persons is 55 kg. Then the weight of the $5^{th}$ person will be
   (a) 45 kg (b) 47.5 kg
   (c) 50 kg (d) 52.5 kg
   **[CSAT 2017]**

5. There are thirteen 2-digit consecutive odd numbers. If 39 is the mean of the first five such numbers, then what is the mean of all the thirteen numbers ?
   (a) 47 (b) 49
   (c) 51 (d) 45 **[CSAT 2017]**

6. The average rainfall in a city for the first four days was recorded to be 0.40 inch. The rainfall on the last two days was in the ratio of 4 : 3. The average of six days was 0.50 inch. What was the rainfall on the fifth day ?
   (a) 0.60 inch
   (b) 0.70 inch
   (c) 0.80 inch
   (d) 0.90 inch **[CSAT 2017]**

7. The average marks of 100 students are given to be 40. It was found later that marks of one student were 53 which were misread as 83. The corrected mean marks are
   (a) 39
   (b) 39.7
   (c) 40
   (d) 40.3 **[CSAT 2019]**

8. A family has two children along with their parents. The average of the weights of the children and their mother is 50 kg. The average of the weights of the children and their father is 52 kg. If the weight of the father is 60 kg, then what is the weight of the mother ?
   (a) 48 kg
   (b) 50 kg
   (c) 52 kg
   (d) 54 kg
   **[CSAT 2019]**

9. The average age of a teacher and three students is 20 years. If all the three students are of same age and the difference between the age of the teacher and each student is 20 years, then what is the age of the teacher ?
(a) 25 years (b) 30 years
(c) 35 years (d) 45 years
**[CSAT 2020]**

10. In a class, there are three groups A, B and C. If one student from group A and two students from group B are shifted to group C, then what happens to the average weight of the students of the class ?
(a) It increases.
(b) It decreases.
(c) It remains the same.
(d) No conclusion can be drawn due to insufficient data.
**[CSAT 2020]**

11. The average score of a batsman after his $50^{th}$ innings was 46.4. After $60^{th}$ innings, his average score increases by 2.6. What was his average score in the last ten innings ?
(a) 122 (b) 91
(c) 62 (d) 49 **[CSAT 2020]**

12. There are two Classes A and B having 25 and 30 students respectively. In Class-A the highest score is 21 and lowest score is 17. In Class-B the highest score is 30 and lowest score is 22. Four students are shifted from Class-A to Class-B.
Consider the following statements:
1. The average score of Class-B will definitely decrease.
2. The average score of Class-A will definitely increase.
Which of the above statements is/are correct ?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2
**[CSAT 2021]**

13. The average weight of A, B, C is 40 kg, the average weight of B, D, E is 42 kg and the weight of F is equal to that of B. What is the average weight of A, B, C, D, E and F ?
(a) 40.5 kg
(b) 40.8 kg
(c) 41 kg
(d) Cannot be determined as data is inadequate
**[CSAT 2022]**

14. For five children with $a < b < c < d < e$; any two successive ages differ by 2 years.
Question: What is the age of the youngest child ?
Statement-1: The age of the eldest is 3 times the youngest.
Statement-2: The average age of the children is 8 years.
Which one of the following is correct in respect of the above Question and the Statements ?
(a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other Statement alone.
(b) The Question can be answered by using either Statement alone.
(c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.
(d) The Question cannot be answered even by using both the Statements together.
**[CSAT 2023]**

15. Consider the following :
Weight of 6 boys = Weight of 7 girls = Weight of 3 men = Weight of 4 women.
If the average weight of the women is 63 kg, then what is the average weight of the boys?
(a) 40 kg (b) 42 kg
(c) 45 kg (d) 63 kg
**[CSAT 2024]**

16. A Question is given followed by two Statements 1 and 2. Consider the Question and the Statements.

Question: If the average marks in a class are 60, then what is the number of students in the class ?

Statement-1: The highest marks in the class are 70 and the lowest marks are 50.

Statement-2: Exclusion of highest and lowest marks from the class does not change the average.

Which one of the following is correct in respect of the above Question and the Statements ?

(a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other Statement alone.

(b) The Question can be answered by using either Statement alone.

(c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.

(d) The Question cannot be answered even by using both the Statements together.

**[CSAT 2024]**



## ANSWER KEY

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | (d) | 3. | (a) | 5. | (a) | 7. | (b) | 9. | (c) | 11. | (c) | 13. | (c) | 15. | (b) |
| 2. | (b) | 4. | (c) | 6. | (c) | 8. | (d) | 10. | (c) | 12. | (a) | 14. | (b) | 16. | (d) |

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# TIME & WORK

## PIPES & CISTERNS

CSAT (GS PAPER II)

# PREVIOUS YEAR QUESTIONS

*with*

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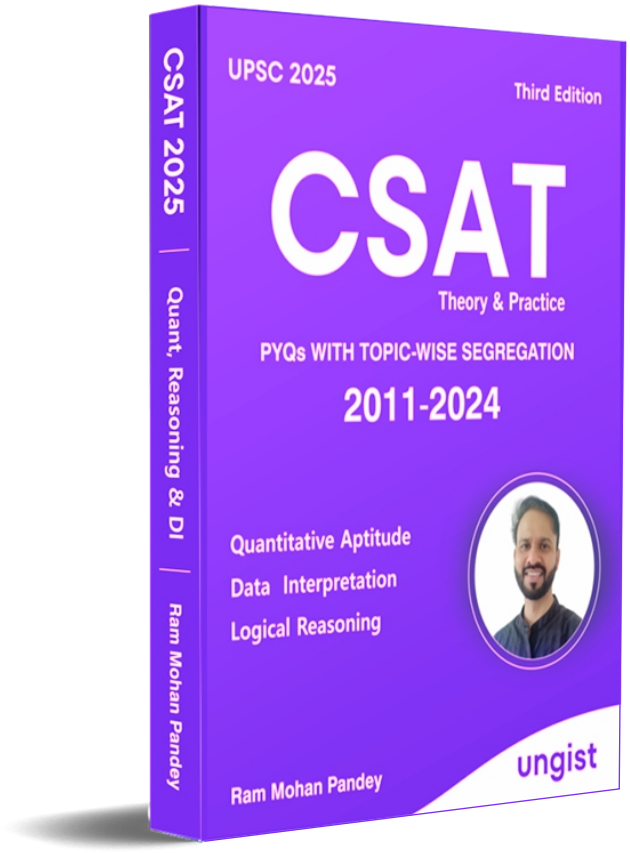


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# Previous Year Questions

## Time and Work

1. In a garrison, there was food for 1000 soldiers for one month. After 10 days, 1000 more soldiers joined the garrison. How long would the soldiers be able to carry on with the remaining food ?
(a) 25 days (b) 20 days
(c) 15 days (d) 10 days
**[CSAT 2013]**

2. Ram and Shyam work on a job together for four days and complete 60% of it. Ram takes leave then and Shyam works for eight more days to complete the job. How long would Ram take to complete the entire job alone ?
(a) 6 days (b) 8 days
(c) 10 days (d) 11 days
**[CSAT 2016]**

3. W can do 25% of a work in 30 days, X can do $\frac{1}{4}$ of the work in 10 days, Y can do 40% of the work in 40 days and Z can do $\frac{1}{3}$ of the work in 13 days. Who will complete the work first ?
(a) W (b) X
(c) Y (d) Z
**[CSAT 2016]**

4. P works thrice as fast as Q, whereas P and Q together can work four times as fast as R. If P, Q and R together work on a job, in what ratio should they share the earnings ?
(a) 3 : 1 : 1
(b) 3 : 2 : 4
(c) 4 : 3 : 4
(d) 3 : 1 : 4 **[CSAT 2017]**

5. A man completes $\frac{7}{8}$ of a job in 21 days. How many more days will it take him to finish the job if quantum of work is further increased by 50% ?
(a) 24 (b) 21
(c) 18 (d) 15 **[CSAT 2021]**

6. 24 men and 12 women can do a piece of work in 30 days. In how many days can 12 men and 24 women do the same piece of work ?
(a) 30 days
(b) More than 30 days
(c) Less than 30 days or more than 30 days
(d) Data is inadequate to draw any conclusion
**[CSAT 2022]**

7. *A*, *B*, *C* working independently can do a piece of work in 8, 16 and 12 days respectively. *A* alone works on Monday, *B* alone works on Tuesday, *C* alone works on Wednesday; *A* alone, again works on Thursday and so on. Consider the following statements :
1. The work will be finished on Thursday.
2. The work will be finished in 10 days.
Which of the above statements is/are correct ?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2
**[CSAT 2023]**

8. A certain number of men can complete a piece of work in 6k days, where k is a natural number. By what percent should the number of men be increased so that the work can be completed in 5k days ?
(a) 10%
(b) (50/3)%
(c) 20%
(d) 25% **[CSAT 2024]**

9. X, Y and Z can complete a piece of work individually in 6 hours, 8 hours and 8 hours respectively. However, only one person at a time can work in each hour and nobody can work for two consecutive hours. All are engaged to finish the work. What is the minimum amount of time that they will take to finish the work ?

(a) 6 hours 15 minutes
(b) 6 hours 30 minutes
(c) 6 hours 45 minutes
(d) 7 hours **[CSAT 2024]**

## ANSWER KEY

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | (d) | 3. | (d) | 4. | (a) | 5. | (d) | 6. | (d) | 7. | (a) | 8. | (c) | 9. | (c) | | |
| 2. | (c) | | | | | | | | | | | | | | | | |

# Previous Year Questions

## Pipes and Cisterns

1. Two pipes A and B can independently fill a tank completely in 20 and 30 minutes respectively. If both the pipes are opened simultaneously, how much time will they take to fill the tank completely ?

   (a) 10 minutes (b) 12 minutes
   (c) 15 minutes (d) 25 minutes

   **[CSAT 2015]**

2. There are three pillars X, Y and Z of different heights. Three spiders A, B and C start to climb on these pillars simultaneously. In one chance, A climbs on X by 6 cm but slips down 1 cm. B climbs on Y by 7 cm but slips down 3 cm. C climbs on Z by 6.5 cm but slips down 2 cm. If each of them requires 40 chances to reach the top of the pillars, what is the height of the shortest pillar ?

   (a) 161 cm (b) 163 cm
   (c) 182 cm (d) 210 cm

   **[CSAT 2017]**

3. A frog tries to come out of a dried well 4.5 m deep with slippery walls. Every time the frog jumps 30 cm, slides down 15 cm. What is the number of jumps required for the frog to come out of the well ?

   (a) 28
   (b) 29
   (c) 30
   (d) 31 **[CSAT 2020]**



## ANSWER KEY

1. (b) 2. (b) 3. (b)

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PRELIMS 2026

Ram Mohan Pandey

# PERMUTATION & COMBINATION, PROBABILITY

CSAT (GS PAPER II)

## PREVIOUS YEAR QUESTIONS

*with*

ANSWER KEY

## 2011-2024

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# Previous Year Questions

## Permutation and Combination

1. Three flags, each of different colour, are available for a military exercise. Using these flags, different codes can be generated by waving
   1. single flag of different colours or
   2. any two flags in a different sequence of colour

   Or
   3. three flags in a different sequence of colours.

   The maximum number of codes that can be generated, is
   (a) 6 (b) 9
   (c) 15 (d) 18 **[CSAT 2003]**

2. A two member committee comprising of one male and one female member is to be constituted out of five males and three females. Amongst the females, Mrs. A refused to be a member of the committee in which Mr. B is taken as the member. In how many different ways can the committee be constituted ?
   (a) 11 (b) 12
   (c) 13 (d) 14 **[CSAT 2003]**

3. In a question of a test paper, there are five items each under List-A and List-B. The examinees are required to match each item under List-A with its corresponding correct item under List-B. Further, it is given that
   1. no examinee has given the correct answer.
   2. answers of no two examinees are identical.

   Which is the maximum number of examinees who took this test ?
   (a) 24 (b) 26
   (c) 119 (d) 129 **[CSAT 2004]**

4. Nine different letters are to be dropped in three different letter boxes. In how many different ways can this be done ?
   (a) 27
   (b) $3^9$
   (c) $9^2$
   (d) $3^9 - 3$ **[CSAT 2004]**

5. In how many different ways can six players be arranged in a line such that two of them, Ajit and Mukherjee, are never together ?
   (a) 120 (b) 240
   (c) 360 (d) 480 **[CSAT 2004]**

6. On a railway route between two places A and B, there are 20 stations on the way. If 4 new stations are to be added, how many types of new tickets will be required if each ticket is issued for a one way journey ?
   (a) 14 (b) 48
   (c) 96 (d) 108 **[CSAT 2005]**

7. 2 men and 1 woman board a bus in which 5 seats are vacant. One of these five seats is reserved for ladies. A women may or may not sit on the seat reserved for ladies but a man cannot sit on the seat reserved for ladies. In how many different ways can the five seats occupied by these passengers ?
   (a) 15
   (b) 36
   (c) 48
   (d) 60 **[CSAT 2005]**

8. A square is divided into 9 identical smaller squares. Six identical balls are to be placed in these smaller square such that each of the three rows gets at least one ball (one ball in one square only). In how many different ways can this be done ?
(a) 27
(b) 36
(c) 54
(d) 81 **[CSAT 2005]**

9. There are 10 identical coins and each one of them has 'H' engraved on its one face and 'T' engraved on its other face. These 10 coins are lying on a table and each one of them has 'H' face as the upper face. In one attempt, exactly four (neither more nor less) coins can be turned upside down. What is the minimum total number of attempts in which the 'T' faces of all the 10 coins can be brought to be the upper faces ?
(a) 4
(b) 7
(c) 8
(d) Not possible **[CSAT 2005]**

10. Each of two women and three men is to occupy one chair out of eight chairs, each of which numbered from 1 to 8. First, women are to occupy any two chairs from those numbered 1 to 4; and then the three men would occupy any, three chairs out of the remaining six chairs. What is the maximum number of different ways in which this can be done ?
(a) 40
(b) 132
(c) 1440
(d) 3660 **[CSAT 2006]**

11. In a tournament, each of the participants was to play one match against each of the other participants. Three players fell ill after each of them had played three matches and had to leave the tournament. What was the total number of participants at the beginning, if the total number of matches played was 75 ?
(a) 08 (b) 10
(c) 12 (d) 15 **[CSAT 2006]**

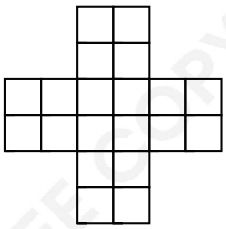
12. There are three parallel straight lines. Two points, 'A' and 'B', are marked on the first line, points, 'C' and 'D' are marked on the second line; and points, 'E' and 'F', are marked on the third line. Each of these 6 points can move to any position on its respective straight line.
Consider the following statements:
1. The maximum number of triangles that can be drawn by joining these points is 18.
2. The minimum number of triangles that can be drawn by joining these points is zero.
Which of the statement(s) given above is/are correct ?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2 **[CSAT 2006]**

13. A mixed doubles tennis game is to be played between two teams (each team consists of one male and one female.) There are four married couples. No team is to consist of a husband and his wife. What is the maximum number of games that can be played ?
(a) 12
(b) 21
(c) 36
(d) 42 **[CSAT 2006]**

14. In a question paper, there are four multiple choice type questions. Each question has five choices with only one choice for its correct answer. What is the total number of ways in which a candidate will not get all the four answers correct ?

(a) 19
(b) 120
(c) 624
(d) 1024 **[CSAT 2006]**

15. Each of eight identical balls is to be placed in the squares shown in the figures given below in a horizontal direction such that one horizontal row contains six balls and the other horizontal row contains two balls. In how many maximum different ways can this be done ?

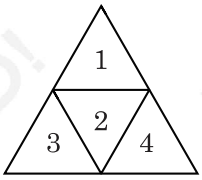


(a) 38
(b) 28
(c) 16
(d) 14 **[CSAT 2006]**

16. Each of the 3 persons is to be given some identical items such that product of the numbers of items received by each of the three persons is equal to 30. In how many maximum different ways can this distribution be done ?

(a) 21
(b) 24
(c) 27
(d) 33 **[CSAT 2007]**

17. In the figure shown below, what is the maximum number of different ways in which 8 identical balls can be placed in the small triangles 1, 2, 3 and 4 such that each triangle contains at least one ball ?




(a) 32
(b) 35
(c) 44
(d) 56 **[CSAT 2007]**

18. Amit has five friends: 3 girls and 2 boys. Amit's wife also has 5 friends: 3 boys and 2 girls. In how many maximum number of different ways can they invite 2 boys and 2 girls such that two of them are Amit's friends and two are his wife's?

(a) 24 (b) 38
(c) 46 (d) 58 **[CSAT 2007]**

19. Five balls of different colours are to be placed in three different boxes such that any box contains at least one ball. What is the maximum number of different ways in which this can be done ?

(a) 90 (b) 120
(c) 150 (d) 180 **[CSAT 2007]**

20. All the six letters of the name SACHIN are arranged to form different words without repeating any letter in any one word. The words so formed are then arranged as in a dictionary. What will be the position of the word SACHIN in that sequence ?

(a) 436 (b) 590
(c) 601 (d) 751 **[CSAT 2007]**

21. Three dice (each having six faces with each face having one number from 1 to 6) are rolled. What is the number of possible outcomes such that at least one dice shows the number 2 ?

(a) 36
(b) 81
(c) 91
(d) 116 **[CSAT 2007]**

22. In how many maximum different ways can 3 identical balls be placed in the 12 squares (each ball to be placed in the exact centre of the squares and only one ball is to be placed in one square) shown in the figure given below such that they do not lie along the same straight line ?

(a) 144
(b) 200
(c) 204
(d) 216 **[CSAT 2007]**

23. Groups each containing 3 boys are to be formed out of 5 boys - A, B,C, D and E such that no one group contains both C and D together. What is the maximum number of such different groups ?

(a) 5 (b) 6
(c) 7 (d) 8 **[CSAT 2007]**

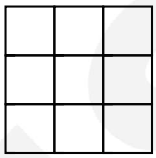
24. In how many different ways can four books A, B, C and D be arranged one above another in a vertical order such that the books A and B are never in continuous position ?

(a) 9 (b) 12
(c) 14 (d) 18 **[CSAT 2008]**

25. A schoolteacher has to select the maximum possible number of different groups of 3 students out of a total of 6 students. In how many groups any particular student will be included ?

(a) 6 (b) 8
(c) 10 (d) 12 **[CSAT 2008]**

26. In how many different ways can all of 5 identical balls be placed in the cells shown below such that each row contains at least 1 ball ?

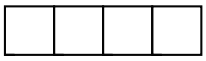


(a) 64
(b) 81
(c) 84
(d) 108 **[CSAT 2008]**

27. There are 6 different letters and 6 correspondingly addressed envelopes. If the letters are randomly put in the envelopes, what is the probability that exactly 5 letters go into the correctly addressed envelopes ?

(a) Zero
(b) $\frac{1}{6}$
(c) $\frac{1}{2}$
(d) $\frac{5}{6}$ **[CSAT 2008]**

28. There are two identical red, two identical black and two identical white balls. In how many different ways can the balls be placed in the cells (each cell to contain one ball) shown below such that balls of the same colour do not occupy any two consecutive cells?



(a) 15 (b) 18
(c) 24 (d) 30 **[CSAT 2008]**

29. A person has 4 coins each of different denomination. What is the number of different sums of money the person can form (using one or more coins at a time) ?
(a) 16 (b) 15
(c) 12 (d) 11 **[CSAT 2009]**

30. How many numbers lie between 300 and 500 in which 4 comes only one time ?
(a) 99 (b) 100
(c) 110 (d) 120 **[CSAT 2009]**

31. How many three-digit numbers can be generated from 1, 2, 3, 4, 5, 6, 7, 8, 9 such that the digits are in ascending order ?
(a) 80 (b) 81
(c) 83 (d) 84 **[CSAT 2009]**

32. In a carrom board game competition, $m$ boys and $n$ girls ($m > n > 1$) of a school participate in which every student has to play exactly one game with every other student. Out of the total games played, it was found that in 221 games one player was a boy and the other player was a girl.
Consider the following statements:
1. The total number of students that participated in the competition is 30.
2. The number of games in which both players were girls is 78.
Which of the statements given above is/are correct ?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2 **[CSAT 2009]**

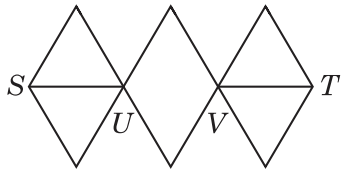
33. A question paper had ten questions. Each question could only be answered as True (T) or False (F). Each candidate answered all the questions. Yet, no two candidates wrote the answers in an identical sequence. How many different sequences of answers are possible ?
(a) 20
(b) 40
(c) 512
(d) 1024 **[CSAT 2010]**

34. A person X has four notes of Rupee 1, 2, 5 and 10 denomination. The number of different sums of money she can form from them is
(a) 16 (b) 15
(c) 12 (d) 8 **[CSAT 2010]**

35. When ten persons shake hands with one another, in how many ways is it possible ?
(a) 20 (b) 25
(c) 40 (d) 45 **[CSAT 2010]**

36. In how many ways can four children be made to stand in a line such that two of them, A and B are always together ?
(a) 6
(b) 12
(c) 18
(d) 24 **[CSAT 2010]**

37. With reference to the figure given below, the number of different routes from S to T without retracing from U and/or V, is




(a) 3
(b) 6
(c) 9
(d) 18 **[CSAT 2014]**

38. Twelve people form a club. By picking lots, one of them will host a dinner for all once in a month. The number of dinners a particular member has to host in one year is
(a) One
(b) Zero
(c) Three
(d) Cannot be predicated **[CSAT 2015]**

39. A selection is to be made for one post of Principle and two posts of Vice-Principal. Amongst the six candidates called for the interview, only two are eligible for the post of Principle while they all are eligible for the post of Vice-Principal. The number of possible combinations of selectees is
(a) 4 (b) 12
(c) 18 (d) None of the above
**[CSAT 2015]**

40. There are 5 tasks and 5 persons. Task-1 cannot be assigned to either person-1 or person-2. Task-2 must be assigned to either person-3 or person-4. Every person is to be assigned one task. In how many ways can be assignment be done ?
(a) 6 (b) 12
(c) 24 (d) 144 **[CSAT 2015]**

41. In a question paper there are five questions to be attempted and answer to each question has two choices – True (T) or False (F). It is given that no two candidates have given the answer to the five questions in an identical sequence. For this to happen the maximum number of candidates is
(a) 10 (b) 18
(c) 26 (d) 32 **[CSAT 2016]**

42. 4-digit numbers are to be formed using the digits 1, 2, 3 and 4; and none of these four digits are repeated in any manner. Further,
1. 2 and 3 are not to immediately follow each other.
2. 1 is not to be immediately followed by 3.
3. 4 is not to appear at the last place.
4. 1 is not to appear at the first place.

How many different numbers can be formed ?
(a) 6
(b) 8
(c) 9
(d) None of the above **[CSAT 2016]**

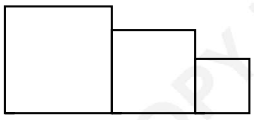
43. There are 4 horizontal and 4 vertical lines, parallel and equidistant to one another on a board. What is the maximum number of rectangles and squares that can be formed ?
(a) 16 (b) 24
(c) 36 (d) 42 **[CSAT 2017]**

44. A bag contains 20 balls. 8 balls are green, 7 are white and 5 are red. What is the minimum number of balls that must be picked up from the bag blindfolded (without replacing any of it) to be *assured* of picking at least one ball of each colour ?
(a) 17 (b) 16
(c) 13 (d) 11 **[CSAT 2017]**

45. If 2 boys and 2 girls are to be arranged in a row so that the girls are not next to each other, how many possible arrangements are there ?
(a) 3 (b) 6
(c) 12 (d) 24 **[CSAT 2017]**

46. There are 24 equally spaced points lying on the circumference of a circle. What is the maximum number of equilateral triangles that can be drawn by taking sets of three points as the vertices ?
(a) 4 (b) 6
(c) 8 (d) 12 **[CSAT 2018]**

47. For a sports meet, a winners' stand comprising three wooden blocks is in the following form:



There are six different colours available to choose from and each of the three wooden blocks is to be painted such that no two of them has the same colour. In how many different ways can the winners' stand be painted ?
(a) 120 (b) 81
(c) 66 (d) 36 **[CSAT 2018]**

48. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of four parallel lines, is
(a) 18 (b) 24
(c) 32 (d) 36 **[CSAT 2019]**

49. How many triplets $(x, y, z)$ satisfy the equation $x + y + z = 6$, where $x$, $y$ and $z$ are natural numbers ?
(a) 4
(b) 5
(c) 9
(d) 10 **[CSAT 2019]**

50. How many different 5-letter words (with or without meaning) can be constructed using all the letters of the word 'DELHI' so that each word has to start with D and end with I ?
(a) 24 (b) 18
(c) 12 (d) 6 **[CSAT 2020]**

51. On a chess board, in how many different ways can 6 consecutive squares be chosen on the diagonals along a straight path ?
(a) 4 (b) 6
(c) 8 (d) 12 **[CSAT 2021]**

52. Using 2, 2, 3, 3, 3, as digits, how many distinct numbers greater than 30,000 can be formed ?
(a) 3 (b) 6
(c) 9 (d) 12 **[CSAT 2021]**

53. There are 6 persons arranged in a row. Another person has to shake hands with 3 of them so that he should not shake hands with two consecutive persons. In how many distinct possible combinations can the handshakes take place ?
(a) 3 (b) 4
(c) 5 (d) 6 **[CSAT 2021]**

54. In a tournament of Chess having 150 entrants, a player is eliminated whenever he loses a match. It is given that no match results in a tie/draw. How many matches are played in the entire tournament ?
(a) 151 (b) 150
(c) 149 (d) 148 **[CSAT 2022]**

55. How many 3-digit natural numbers (without repetition of digits) are there such that each digit is odd and the number is divisible by 5 ?
(a) 8 (b) 12
(c) 16 (d) 24 **[CSAT 2022]**

56. The letters $A$, $B$, $C$, $D$ and $E$ are arranged in such a way that there are exactly two letters between $A$ and $E$. How many such arrangements are possible ?
(a) 12
(b) 18
(c) 24
(d) 36 **[CSAT 2022]**

57. There is a numeric lock which has a 3-digit PIN. The PIN contains digits 1 to 7. There is no repetition of digits. The digits in the PIN from left to right are in decreasing order. Any two digits in the PIN differ by at least 2. How many maximum attempts does one need to find out the PIN with certainty ?
(a) 6 (b) 8
(c) 10 (d) 12 **[CSAT 2022]**

58. One non-zero digit, one vowel and one consonant from English alphabet (in capital) are to be used in forming passwords, such that each password has to start with a vowel and end with a consonant. How many such passwords can be generated ?
(a) 105
(b) 525
(c) 945
(d) 1050 **[CSAT 2022]**

59. There are 9 cups placed on a table arranged in equal number of rows and columns out of which 6 cups contain coffee and 3 cups contain tea. In how many ways can they be arranged so that each row should contain at least one cup of coffee ?
(a) 18
(b) 27
(c) 54
(d) 81 **[CSAT 2022]**

60. What is the number of numbers of the form $0.XY$, where $X$ and $Y$ are distinct non-zero digits ?
(a) 72
(b) 81
(c) 90
(d) 100 **[CSAT 2022]**

61. Raj has ten pairs of red, nine pairs of white and eight pairs of black shoes in a box. If he randomly picks shoes one by one (without replacement) from the box to get a red pair of shoes to wear, what is the maximum number of attempts he has to make ?
(a) 27
(b) 36
(c) 44
(d) 45 **[CSAT 2023]**

62. In how many ways can a batsman score exactly 25 runs by scoring single runs, fours and sixes only, irrespective of the sequence of scoring shots ?
(a) 18 (b) 19
(c) 20 (d) 21 **[CSAT 2023]**

63. There are four letters and four envelopes and exactly one letter is to be put in exactly one envelope with the correct address. If the letters are randomly inserted into the envelopes, then consider the following statements :
1. It is possible that exactly one letter goes into an incorrect envelope.
2. There are only six ways in which only two letters can go into the correct envelopes.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2
**[CSAT 2023]**

64. How many distinct 8-digit numbers can be formed by rearranging the digits of the number 11223344 such that odd digits occupy odd positions and even digits occupy even positions ?

(a) 12 (b) 18
(c) 36 (d) 72 **[CSAT 2023]**

65. *ABCD* is a square. One point on each of *AB* and *CD*; and two distinct points on each of *BC* and *DA* are chosen. How many distinct triangles can be drawn using any three points as vertices out of these six points ?

(a) 16 (b) 18
(c) 20 (d) 24 **[CSAT 2023]**

66. A box contains 14 black balls, 20 blue balls, 26 green balls, 28 yellow balls, 38 red balls and 54 white balls. Consider the following statements :

1. The smallest number $n$ such that any $n$ balls drawn from the box randomly must contain one full group of at least one colour is 175.
2. The smallest number $m$ such that any $m$ balls drawn from the box randomly must contain at least one ball of each colour is 167.

Which of the above statements is/are correct ?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2 **[CSAT 2023]**

67. What is the number of selections of 10 consecutive things out of 12 things in a circle taken in the clockwise direction ?

(a) 3
(b) 11
(c) 12
(d) 66 **[CSAT 2023]**

68. In an examination, the maximum marks for each of the four papers namely *P*, *Q*, *R* and *S* are 100. Marks scored by the students are in integers. A student can score 99% in $n$ different ways. What is the value of $n$ ?

(a) 16
(b) 17
(c) 23
(d) 35 **[CSAT 2023]**

69. A flag has to be designed with 4 horizontal stripes using some or all of the colours red, green and yellow. What is the number of different ways in which this can be done so that no two adjacent stripes have the same colour ?

(a) 12
(b) 18
(c) 24
(d) 36 **[CSAT 2023]**

70. There are five persons *P*, *Q*, *R*, *S* and *T* each one of whom has to be assigned one task. Neither *P* nor *Q* can be assigned Task-1. Task-2 must be assigned to either *R* or *S*. In how many ways can the assignment be done ?

(a) 6
(b) 12
(c) 18
(d) 24 **[CSAT 2023]**

71. What is the sum of all 4-digit numbers less than 2000 formed by the digits 1, 2, 3 and 4, where none of the digits is repeated ?

(a) 7998
(b) 8028
(c) 8878
(d) 9238 **[CSAT 2023]**

## ANSWER KEY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. (c) | 10. (c) | 19. (c) | 28. (c) | 37. (d) | 46. (c) | 55. (b) | 64. (c) |
| 2. (d) | 11. (d) | 20. (c) | 29. (b) | 38. (d) | 47. (a) | 56. (c) | 65. (c) |
| 3. (c) | 12. (b) | 21. (c) | 30. (a) | 39. (d) | 48. (d) | 57. (c) | 66. (c) |
| 4. (b) | 13. (d) | 22. (b) | 31. (d) | 40. (c) | 49. (d) | 58. (c) | 67. (c) |
| 5. (d) | 14. (c) | 23. (c) | 32. (c) | 41. (d) | 50. (d) | 59. (d) | 68. (d) |
| 6. (d) | 15. (a) | 24. (b) | 33. (d) | 42. (a) | 51. (b) | 60. (a) | 69. (c) |
| 7. (b) | 16. (c) | 25. (c) | 34. (b) | 43. (c) | 52. (b) | 61. (d) | 70. (d) |
| 8. (d) | 17. (b) | 26. (d) | 35. (d) | 44. (b) | 53. (b) | 62. (b) | 71. (a) |
| 9. (a) | 18. (b) | 27. (a) | 36. (b) | 45. (c) | 54. (c) | 63. (b) | |

# Previous Year Questions

## Probability

1. There are 6 different letters and 6 correspondingly addressed envelopes. If the letters are randomly put in the envelopes, what is the probability that exactly 5 letters go into the correctly addressed envelopes ?

(a) Zero (b) $\frac{1}{6}$

(c) $\frac{1}{2}$ (d) $\frac{5}{6}$ **[CSAT 2008]**

2. A bag contains 15 red balls and 20 black balls. Each ball is numbered either 1 or 2 or 3. 20% of the red balls are numbered 1 and 40% of them are numbered 3. Similarly, among the black balls, 45% are numbered 2 and 30% are numbered 3. A boy picks a ball at random. He wins if the ball is red and numbered 3 or if it is black and numbered 1 or 2. What are the chances of his winning ?

(a) $\frac{1}{2}$ (b) $\frac{4}{7}$

(c) $\frac{5}{9}$ (d) $\frac{12}{13}$ **[CSAT 2018]**

**ANSWER KEY**

1. (a) 2. (b)

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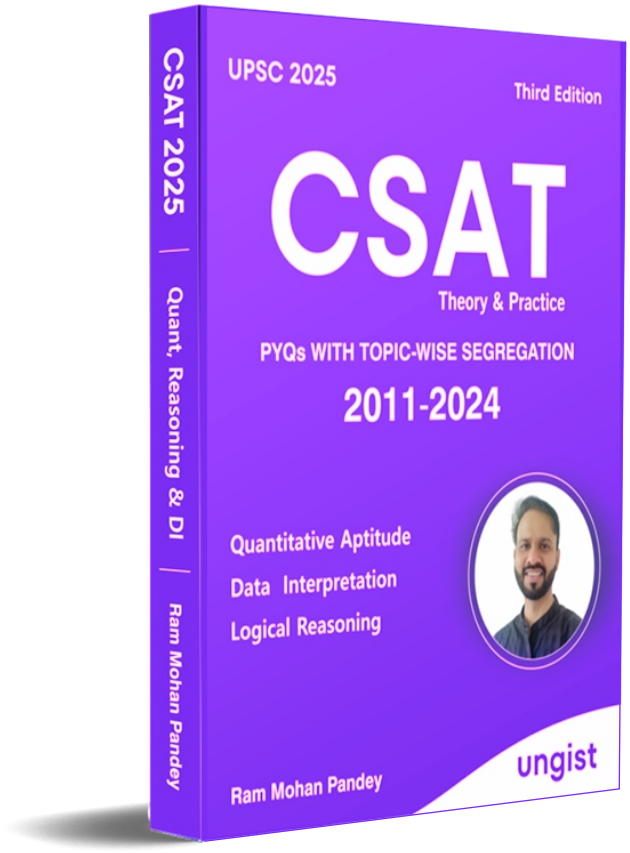
*for* UPSC CSE PRELIMS

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