IAE ACADEMY INSTITUTE FOR ENGINEERS

PLACEMENT TESTS · APTITUDE PRACTICE

IAE Academy free study material · Updated 30 October 2026

Aptitude Practice for Placement Tests

INSIDE

- 280 questions in 28 topics
- Quantitative aptitude, Logical reasoning, Verbal ability and Programming logic
- Answers and working after each topic

Companies do not publish their test papers; these questions are ours.

Online, one page per topic: **iaeacademy.in/study/aptitude-practice**

FREE COUNSELLING

Preparing for GATE or placements? Talk to IAE Academy.

Or call **+91 84204 36524**

Every day, 10:30 am to 7:30 pm

Chat on WhatsApp

Free. Not for sale. Pass it on.

Quantitative aptitude

Numbers and divisibility

Q1

Which of the following numbers is divisible by 9?

(A) 5,314
(B) 4,527
(C) 6,208
(D) 7,325

Q2

What is the HCF of 36 and 48?

(A) 6
(B) 9
(C) 12
(D) 24

Q3

Find the LCM of 6, 8 and 10.

Q4

What is the unit digit of 7^{45}?

(A) 9
(B) 1
(C) 3
(D) 7

Q5

What is the smallest number greater than 15 that leaves remainder 3 when divided by 8, by 12 and by 15?

(A) 123
(B) 117
(C) 243
(D) 363

Q6

How many positive factors does 360 have?

Q7

For which digit d is the four-digit number $3d84$ divisible by 11?

(A) 5
(B) 6
(C) 7
(D) 8

Q8

The HCF of two numbers is 12 and their LCM is 360. One of the numbers is 72. What is the other number?

(A) 48
(B) 90
(C) 120
(D) 60

Q9

What is the remainder when 2^{50} is divided by 7?

(A) 4
(B) 1
(C) 2
(D) 5

Q10

What is the largest number that divides both 245 and 1029 and leaves remainder 5 each time?

Answers and working: numbers and divisibility

Q1. Answer: (B)

1. A number is divisible by 9 if its digit sum is divisible by 9.
2. Digit sums: 5,314 gives 13; 4,527 gives 18; 6,208 gives 16; 7,325 gives 17.
3. Only 18 is a multiple of 9.
4. The answer is 4,527.

Q2. Answer: (C)

1. Write the prime factors: $36 = 2^2 \times 3^2$ and $48 = 2^4 \times 3$.
2. Take the lowest power of each common prime: 2^2 and 3.
3. HCF $= 4 \times 3 = 12$.
4. The answer is 12.

Q3. Answer: 120

1. Prime factors: $6 = 2 \times 3$, $8 = 2^3$, $10 = 2 \times 5$.
2. Take the highest power of each prime: 2^3, 3 and 5.
3. LCM $= 8 \times 3 \times 5 = 120$.
4. The answer is 120.

Q4. Answer: (D)

1. The unit digits of powers of 7 repeat in a cycle of 4: 7, 9, 3, 1.
2. Find $45 \bmod 4 = 1$.
3. The first position in the cycle is 7.
4. The answer is 7.

Q5. Answer: (A)

1. A number leaving the same remainder 3 is of the form (common multiple) + 3.
2. LCM of 8, 12 and 15 is 120.
3. The number 3 itself is not greater than 15, so take the next one: $120 + 3 = 123$.
4. The answer is 123.

Q6. Answer: 24

1. Prime factorise: $360 = 2^3 \times 3^2 \times 5$.
2. Number of factors $= (3+1)(2+1)(1+1)$.
3. This is $4 \times 3 \times 2 = 24$.
4. The answer is 24.

Q7. Answer: (C)

1. A number is divisible by 11 if the difference between the sums of alternate digits is 0 or a multiple of 11.
2. Alternate sums: $(3 + 8) = 11$ and $(d + 4)$.
3. Difference $= 11 - (d + 4) = 7 - d$, which must be 0 for a single digit.
4. So $d = 7$, and $3784 = 11 \times 344$.
5. The answer is 7.

Q8. Answer: (D)

1. For two numbers, product $=$ HCF $\times$ LCM.
2. $72 \times x = 12 \times 360 = 4320$.
3. $x = 4320 \div 72 = 60$.
4. Check: HCF of 72 and 60 is 12 and their LCM is 360.
5. The answer is 60.

Q9. Answer: (A)

1. $2^3 = 8$ leaves remainder 1 when divided by 7.
2. Write $2^{50} = (2^3)^{16} \times 2^2$.
3. $(2^3)^{16}$ leaves remainder 1, so the remainder is that of $2^2 = 4$.
4. The answer is 4.

Q10. Answer: 16

1. The divisor must divide $245 - 5 = 240$ and $1029 - 5 = 1024$.
2. The largest such divisor is HCF(240, 1024).
3. $240 = 2^4 \times 3 \times 5$ and $1024 = 2^{10}$, so the HCF is $2^4 = 16$.
4. The remainder 5 is less than 16, so 16 is valid.
5. The answer is 16.

Percentages, profit and loss

Q1

The price of a notebook rises from Rs 400 to Rs 460. What is the percentage increase in its price?

(A) 12%
(B) 15%
(C) 18%
(D) 20%

Q2

A shopkeeper buys a bag for Rs 800 and sells it at a profit of 25%. At what price does he sell the bag?

(A) Rs 900
(B) Rs 1,000
(C) Rs 1,020
(D) Rs 1,200

Q3

The marked price of a jacket is Rs 1,500. A discount of 20% is given on it. What is the selling price?

(A) Rs 1,150
(B) Rs 1,200
(C) Rs 1,250

(D) Rs 1,300

Q4

A trader buys a table for Rs 640 and sells it for Rs 560. Find his loss percentage.

Q5

A shirt has a marked price of Rs 2,000. The shopkeeper gives two successive discounts of 20% and 10%. What is the final price paid?

(A) Rs 1,400
(B) Rs 1,440
(C) Rs 1,460
(D) Rs 1,500

Q6

A worker's salary is first increased by 20% and then the new salary is decreased by 20%. What is the net change in the salary compared with the original?

(A) No change
(B) 2% decrease
(C) 4% decrease
(D) 4% increase

Q7

A radio is sold for Rs 1,320 at a profit of 10%. What is its cost price?

(A) Rs 1,188
(B) Rs 1,200
(C) Rs 1,210
(D) Rs 1,250

Q8

A shopkeeper earns a profit of Rs 180 on a calculator. This profit is 12% of the cost price. Find the cost price in rupees.

Q9

A dealer sells two lamps at Rs 1,200 each. On one he gains 20% and on the other he loses 20%. What is his overall result on the two lamps together?

(A) No profit, no loss
(B) 2% loss
(C) 4% loss
(D) 5% loss

Q10

A trader marks his goods 40% above the cost price. He gives a discount on the marked price and still earns a profit of 12%. What is the rate of discount?

(A) 15%

(B) 18%

(C) 20%

(D) 22%

Answers and working: percentages, profit and loss

Q1. Answer: (B)

1. Increase in price = 460 - 400 = Rs 60.
2. Percentage increase = 60 / 400 × 100.
3. This equals 15%.
4. The answer is 15%, option B.

Q2. Answer: (B)

1. Profit = 25% of 800 = Rs 200.
2. Selling price = cost price + profit = 800 + 200.
3. Selling price = Rs 1,000.
4. The answer is Rs 1,000, option B.

Q3. Answer: (B)

1. Discount = 20% of 1,500 = Rs 300.
2. Selling price = marked price - discount = 1,500 - 300.
3. Selling price = Rs 1,200.
4. The answer is Rs 1,200, option B.

Q4. Answer: 12.5

1. Loss = 640 - 560 = Rs 80.
2. Loss percentage = loss / cost price × 100 = 80 / 640 × 100.
3. 80 / 640 = 1/8, and 1/8 of 100 is 12.5.
4. The loss is 12.5%.

Q5. Answer: (B)

1. After the first discount of 20%, price = 2,000 × 0.80 = Rs 1,600.
2. After the second discount of 10%, price = 1,600 × 0.90.
3. Final price = Rs 1,440.
4. The answer is Rs 1,440, option B.

Q6. Answer: (C)

1. Let the original salary be 100.
2. After a 20% increase it becomes 120.
3. After a 20% decrease on 120 it becomes 120 × 0.80 = 96.
4. The salary falls from 100 to 96, a 4% decrease. The answer is option C.

Q7. Answer: (B)

1. A profit of 10% means selling price = 110% of cost price.
2. So 1.10 × cost price = 1,320.
3. Cost price = 1,320 / 1.10.
4. Cost price = Rs 1,200, option B.

Q8. Answer: 1500

1. Profit = 12% of cost price = Rs 180.
2. So 0.12 × cost price = 180.
3. Cost price = 180 / 0.12.
4. The cost price is Rs 1,500.

Q9. Answer: (C)

1. Lamp with 20% gain: cost price = 1,200 / 1.20 = Rs 1,000.
2. Lamp with 20% loss: cost price = 1,200 / 0.80 = Rs 1,500.
3. Total cost = Rs 2,500 and total selling price = Rs 2,400, so loss = Rs 100.
4. Loss percentage = 100 / 2,500 × 100 = 4%. The answer is option C.

Q10. Answer: (C)

1. Let the cost price be 100. Marked price = 140.
2. Selling price for a 12% profit = 112.
3. Discount = 140 - 112 = 28.
4. Discount rate = 28 / 140 × 100 = 20%, option C.

Ratio, proportion and mixtures

Q1

The ratio of boys to girls in a college is 3 : 5. The college has 480 students in all. How many girls are there?

(A) 180
(B) 240
(C) 300
(D) 320

Q2

Rs 7,200 is divided among three friends in the ratio 2 : 3 : 4. What is the smallest share?

(A) Rs 1,400
(B) Rs 1,600
(C) Rs 1,800
(D) Rs 2,400

Q3

Two numbers a and b are in the ratio 4 : 7. If b = 56, find a.

Q4

A shopkeeper mixes rice costing Rs 40 per kg with rice costing Rs 55 per kg. He wants the mixture to cost Rs 46 per kg. In what ratio, cheaper to dearer, should he mix them?

(A) 2 : 3
(B) 3 : 2

(C) 3 : 4

(D) 4 : 3

Q5

A puts in Rs 30,000 for 8 months and B puts in Rs 45,000 for 6 months in a small business. The profit is Rs 8,500. What is A's share of the profit?

(A) Rs 3,600

(B) Rs 4,000

(C) Rs 4,250

(D) Rs 4,500

Q6

A vessel holds 40 litres of pure milk. 8 litres are taken out and replaced by water. Then 8 litres of the new mixture are taken out and again replaced by water. How much milk is left in the vessel?

(A) 24 litres

(B) 25.6 litres

(C) 27.2 litres

(D) 28 litres

Q7

Vessel A has milk and water in the ratio 3 : 1. Vessel B has milk and water in the ratio 2 : 3. 20 litres from A and 30 litres from B are poured into a larger vessel. How many litres of water are in the larger vessel?

Q8

The incomes of two people are in the ratio 5 : 4 and their expenditures are in the ratio 3 : 2. Each saves Rs 6,000 a month. What is the income of the first person?

(A) Rs 12,000

(B) Rs 15,000

(C) Rs 18,000

(D) Rs 20,000

Q9

A mixture of 64 litres has milk and water in the ratio 5 : 3. How much water must be added so that the ratio of milk to water becomes 5 : 7?

(A) 24 litres

(B) 28 litres

(C) 32 litres

(D) 36 litres

Q10

A bag holds Re 1, Rs 2 and Rs 5 coins in the ratio 5 : 3 : 2 by number. The total value of the coins is Rs 1,260.

How many Rs 5 coins are in the bag?

Answers and working: ratio, proportion and mixtures

Q1. Answer: (C)

1. Total parts = 3 + 5 = 8.
2. One part = 480 / 8 = 60 students.
3. Girls = 5 parts = 5 x 60.
4. Girls = 300.

Q2. Answer: (B)

1. Total parts = 2 + 3 + 4 = 9.
2. One part = 7,200 / 9 = Rs 800.
3. Smallest share = 2 parts = 2 x 800.
4. Smallest share = Rs 1,600.

Q3. Answer: 32

1. a / b = 4 / 7.
2. b = 56 means one part = 56 / 7 = 8.
3. a = 4 parts = 4 x 8.
4. a = 32.

Q4. Answer: (B)

1. By alligation, cheaper : dearer = (55 minus 46) : (46 minus 40).
2. That is 9 : 6.
3. Divide both by 3.
4. The ratio is 3 : 2.

Q5. Answer: (B)

1. A's capital x time = 30,000 x 8 = 240,000.
2. B's capital x time = 45,000 x 6 = 270,000.
3. Ratio A : B = 240 : 270 = 8 : 9.
4. A's share = 8/17 of 8,500 = 8 x 500 = Rs 4,000. The answer is option B.

Q6. Answer: (B)

1. Each step keeps 32/40 = 4/5 of the milk.
2. After two steps, milk = 40 x (4/5) x (4/5).
3. = 40 x 16/25.
4. Milk left = 25.6 litres.

Q7. Answer: 23

1. Water in 20 litres of A = 20 x 1/4 = 5 litres.
2. Water in 30 litres of B = 30 x 3/5 = 18 litres.
3. Total water = 5 + 18.
4. Water = 23 litres.

Q8. Answer: (B)

1. Let incomes be 5x and 4x, expenditures 3y and 2y.
2. Income - expenditure = saving, so 5x - 3y = 6,000 and 4x - 2y = 6,000.
3. From the second, y = 2x - 3,000. Put this in the first: 5x - 6x + 9,000 = 6,000, so x = 3,000.
4. First income = 5 x 3,000 = Rs 15,000. The answer is option B.

Q9. Answer: (C)

1. Milk = 64 x 5/8 = 40 litres; water = 24 litres.
2. Milk stays 40 litres, so new water = 40 x 7/5 = 56 litres.
3. Water to add = 56 minus 24.
4. Water to add = 32 litres.

Q10. Answer: 120

1. Take 5k, 3k and 2k coins of Re 1, Rs 2 and Rs 5.
2. Value = 5k x 1 + 3k x 2 + 2k x 5 = 21k rupees.
3. 21k = 1,260, so k = 60.
4. Rs 5 coins = 2k = 120.

Averages and ages

Q1

The five numbers 12, 15, 18, 23 and 32 are given. What is their average?

(A) 18
(B) 20
(C) 22
(D) 24

Q2

The average of six numbers is 40. A seventh number is added and the average of all seven becomes 42. What is the seventh number?

(A) 50
(B) 52
(C) 54
(D) 56

Q3

A father is three times as old as his son. After 12 years, the father will be twice as old as the son. What is the son's present age?

(A) 10 years
(B) 12 years
(C) 14 years
(D) 16 years

Q4

Section A has 30 students with an average mark of 60. Section B has 20 students with an average mark of 70. What is the average mark of all 50 students together?

(A) 64
(B) 65
(C) 66
(D) 63

Q5

The average of eight numbers is 25. One of the numbers, 40, is replaced by 16. What is the new average?

(A) 21
(B) 22
(C) 23
(D) 24

Q6

The average mark of 10 students in a test is 56. A student who scored 92 is removed from the list. What is the average mark of the remaining 9 students?

Q7

The present ages of Ravi and Sunil are in the ratio 5 : 7. Four years ago, the sum of their ages was 40 years. What is Sunil's present age?

(A) 24 years
(B) 26 years
(C) 28 years
(D) 32 years

Q8

The average of 11 numbers is 50. The average of the first six numbers is 49 and the average of the last six numbers is 52. What is the sixth number?

(A) 52
(B) 54
(C) 55
(D) 56

Q9

A batter has played 20 innings, with an average of 42 runs per innings (total runs divided by number of innings). How many runs must the batter score in the 21st innings to raise the average to 44?

Q10

The sum of the present ages of a mother and her daughter is 60 years. Six years ago, the mother was five times as old as the daughter. What will be the mother's age after 4 years?

(A) 50 years

(B) 48 years

(C) 52 years

(D) 54 years

Answers and working: averages and ages

Q1. Answer: (B)

1. Add the numbers: 12 + 15 + 18 + 23 + 32 = 100.
2. Divide by the count: 100 / 5 = 20.
3. The average is 20.

Q2. Answer: (C)

1. Sum of the six numbers = 6 x 40 = 240.
2. Sum of the seven numbers = 7 x 42 = 294.
3. Seventh number = 294 - 240 = 54.
4. The answer is 54.

Q3. Answer: (B)

1. Let the son's age be x years. The father is 3x years.
2. After 12 years: 3x + 12 = 2(x + 12).
3. So 3x + 12 = 2x + 24, which gives x = 12.
4. The son is 12 years old.

Q4. Answer: (A)

1. Total marks of A = 30 x 60 = 1800.
2. Total marks of B = 20 x 70 = 1400.
3. Combined total = 3200 for 50 students.
4. Average = 3200 / 50 = 64.

Q5. Answer: (B)

1. Original sum = 8 x 25 = 200.
2. The sum falls by 40 - 16 = 24, so the new sum is 176.
3. New average = 176 / 8 = 22.
4. The answer is 22.

Q6. Answer: 52

1. Total marks of 10 students = 10 x 56 = 560.
2. Marks of the remaining 9 = 560 - 92 = 468.
3. Average = 468 / 9 = 52.
4. The answer is 52.

Q7. Answer: (C)

1. Four years ago the sum was 40, so the present sum is 40 + 4 + 4 = 48.
2. The ratio 5 : 7 has 12 parts, so one part = 48 / 12 = 4.
3. Sunil's age = 7 x 4 = 28 years.
4. The answer is 28 years.

Q8. Answer: (D)

1. Sum of the first six = 6 x 49 = 294.

2. Sum of the last six = 6 x 52 = 312.
3. Adding both counts the sixth number twice: 294 + 312 = 606.
4. Sum of all 11 = 11 x 50 = 550.
5. Sixth number = 606 - 550 = 56.

Q9. Answer: 84

1. Total runs in 20 innings = 20 x 42 = 840.
2. Total runs needed in 21 innings for an average of 44 = 21 x 44 = 924.
3. Runs needed in the 21st innings = 924 - 840 = 84.
4. The answer is 84.

Q10. Answer: (A)

1. Let the daughter's age be d, so the mother's age is 60 - d.
2. Six years ago: 60 - d - 6 = 5(d - 6), so 54 - d = 5d - 30.
3. This gives 6d = 84, so d = 14 and the mother is 46.
4. After 4 years the mother will be 46 + 4 = 50 years old.

Time and work

Q1

A can finish a job in 12 days and B can finish the same job in 24 days. Working together, in how many days will they finish it?

(A) 6 days
(B) 8 days
(C) 9 days
(D) 18 days

Q2

One pipe can fill an empty tank in 20 minutes and another pipe can fill it in 30 minutes. If both pipes are opened together, how long will the tank take to fill?

(A) 10 minutes
(B) 12 minutes
(C) 15 minutes
(D) 25 minutes

Q3

6 workers, all working at the same rate, complete a job in 15 days. How many days will 10 such workers take to complete the same job?

Q4

A and B together can finish a job in 10 days. A alone can finish it in 15 days. In how many days can B alone finish it?

(A) 20 days
(B) 25 days
(C) 30 days
(D) 35 days

Q5

An empty tank has an inlet pipe that fills it in 6 hours and an outlet pipe that empties a full tank in 9 hours. If both pipes are opened together, how long will the tank take to become full?

(A) 12 hours
(B) 15 hours
(C) 18 hours
(D) 24 hours

Q6

A works twice as fast as B. Together they finish a job in 14 days. In how many days can A alone finish the job?

(A) 18 days
(B) 21 days
(C) 28 days
(D) 42 days

Q7

A can do a piece of work in 18 days. A works on it alone for 6 days and then leaves. B completes the remaining work alone in 16 days. In how many days can B alone do the whole work?

Q8

A can complete a job alone in 9 days and B can complete it alone in 6 days. They work on it together and are paid Rs 7,500 in all, shared in proportion to the work each does. How much does A get?

(A) Rs 2,500
(B) Rs 3,000
(C) Rs 3,750
(D) Rs 4,500

Q9

Pipe A can fill a tank in 8 hours and pipe B can fill it in 12 hours. A leak at the bottom can empty the full tank in 24 hours. If both pipes and the leak are all working, how long will the empty tank take to fill?

(A) 4 hours
(B) 6 hours
(C) 7.5 hours
(D) 9 hours

Q10

A alone can do a job in 30 days and B alone can do it in 20 days. They start the job together, but A leaves 5 days before the job is finished, and B works till the end. In how many days in all is the job finished?

Answers and working: time and work

Q1. Answer: (B)

1. A does $\frac{1}{12}$ of the job in a day.
2. B does $\frac{1}{24}$ of the job in a day.
3. Together they do $\frac{2}{24} + \frac{1}{24} = \frac{3}{24} = \frac{1}{8}$ of the job in a day.
4. They finish in 8 days. The answer is B.

Q2. Answer: (B)

1. The first pipe fills $\frac{1}{20}$ of the tank in a minute.
2. The second pipe fills $\frac{1}{30}$ of the tank in a minute.
3. Together they fill $\frac{3}{60} + \frac{2}{60} = \frac{5}{60} = \frac{1}{12}$ in a minute.
4. The tank fills in 12 minutes. The answer is B.

Q3. Answer: 9

1. The job needs $6 \times 15 = 90$ worker-days of work.
2. With 10 workers, the time is $90 \div 10 = 9$ days.
3. The answer is 9 days.

Q4. Answer: (C)

1. Together they do $\frac{1}{10}$ of the job in a day.
2. A alone does $\frac{1}{15}$ of the job in a day.
3. B's share is $\frac{1}{10} - \frac{1}{15} = \frac{3}{30} - \frac{2}{30} = \frac{1}{30}$ per day.
4. B alone needs 30 days. The answer is C.

Q5. Answer: (C)

1. The inlet fills $\frac{1}{6}$ of the tank in an hour.
2. The outlet removes $\frac{1}{9}$ of the tank in an hour.
3. The net filling is $\frac{1}{6} - \frac{1}{9} = \frac{3}{18} - \frac{2}{18} = \frac{1}{18}$ per hour.
4. The tank fills in 18 hours. The answer is C.

Q6. Answer: (B)

1. Let B do x of the job in a day. Then A does $2x$.
2. Together they do $3x = \frac{1}{14}$ per day, so $x = \frac{1}{42}$.
3. A does $2x = \frac{2}{42} = \frac{1}{21}$ of the job per day.
4. A alone needs 21 days. The answer is B.

Q7. Answer: 24

1. In 6 days A completes $\frac{6}{18} = \frac{1}{3}$ of the work.
2. The remaining work is $1 - \frac{1}{3} = \frac{2}{3}$.
3. B does $\frac{2}{3}$ of the work in 16 days.
4. The whole work takes B $16 \times \frac{3}{2} = 24$ days. The answer is 24.

Q8. Answer: (B)

1. A's daily work is $\frac{1}{9}$ and B's is $\frac{1}{6}$.

2. Ratio of A to B is $\frac{1}{9} : \frac{1}{6} = 2 : 3$ (multiply both by 18).
3. A's share is $\frac{2}{5}$ of Rs 7,500.
4. A gets Rs 3,000. The answer is B.

Q9. Answer: (B)

1. Take the tank as 24 units. Pipe A adds 3 units an hour.
2. Pipe B adds 2 units an hour.
3. The leak removes 1 unit an hour.
4. Net filling is $3 + 2 - 1 = 4$ units an hour, so the time is $24 \div 4 = 6$ hours. The answer is B.

Q10. Answer: 14

1. Let the job take x days. B works all x days and A works $x - 5$ days.
2. The work done is $\frac{x-5}{30} + \frac{x}{20} = 1$.
3. Multiply by 60: $2(x - 5) + 3x = 60$, so $5x = 70$.
4. $x = 14$. The job is finished in 14 days.

Time, speed and distance

Q1

A car runs at a steady speed of 54 km/h. What is its speed in metres per second?

(A) 12 m/s
(B) 15 m/s
(C) 18 m/s
(D) 20 m/s

Q2

A bus covers 180 km in 4 hours at a constant speed. How far will it go in 7 hours at the same speed?

(A) 280 km
(B) 305 km
(C) 315 km
(D) 330 km

Q3

Two cyclists start at the same time from two towns 60 km apart and ride towards each other. Their speeds are 12 km/h and 18 km/h. After how many hours do they meet?

Q4

A train 120 m long crosses a pole in 8 seconds. How many seconds will it take to cross a platform 180 m long at the same speed?

(A) 16 s
(B) 20 s

(C) 24 s

(D) 30 s

Q5

A boat goes 12 km/h in still water. The stream flows at 3 km/h. How many hours does the boat take to go 36 km upstream?

(A) 3 hours

(B) 4 hours

(C) 4.5 hours

(D) 6 hours

Q6

A man drives from his house to a market at 40 km/h and returns by the same road at 60 km/h. What is his average speed for the whole trip?

(A) 45 km/h

(B) 48 km/h

(C) 50 km/h

(D) 52 km/h

Q7

Two trains of lengths 100 m and 140 m run on parallel tracks in opposite directions at 54 km/h and 66 km/h. How many seconds do they take to cross each other completely?

(A) 6 s

(B) 7.2 s

(C) 8 s

(D) 9 s

Q8

A train 200 m long runs at 72 km/h. It overtakes another train 150 m long running in the same direction at 36 km/h. How many seconds does it take to pass the slower train completely?

(A) 25 s

(B) 30 s

(C) 35 s

(D) 40 s

Q9

A boat takes 2 hours to go 30 km downstream and 3 hours to come back the same 30 km upstream. What is the speed of the stream in km/h?

Q10

A train 180 m long passes a man walking in the same direction at 6 km/h in 12 seconds. What is the speed of

the train in km/h?

Answers and working: time, speed and distance

Q1. Answer: (B)

1. To change km/h to m/s, multiply by $\frac{5}{18}$.
2. Speed $= 54 \times \frac{5}{18}$.
3. $54 \div 18 = 3$, and $3 \times 5 = 15$.
4. The speed is 15 m/s.

Q2. Answer: (C)

1. Speed $= 180 \div 4 = 45$ km/h.
2. Distance in 7 hours $= 45 \times 7$.
3. $45 \times 7 = 315$.
4. The bus covers 315 km.

Q3. Answer: 2

1. They move towards each other, so the speeds add.
2. Relative speed $= 12 + 18 = 30$ km/h.
3. Time $= 60 \div 30 = 2$ hours.
4. They meet after 2 hours.

Q4. Answer: (B)

1. Speed $= 120 \div 8 = 15$ m/s.
2. To cross the platform, the train covers its own length plus the platform: $120 + 180 = 300$ m.
3. Time $= 300 \div 15 = 20$ s.
4. The train takes 20 seconds.

Q5. Answer: (B)

1. Upstream speed $= 12 - 3 = 9$ km/h.
2. Time $= \text{distance} \div \text{speed}$.
3. Time $= 36 \div 9 = 4$ hours.
4. The boat takes 4 hours.

Q6. Answer: (B)

1. Let the one-way distance be 120 km, a common multiple of 40 and 60.
2. Time going $= 120 \div 40 = 3$ h. Time returning $= 120 \div 60 = 2$ h.
3. Total distance $= 240$ km and total time $= 5$ h.
4. Average speed $= 240 \div 5 = 48$ km/h, which is option B.

Q7. Answer: (B)

1. Opposite directions, so the speeds add: $54 + 66 = 120$ km/h.
2. In m/s this is $120 \times \frac{5}{18} = \frac{100}{3}$ m/s.
3. Distance to be covered $= 100 + 140 = 240$ m.
4. Time $= 240 \div \frac{100}{3} = 7.2$ s.

Q8. Answer: (C)

1. Same direction, so the speeds are subtracted: $72 - 36 = 36$ km/h.
2. 36 km/h $= 36 \times \frac{5}{18} = 10$ m/s.
3. Distance to be covered $= 200 + 150 = 350$ m.
4. Time $= 350 \div 10 = 35$ s.

Q9. Answer: 2.5

1. Downstream speed $= 30 \div 2 = 15$ km/h.
2. Upstream speed $= 30 \div 3 = 10$ km/h.
3. Let the boat's speed in still water be b and the stream speed be s. Then $b + s = 15$ and $b - s = 10$.
4. Subtracting the second from the first gives $2s = 5$, so $s = 2.5$.
5. The stream speed is 2.5 km/h.

Q10. Answer: 60

1. Relative speed $= 180 \div 12 = 15$ m/s.
2. In km/h this is $15 \times \frac{18}{5} = 54$ km/h.
3. Relative speed $=$ train speed $-$ man's speed, so train speed $= 54 + 6$.
4. The train runs at 60 km/h.

Simple and compound interest

Q1

What is the simple interest on Rs 5,000 for 3 years at 8% per annum?

(A) Rs 1,000
(B) Rs 1,200
(C) Rs 1,400
(D) Rs 1,600

Q2

A sum of Rs 12,000 is lent at 5% simple interest per annum. The interest earned is Rs 1,800. For how many years was the money lent?

Q3

What is the compound interest on Rs 10,000 for 2 years at 10% per annum, compounded yearly?

(A) Rs 2,000
(B) Rs 2,100
(C) Rs 2,200
(D) Rs 2,400

Q4

At what rate of simple interest per annum will a sum of money double itself in 8 years?

(A) 8%

(B) 10%
(C) 15%
(D) 12.5%

Q5

Rs 8,000 is invested for 1 year at 10% per annum, compounded half-yearly. What is the amount at the end of the year?

(A) Rs 8,800
(B) Rs 8,820
(C) Rs 8,840
(D) Rs 8,900

Q6

What is the difference between the compound interest (yearly) and the simple interest on Rs 5,000 for 2 years at 6% per annum?

(A) Rs 12
(B) Rs 18
(C) Rs 24
(D) Rs 36

Q7

A sum of money at simple interest amounts to Rs 6,600 in 2 years and to Rs 7,150 in 3 years. Find the sum in rupees.

Q8

A sum placed at compound interest (yearly) amounts to Rs 13,230 in 2 years and to Rs 13,891.50 in 3 years. What is the rate of interest per annum?

(A) 4%
(B) 5%
(C) 6%
(D) 10%

Q9

What is the compound interest on Rs 12,000 for 1.5 years at 20% per annum, compounded half-yearly?

(A) Rs 3,600
(B) Rs 3,720
(C) Rs 4,000
(D) Rs 3,972

Q10

A loan of Rs 4,200 is to be repaid in two equal yearly instalments, the first paid at the end of year 1 and the second at the end of year 2. Interest is 10% per annum, compounded yearly. What is each instalment?

(A) Rs 2,420

(B) Rs 2,100

(C) Rs 2,310

(D) Rs 2,520

Answers and working: simple and compound interest

Q1. Answer: (B)

1. Use SI = P x R x T / 100.
2. SI = 5,000 x 8 x 3 / 100.
3. 5,000 x 8 = 40,000, and 40,000 x 3 = 1,20,000.
4. Divide by 100 to get Rs 1,200. The answer is Rs 1,200.

Q2. Answer: 3

1. Interest for one year = 12,000 x 5 / 100 = Rs 600.
2. Number of years = total interest / yearly interest.
3. 1,800 / 600 = 3.
4. The money was lent for 3 years.

Q3. Answer: (B)

1. Amount = 10,000 × (1.1)^2.
2. (1.1)^2 = 1.21, so the amount is Rs 12,100.
3. CI = amount - principal = 12,100 - 10,000.
4. The compound interest is Rs 2,100.

Q4. Answer: (D)

1. If the sum doubles, the interest equals the principal P.
2. So P = P x R x 8 / 100.
3. This gives R x 8 = 100.
4. R = 12.5. The rate is 12.5% per annum.

Q5. Answer: (B)

1. Half-yearly rate = 10 / 2 = 5%, and there are 2 half-years.
2. Amount = 8,000 × (1.05)^2.
3. (1.05)^2 = 1.1025.
4. 8,000 × 1.1025 = Rs 8,820. The amount is Rs 8,820.

Q6. Answer: (B)

1. SI for 2 years = 5,000 x 6 x 2 / 100 = Rs 600.
2. Amount at CI = 5,000 x (1.06)^2 = 5,000 x 1.1236 = Rs 5,618.
3. CI = 5,618 - 5,000 = Rs 618.
4. Difference = 618 - 600 = Rs 18. The answer is Rs 18.

Q7. Answer: 5500

1. Interest for the third year = 7,150 - 6,600 = Rs 550.
2. Simple interest is the same every year, so interest for 2 years = Rs 1,100.
3. Sum = amount after 2 years - interest for 2 years.
4. 6,600 - 1,100 = 5,500. The sum is Rs 5,500.

Q8. Answer: (B)

1. The interest earned in the third year = 13,891.50 - 13,230 = Rs 661.50.
2. This interest is earned on the amount at the end of year 2, so R/100 = 661.50 / 13,230.
3. 661.50 / 13,230 = 0.05.
4. R = 5. The rate is 5% per annum.

Q9. Answer: (D)

1. Half-yearly rate = 10%, and 1.5 years = 3 half-years.
2. Amount = 12,000 x (1.1)^3.
3. (1.1)^3 = 1.331, so the amount is 12,000 x 1.331 = Rs 15,972.
4. CI = 15,972 - 12,000 = Rs 3,972. The answer is Rs 3,972.

Q10. Answer: (A)

1. Let each instalment be x. Present value of the two payments must equal the loan.
2. x / 1.1 + x / (1.1)^2 = 4,200.
3. x (1/1.1 + 1/1.21) = x (1.1 + 1) / 1.21 = 2.1x / 1.21.
4. So x = 4,200 × 1.21 / 2.1 = 2,000 × 1.21 = 2,420. Each instalment is Rs 2,420.

Permutations, combinations and probability

Q1

In how many ways can 5 different books be arranged in a row on a shelf?

(A) 24
(B) 60
(C) 120
(D) 720

Q2

A class has 8 students. In how many ways can a team of 3 students be chosen from them?

Q3

A pack of 52 playing cards has 4 suits of 13 cards each, and each suit has one king. One card is drawn at random from the well shuffled pack. What is the probability that it is a king?

(A) $\frac{1}{52}$
(B) $\frac{1}{13}$
(C) $\frac{1}{4}$
(D) $\frac{4}{13}$

Q4

How many different arrangements can be made using all the letters of the word LEVEL?

(A) 15
(B) 30
(C) 60
(D) 120

Q5

A committee of 4 is to be chosen from 4 men and 3 women. It must have at least 2 women. In how many ways can this be done?

(A) 18
(B) 22
(C) 25
(D) 35

Q6

A fair coin is tossed 4 times. What is the probability of getting exactly 2 heads?

(A) $\frac{1}{4}$
(B) $\frac{3}{8}$
(C) $\frac{1}{2}$
(D) $\frac{5}{8}$

Q7

Two fair six-faced dice (numbered 1 to 6) are rolled together. What is the probability that the sum of the two numbers is 8?

(A) $\frac{1}{6}$
(B) $\frac{5}{36}$
(C) $\frac{1}{9}$
(D) $\frac{7}{36}$

Q8

Six people, including Asha and Binoy, are to sit in a row. In how many ways can they sit if Asha and Binoy must sit next to each other?

(A) 120
(B) 240
(C) 360
(D) 480

Q9

Using the digits 1 to 9, each digit at most once in a number, how many 3-digit even numbers can be formed?

Q10

A bag has 4 red balls and 6 blue balls. Two balls are drawn at random one after the other, without replacement. What is the probability that both balls have the same colour?

(A) $\frac{1}{3}$

(B) $\frac{2}{5}$

(C) $\frac{7}{15}$

(D) $\frac{8}{15}$

Answers and working: permutations, combinations and probability

Q1. Answer: (C)

1. Five different books fill five places in a row.
2. The number of arrangements is $5!$.
3. $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$.
4. The answer is 120.

Q2. Answer: 56

1. The order of choosing does not matter, so use a selection.
2. Number of teams is $\binom{8}{3} = \dfrac{8 \times 7 \times 6}{3 \times 2 \times 1}$.
3. $\dfrac{336}{6} = 56$.
4. The answer is 56.

Q3. Answer: (B)

1. The pack has 52 cards, and each is equally likely to be drawn.
2. Each of the 4 suits has one king, so there are 4 kings.
3. Probability is $\dfrac{4}{52}$.
4. This simplifies to $\dfrac{1}{13}$, so the answer is B.

Q4. Answer: (B)

1. LEVEL has 5 letters: L twice, E twice, V once.
2. Arrangements are $\dfrac{5!}{2!\,2!}$.
3. $\dfrac{120}{4} = 30$.
4. The answer is 30.

Q5. Answer: (B)

1. Case 1: 2 women and 2 men gives $\binom{3}{2}\binom{4}{2} = 3 \times 6 = 18$.
2. Case 2: 3 women and 1 man gives $\binom{3}{3}\binom{4}{1} = 4$.
3. The cases cannot happen together, so add them.
4. $18 + 4 = 22$, so the answer is B.

Q6. Answer: (B)

1. Total outcomes are $2^4 = 16$, all equally likely.
2. Outcomes with exactly 2 heads: $\binom{4}{2} = 6$.
3. Probability is $\dfrac{6}{16}$.
4. This equals $\dfrac{3}{8}$, so the answer is B.

Q7. Answer: (B)

1. Total outcomes are $6 \times 6 = 36$.
2. Pairs with sum 8: (2,6), (3,5), (4,4), (5,3), (6,2).

3. That is 5 favourable outcomes.
4. Probability is $\frac{5}{36}$, so the answer is B.

Q8. Answer: (B)

1. Treat Asha and Binoy as one block. Now there are 5 units.
2. The 5 units can be arranged in $5! = 120$ ways.
3. Inside the block, the two can swap places in 2 ways.
4. Total is $120 \times 2 = 240$, so the answer is B.

Q9. Answer: 224

1. The last digit must be even: 2, 4, 6 or 8, so 4 choices.
2. The first digit can be any of the 8 remaining digits.
3. The middle digit can be any of the 7 digits left.
4. Total is $4 \times 8 \times 7 = 224$.

Q10. Answer: (C)

1. Total ways to pick 2 balls: $\binom{10}{2} = 45$.
2. Both red: $\binom{4}{2} = 6$. Both blue: $\binom{6}{2} = 15$.
3. Same colour: $6 + 15 = 21$ ways.
4. Probability is $\frac{21}{45} = \frac{7}{15}$, so the answer is C.

Logical reasoning

Number and letter series

Q1

Find the missing number in the series: 4, 9, 14, 19, ?, 29

(A) 23
(B) 24
(C) 25
(D) 26

Q2

Which of these numbers is not a perfect square?

(A) 16
(B) 25
(C) 48
(D) 49

Q3

Hot is to cold as day is to ?

(A) Night
(B) Sun
(C) Light
(D) Morning

Q4

Find the next number in the series: 2, 6, 12, 20, 30, ?

Q5

Find the next letter in the series: B, D, G, K, ?

(A) O
(B) P
(C) Q
(D) R

Q6

Three of these letter groups follow the same pattern. Which group is the odd one out?

(A) ACE
(B) FHJ
(C) KMO

(D) PQR

Q7

Find the missing number in the series: 1, 1, 2, 3, 5, 8, ?, 21

(A) 11
(B) 12
(C) 13
(D) 14

Q8

Pairs of numbers follow one rule: 2 : 5, 3 : 10, 4 : 17. Using the same rule, find the missing number: 6 : ?

Q9

Two patterns are mixed in this series. Find the next number: 5, 3, 10, 6, 15, 9, ?

(A) 18
(B) 20
(C) 21
(D) 25

Q10

AZ is to CX as EV is to ?

(A) GT
(B) GU
(C) FT
(D) HS

Answers and working: number and letter series

Q1. Answer: (B)

1. Find the gap between neighbouring terms: 9 - 4 = 5, 14 - 9 = 5, 19 - 14 = 5.
2. Each term is 5 more than the one before.
3. The missing term is 19 + 5 = 24, and 24 + 5 = 29 fits.
4. The answer is B, 24.

Q2. Answer: (C)

1. Check each number: 16 = 4 x 4, 25 = 5 x 5, 49 = 7 x 7.
2. 48 lies between 36 and 49 and is not the square of a whole number.
3. The answer is C, 48.

Q3. Answer: (A)

1. Hot and cold are opposites.
2. So the missing word must be the opposite of day.
3. The opposite of day is night.
4. The answer is A, Night.

Q4. Answer: 42

1. Find the gaps: 6 - 2 = 4, 12 - 6 = 6, 20 - 12 = 8, 30 - 20 = 10.
2. The gaps go up by 2 each time, so the next gap is 12.
3. The next term is 30 + 12 = 42.
4. The answer is 42.

Q5. Answer: (B)

1. Write the letter positions: B = 2, D = 4, G = 7, K = 11.
2. The gaps are 2, 3 and 4, so the next gap is 5.
3. The next position is 11 + 5 = 16, which is the letter P.
4. The answer is B, P.

Q6. Answer: (D)

1. In ACE, FHJ and KMO, each letter is 2 places after the one before it.
2. In PQR, each letter is only 1 place after the one before it.
3. So PQR breaks the pattern.
4. The answer is D, PQR.

Q7. Answer: (C)

1. From the third term on, each term is the sum of the two terms before it: 1 + 1 = 2, 1 + 2 = 3, 2 + 3 = 5, 3 + 5 = 8.
2. The missing term is 5 + 8 = 13.
3. Check with the next term: 8 + 13 = 21.
4. The answer is C, 13.

Q8. Answer: 37

1. Test squares: 2 squared = 4 and 4 + 1 = 5; 3 squared = 9 and 9 + 1 = 10.
2. Check the third pair: 4 squared = 16 and 16 + 1 = 17.
3. The rule is: square the number and add 1.
4. For 6: 36 + 1 = 37.
5. The answer is 37.

Q9. Answer: (B)

1. Take the terms in odd places: 5, 10, 15. They go up by 5.
2. Take the terms in even places: 3, 6, 9. They go up by 3.
3. The next term is in an odd place, so it is 15 + 5 = 20.
4. The answer is B, 20.

Q10. Answer: (A)

1. In AZ to CX, the first letter moves 2 places forward: A to C.
2. The second letter moves 2 places back: Z to X.
3. Apply the same to EV: E moves forward to G, and V moves back to T.
4. The answer is A, GT.

Coding and decoding

Q1

In a certain code, each letter is replaced by the letter 3 places ahead of it in the alphabet. How is BOOK written in this code?

(A) EQQN
(B) FRRN
(C) ERRM
(D) ERRN

Q2

In a certain code language, rice is called wheat, wheat is called maize, maize is called oats and oats is called ragi. In this code, what is real wheat called?

(A) Rice
(B) Wheat
(C) Maize
(D) Oats

Q3

In a code, each letter is replaced by its position number in the alphabet and the numbers are written together without gaps. For example, CAB is written 312. How is FACE written?

(A) 6135
(B) 6315
(C) 5136

(D) 6153

Q4

In a code, each letter is replaced by a number that is one more than its position in the alphabet. For example, BAT is written 3 2 21. Which word is written as 21 10 14 6?

(A) TIME
(B) UJNF
(C) SHLD
(D) TILE

Q5

In a code, the 1st letter of a word is moved 1 place forward, the 2nd letter 2 places forward, the 3rd letter 3 places forward, and the 4th letter 4 places forward. How is LAMP written in this code?

(A) MCOT
(B) MDPT
(C) NCPT
(D) MCPT

Q6

In a code, each letter is replaced by the letter that sits at the same distance from the other end of the alphabet. So A becomes Z, B becomes Y, C becomes X, and so on. How is HOT written in this code?

(A) RLG
(B) SLG
(C) SKG
(D) TLG

Q7

In a certain code, PLAN is written as NJYL. Using the same rule, how is ZONE written?

(A) BQPG
(B) XMKC
(C) XMLC
(D) YNMD

Q8

In a certain code language:

- "fresh green leaf" is written "ma to ri"
- "green leaf falls" is written "to ri su"
- "fresh leaf grows" is written "ri ma na"

The code words are not necessarily in the same order as the words. What is the code for "green"?

(A) ma
(B) ri

(C) to

(D) su

Q9

A word is coded in two steps. First, each letter is moved 2 places forward in the alphabet. Then the whole word is written in reverse order. The coded word is PKQE. What was the original word?

(A) NIOC

(B) GSMR

(C) COIN

(D) COIL

Q10

In a code, the value of a letter is its position number in the alphabet, so A is 1 and Z is 26. The code number of a word is the sum of the values of the letters at its even places minus the sum of the values of the letters at its odd places. Places are counted from the left, starting at 1. Find the code number of PLANET.

Answers and working: coding and decoding

Q1. Answer: (D)

1. The rule is: move each letter 3 places forward.
2. B becomes E, O becomes R, O becomes R.
3. K becomes N.
4. So BOOK is written ERRN.

Q2. Answer: (C)

1. The grain in question is real wheat.
2. In the code, wheat is called maize.
3. So real wheat is called maize. The answer is C.

Q3. Answer: (A)

1. Check with the example: C is 3, A is 1, B is 2, so CAB is 312.
2. F is 6, A is 1, C is 3, E is 5.
3. Written together, FACE is 6135.

Q4. Answer: (A)

1. Check with the example: B is 2, plus 1 gives 3. A is 1, plus 1 gives 2. T is 20, plus 1 gives 21.
2. To decode, subtract 1 from each number: 20, 9, 13, 5.
3. Positions 20, 9, 13, 5 are T, I, M, E.
4. The word is TIME.

Q5. Answer: (D)

1. L moved 1 place forward is M.
2. A moved 2 places forward is C.
3. M moved 3 places forward is P.
4. P moved 4 places forward is T.
5. So LAMP is written MCPT.

Q6. Answer: (B)

1. A letter at position n becomes the letter at position 27 minus n.
2. H is 8, so it becomes position 19, which is S.
3. O is 15, so it becomes position 12, which is L.
4. T is 20, so it becomes position 7, which is G.
5. So HOT is written SLG.

Q7. Answer: (C)

1. Compare PLAN with NJYL: P to N, L to J, A to Y, N to L.
2. Each letter moves 2 places backward. A moves back to Y by going round the end of the alphabet.
3. Z goes to X, O goes to M, N goes to L, E goes to C.
4. So ZONE is written XMLC.

Q8. Answer: (C)

1. The word "leaf" is in all three sentences. The code word "ri" is in all three, so leaf is ri.
2. "fresh" is in sentences 1 and 3. The code words common to those two are ma and ri. Ri is leaf, so fresh is ma.
3. Sentence 1 is "ma to ri". Removing ma (fresh) and ri (leaf) leaves to for green.
4. So the code for green is to.

Q9. Answer: (C)

1. Undo the last step first. Reverse PKQE to get EQKP.
2. Undo the first step. Move each letter 2 places backward.
3. E becomes C, Q becomes O, K becomes I, P becomes N.
4. The original word is COIN.

Q10. Answer: 24

1. The values are P = 16, L = 12, A = 1, N = 14, E = 5, T = 20.
2. Odd places are 1, 3 and 5: P, A, E. Their sum is 16 + 1 + 5 = 22.
3. Even places are 2, 4 and 6: L, N, T. Their sum is 12 + 14 + 20 = 46.
4. Even sum minus odd sum is 46 - 22 = 24.
5. The code number is 24.

Blood relations

Q1

Anil points to a girl and says, "She is the daughter of my mother's only brother." How is the girl related to Anil?

(A) Sister
(B) Cousin
(C) Niece
(D) Aunt

Q2

Meera says, "Rohan is the son of my father's wife." Meera's father has only one wife. How is Rohan related to Meera?

(A) Brother
(B) Cousin
(C) Uncle
(D) Nephew

Q3

Pointing to a man, Sunita says, "His mother is the only daughter of my mother." How is the man related to Sunita?

(A) Son
(B) Nephew

(C) Brother

(D) Cousin

Q4

Deepak and his brother are the only sons of their parents. Deepak introduces a woman as "the wife of my mother's husband's other son." How is the woman related to Deepak?

(A) Sister-in-law

(B) Mother

(C) Sister

(D) Wife

Q5

In a family, P is the father of Q. Q is the sister of R. R is the son of S. Take siblings to have the same two parents. How is S related to P?

(A) Wife

(B) Mother

(C) Sister

(D) Daughter

Q6

A is the brother of B. B is the sister of C. C is the father of D. How is A related to D?

(A) Father

(B) Uncle

(C) Brother

(D) Grandfather

Q7

Given that 'P + Q' means P is the mother of Q and 'P - Q' means P is the brother of Q. Take siblings to have the same two parents. In 'M + N - O', how is M related to O?

(A) Mother

(B) Sister

(C) Aunt

(D) Grandmother

Q8

Using 'P + Q' for P is the mother of Q, 'P - Q' for P is the brother of Q, and 'P x Q' for P is the father of Q, what does 'A x B + C' tell us about A and C?

(A) A is the grandfather of C

(B) A is the father of C

(C) A is the uncle of C

(D) A is the brother of C

Q9

Rahul looks at a photograph and says, "I have no brother or sister, but that man's father is my father's son." Whose photograph is it?

(A) Rahul's own

(B) Rahul's son's

(C) Rahul's father's

(D) Rahul's nephew's

Q10

A family has a grandfather, his wife, their two sons and their wives, and each son has two children. How many people are in this family?

Answers and working: blood relations

Q1. Answer: (B)

1. Anil's mother's brother is Anil's maternal uncle.
2. The uncle's daughter is the daughter of Anil's maternal uncle.
3. A maternal uncle's child is Anil's cousin.
4. The girl is Anil's cousin.

Q2. Answer: (A)

1. Meera's father has only one wife, so his wife is Meera's mother.
2. Rohan is the son of Meera's mother.
3. A son of the same mother is Meera's brother.
4. Rohan is Meera's brother.

Q3. Answer: (A)

1. The only daughter of Sunita's mother is Sunita herself.
2. So the man's mother is Sunita.
3. Hence the man is Sunita's son.

Q4. Answer: (A)

1. Deepak's mother's husband is Deepak's father.
2. Deepak is one of his father's two sons, so the other son is Deepak's brother.
3. The wife of Deepak's brother is Deepak's sister-in-law.
4. The woman is Deepak's sister-in-law.

Q5. Answer: (A)

1. Q and R are siblings, so they have the same parents.
2. P is Q's father, so P is also R's father.
3. R's parents are P and S. P is the father, so S is the mother.
4. S is the mother of R and P is the father, so S is P's wife.

Q6. Answer: (B)

1. A, B and C are siblings.
2. C is the father of D.
3. A is the brother of D's father.
4. A is D's uncle.

Q7. Answer: (A)

1. M + N means M is the mother of N.
2. N - O means N is the brother of O.
3. N and O are siblings of the same parents, so they have the same mother.
4. M is the mother of O.

Q8. Answer: (A)

1. A x B means A is the father of B.

2. B + C means B is the mother of C.
3. A is the father of C's mother.
4. A is the grandfather of C.

Q9. Answer: (B)

1. Rahul has no siblings, so his father's son is Rahul himself.
2. So the man's father is Rahul.
3. The man is therefore Rahul's son.
4. The photograph is of Rahul's son.

Q10. Answer: 10

1. Grandfather and his wife make 2 people.
2. Their two sons add 2 people.
3. The two sons' wives add 2 people.
4. Each son has two children, so 4 children in all.
5. Total is 2 + 2 + 2 + 4 = 10.

Directions and distances

Q1

Asha walks 7 km north and then turns and walks 24 km east. How far is she from her starting point in a straight line?

(A) 31 km
(B) 25 km
(C) 17 km
(D) 29 km

Q2

Ravi starts walking east and covers 5 m. He turns right and walks 3 m. He turns right again and walks 5 m. In which direction is he from his starting point?

(A) North
(B) East
(C) South
(D) West

Q3

Sana walks 12 m west and then turns and walks 9 m south. What is her straight-line distance, in metres, from the starting point?

Q4

Dev walks 9 km north. He turns left and walks 12 km. He turns left again and walks 4 km. How far is he from his starting point?

(A) 13 km
(B) 17 km
(C) 15 km
(D) 11 km

Q5

Kabir walks 15 m south. He turns left and walks 20 m. He turns left again and walks 25 m. In which direction is he from his starting point?

(A) South-east
(B) North-west
(C) South-west
(D) North-east

Q6

Mina walks 22 m north. She turns right and walks 12 m. She turns right and walks 7 m. She turns right again and walks 4 m. How far is she, in metres, from her starting point in a straight line?

Q7

Just after sunrise, Tara stands in an open field and her shadow falls exactly on her right side. Which direction is she facing?

(A) South
(B) North
(C) East
(D) West

Q8

In the evening, just before sunset, Rohan's shadow falls exactly on his left side. He then turns 90 degrees to his right and starts walking. In which direction is he walking?

(A) North
(B) South
(C) East
(D) West

Q9

Neel walks 7 km west. He turns right and walks 5 km. He turns right and walks 13 km. He turns right once more and walks 13 km. How far and in which direction is he from his starting point?

(A) 10 km south-west
(B) 10 km south-east
(C) 14 km south-east
(D) 10 km north-east

Q10

Arjun and Bina start from the same point. Arjun walks 15 m west and then 8 m north. Bina walks 9 m east and then 2 m south. How far apart, in metres, are they now?

Answers and working: directions and distances

Q1. Answer: (B)

1. North and east legs meet at a right angle.
2. Distance squared is $7^2 + 24^2 = 49 + 576 = 625$.
3. Distance is $\sqrt{625} = 25$ km.
4. The answer is 25 km.

Q2. Answer: (C)

1. Facing east, a right turn points him south, so he walks 3 m south.
2. Facing south, a right turn points him west, so he walks 5 m west.
3. The 5 m east and 5 m west cancel out.
4. He is 3 m south of the start. The answer is South.

Q3. Answer: 15

1. The west and south legs form a right angle.
2. Distance squared is $12^2 + 9^2 = 144 + 81 = 225$.
3. Distance is $\sqrt{225} = 15$ m.
4. The answer is 15.

Q4. Answer: (A)

1. Facing north, a left turn points west, so he walks 12 km west.
2. Facing west, a left turn points south, so he walks 4 km south.
3. Net movement is 12 km west and $9 - 4 = 5$ km north.
4. Distance is $\sqrt{12^2 + 5^2} = \sqrt{169} = 13$ km. The answer is 13 km.

Q5. Answer: (D)

1. Facing south, a left turn points east, so he walks 20 m east.
2. Facing east, a left turn points north, so he walks 25 m north.
3. Net movement north is $25 - 15 = 10$ m, and east is 20 m.
4. He is north and east of the start. The answer is North-east.

Q6. Answer: 17

1. The four legs go north 22, east 12, south 7, west 4.
2. Net north is $22 - 7 = 15$ m.
3. Net east is $12 - 4 = 8$ m.
4. Distance is $\sqrt{15^2 + 8^2} = \sqrt{289} = 17$ m. The answer is 17.

Q7. Answer: (A)

1. The sun rises in the east, and a shadow falls on the side opposite the sun. So just after sunrise the shadow falls to the west.
2. Her right side is therefore west.
3. Facing north, a person's right is east. Facing south, a person's right is west. So she is facing south.
4. The answer is South.

Q8. Answer: (D)

1. The sun is in the west in the evening, so the shadow falls to the east.
2. His left side is east, so he is facing south.
3. Turning 90 degrees to the right from south points him west.
4. The answer is West.

Q9. Answer: (B)

1. Facing west, right turns give north 5 km, then east 13 km, then south 13 km.
2. Net east-west: $-7 + 13 = 6$ km, so 6 km east.
3. Net north-south: $5 - 13 = -8$ km, so 8 km south.
4. Distance is $\sqrt{6^2 + 8^2} = 10$ km, towards south-east. The answer is 10 km south-east.

Q10. Answer: 26

1. Take the start as the origin. Arjun is 15 m west and 8 m north.
2. Bina is 9 m east and 2 m south.
3. East-west gap is $15 + 9 = 24$ m. North-south gap is $8 + 2 = 10$ m.
4. Distance is $\sqrt{24^2 + 10^2} = \sqrt{676} = 26$ m. The answer is 26.

Seating arrangements and puzzles

Q1

Four friends, Asha, Binu, Chitra and Dev, sit in a row facing north. Asha sits at the extreme left. Chitra sits immediately to the right of Binu. Dev does not sit next to Asha. Who sits at the extreme right?

(A) Asha
(B) Binu
(C) Chitra
(D) Dev

Q2

Eight people sit around a round table, equally spaced, facing the centre. The seats are numbered 1 to 8 clockwise as seen from above. Meena sits in seat 3. Sunil sits directly opposite Meena. Tara sits second to the right of Sunil. Facing the centre, a person's right is the anticlockwise direction. What is Tara's seat number?

Q3

Three friends, Kiran, Lata and Manoj, each own exactly one pet, and the pets are a dog, a cat and a parrot, all different. Kiran owns neither the dog nor the cat. Lata does not own the dog. Who owns the cat?

(A) Kiran
(B) Lata
(C) Manoj
(D) It cannot be determined

Q4

Six people, P, Q, R, S, T and U, sit in a row facing north. Q sits third from the left. U sits immediately to the right of Q. P sits immediately to the left of Q. S sits at one of the two ends. T and R sit next to each other. R does not sit at the extreme right. Who sits third to the right of P?

(A) S

(B) T

(C) R

(D) U

Q5

Six people, Anu, Bhim, Charu, Dilip, Esha and Farid, sit at a round table, equally spaced, facing the centre. When a person faces the centre, their left is the clockwise direction as seen from above. Anu sits opposite Dilip. Bhim sits immediately to the left of Anu. Charu sits opposite Bhim. Esha does not sit next to Anu. Who sits immediately to the right of Farid?

(A) Anu

(B) Charu

(C) Dilip

(D) Esha

Q6

Hari, Ila and Jay live in three flats, one on each of floors 1, 2 and 3. Each owns a different vehicle from a bike, a car and a scooter. Jay lives on a lower floor than Ila. Hari does not live on floor 1. The person on floor 2 owns the car. Hari does not own the car. Jay does not own the bike. Who owns the bike, and on which floor does that person live?

(A) Hari, floor 3

(B) Ila, floor 2

(C) Jay, floor 1

(D) Hari, floor 2

Q7

Eleven people stand in a row facing north. Rekha is third from the left end. Sanjay is fifth from the right end. Tina stands exactly midway between Rekha and Sanjay. How many people stand to the left of Tina?

Q8

Eight people, Anu, Bhim, Charu, Dilip, Esha, Farid, Gita and Hari, sit at a round table, equally spaced, facing the centre. A person's left is the clockwise direction as seen from above. Anu sits opposite Esha. Bhim sits second to the left of Anu. Charu sits immediately to the right of Esha. Dilip sits opposite Bhim. Hari sits directly between Dilip and Anu, next to both. Farid sits immediately to the right of Bhim. Who sits third to the right of Gita?

(A) Bhim

(B) Charu

(C) Esha

(D) Hari

Q9

Five people, Pia, Raj, Sana, Tej and Uma, sit in a row facing north. Each wears a different colour from red, blue, green, yellow and white. Uma wears red and sits at the left end. Raj wears blue and sits at the right end. Tej sits immediately to the left of Raj. Pia sits in the middle. The person in green sits immediately to the left of the person in white. Tej does not wear white. Who wears green?

(A) Pia

(B) Sana

(C) Tej

(D) Uma

Q10

Twelve people sit around a round table, equally spaced, facing the centre. Anil and Bala have exactly 3 people between them along the shorter arc. Chandra sits directly opposite Anil. Deepa sits exactly in the middle of the shorter arc between Bala and Chandra, with one person on each side of her on that arc. How many people sit between Deepa and Anil along the shorter arc?

Answers and working: seating arrangements and puzzles

Q1. Answer: (D)

1. Asha takes the first seat from the left.
2. Dev is not next to Asha, so Dev is in seat 3 or seat 4.
3. If Dev were in seat 3, Binu and Chitra would be in seats 2 and 4, which are not adjacent.
4. So Dev is in seat 4, and Binu and Chitra are in seats 2 and 3. Dev sits at the extreme right.

Q2. Answer: 5

1. Opposite seats differ by 4, so Sunil is in seat 3 + 4 = 7.
2. Right means anticlockwise, so the seat count goes down from 7.
3. First to the right of Sunil is seat 6, second is seat 5.
4. Tara sits in seat 5.

Q3. Answer: (B)

1. Kiran owns neither the dog nor the cat, so Kiran owns the parrot.
2. The dog and the cat are left for Lata and Manoj.
3. Lata does not own the dog, so Lata owns the cat.
4. Manoj owns the dog. The cat belongs to Lata.

Q4. Answer: (C)

1. From the left, seat 2 is P, seat 3 is Q and seat 4 is U.
2. S, T and R fill seats 1, 5 and 6.
3. T and R are adjacent, so they take seats 5 and 6, and S takes seat 1.
4. R is not at the extreme right, so R is in seat 5 and T is in seat 6.
5. P is in seat 2, so the third to the right is seat 5, which is R.

Q5. Answer: (B)

1. Number the seats clockwise 1 to 6 with Anu in seat 1. Dilip is then in seat 4.
2. Bhim is immediately left of Anu, so Bhim is in seat 2, and Charu opposite is in seat 5.
3. Esha and Farid take seats 3 and 6. Seat 6 is next to Anu, so Esha is in seat 3 and Farid is in seat 6.
4. Right is anticlockwise, so the person immediately right of Farid is in seat 5, which is Charu.

Q6. Answer: (A)

1. Jay is below Ila and Hari is not on floor 1. The floors are either Jay 1, Ila 2, Hari 3 or Jay 1, Ila 3, Hari 2.
2. In the second case Hari is on floor 2 and would own the car, which is not allowed. So Jay is on 1, Ila on 2, Hari on 3.
3. The person on floor 2 owns the car, so Ila owns the car.
4. Jay does not own the bike, so Jay owns the scooter and Hari owns the bike on floor 3.

Q7. Answer: 4

1. Rekha is in position 3 from the left.
2. Sanjay is fifth from the right, so his position from the left is 11 - 5 + 1 = 7.
3. Midway between positions 3 and 7 is position 5, so Tina is in position 5.

4. The number of people to her left is 4.

Q8. Answer: (A)

1. Number seats clockwise 1 to 8 with Anu in seat 1. Esha is in seat 5.
2. Bhim is second to the left of Anu, so seat 3. Charu is immediately right of Esha, so seat 4. Dilip is opposite Bhim, so seat 7.
3. Hari sits next to both Dilip (seat 7) and Anu (seat 1), so Hari is in seat 8.
4. Farid is immediately right of Bhim, so seat 2. Gita takes the last seat, seat 6.
5. Right is anticlockwise: from seat 6 the third to the right is seat 3, which is Bhim.

Q9. Answer: (B)

1. The order from the left is Uma, then Sana, Pia, Tej, Raj, since Sana is the only one left for seat 2.
2. Red and blue are taken, so green, white and yellow go to Sana, Pia and Tej.
3. Green is immediately left of white, so the pair is Sana and Pia, or Pia and Tej.
4. If the pair were Pia and Tej, Tej would wear white, which is not allowed. So Sana wears green and Pia wears white.
5. Sana wears green.

Q10. Answer: 4

1. Call Anil's seat 0. With 3 people between, Bala is 4 seats away from Anil.
2. Opposite seats are 6 apart, so Chandra is 6 seats from Anil.
3. Bala and Chandra are 2 seats apart, so Deepa is in the seat between them, 5 seats from Anil.
4. The seats strictly between Deepa and Anil on that side number 4. The answer is 4.

Syllogisms and statements

Q1

Statements:
All pens are books.
All books are files.

Which conclusion follows?

(A) All files are pens
(B) All pens are files
(C) Some files are not books
(D) No pen is a file

Q2

Statements:
Some tablets are phones.
All phones are devices.

Conclusions:
I. Some tablets are devices.
II. All tablets are devices.

Which option is correct?

(A) Only I follows

(B) Only II follows

(C) Both I and II follow

(D) Neither I nor II follows

Q3

Statements:
Some roses are red.
No red thing is a stone.

Conclusions:
I. Some roses are not stones.
II. No rose is a stone.

Which option is correct?

(A) Only I follows

(B) Only II follows

(C) Both I and II follow

(D) Neither I nor II follows

Q4

Statement:
The library will stay open until 10 pm during the exam month.

Conclusions:
I. Students can use the library in the evening during the exam month.
II. Every student will study in the library until 10 pm.

Which option is correct?

(A) Only I follows

(B) Only II follows

(C) Both I and II follow

(D) Neither I nor II follows

Q5

Statements:
All engineers are readers.
Some readers are writers.
No writer is a singer.

Conclusions:
I. Some readers are not singers.
II. Some engineers are writers.
III. No engineer is a singer.

Which option is correct?

(A) Only I follows

(B) Only I and II follow

(C) Only I and III follow

(D) I, II and III follow

Q6

Statement:
A lab notice says: "Carry your ID card to the lab. Entry without it will not be allowed."

Assumptions:
I. An ID card can be used to identify a student.
II. All students own a mobile phone.

Which assumption is implicit in the statement?

(A) Only I is implicit

(B) Only II is implicit

(C) Both I and II are implicit

(D) Neither I nor II is implicit

Q7

Statements:
All bolts are nuts.
No nut is a screw.
Some screws are washers.

Conclusions:
1. No bolt is a screw.
2. Some washers are not nuts.
3. Some nuts are washers.
4. No bolt is a washer.

How many of these four conclusions follow from the statements?

Q8

Statements:
All stars are rocks.
Some rocks are metals.

Conclusions:
I. Some stars are metals.
II. No star is a metal.

Which option is correct?

(A) Only I follows

(B) Only II follows

(C) Either I or II follows

(D) Neither I nor II follows

Q9

Statement:
A coaching centre announces: "Students who score below 60% in the weekly test must attend the extra

Sunday class."

Assumptions:
I. The extra class can help a weak student improve.
II. The weekly test marks show how well a student has understood the week's work.
III. All students will score below 60%.

Which assumptions are implicit?

(A) Only I is implicit

(B) Only II is implicit

(C) Only I and II are implicit

(D) I, II and III are implicit

Q10

Statements:
All A are B.
All B are C.
Some D are A.
Some E are C.

Conclusions:
1. Some D are B.
2. Some D are C.
3. All A are C.
4. Some E are A.
5. Some C are D.
6. Some B are D.

How many of these six conclusions follow from the statements?

Answers and working: syllogisms and statements

Q1. Answer: (B)

1. Pens are inside books, and books are inside files.
2. So pens are inside files.
3. Option A reverses the chain, so it does not follow.
4. Options C and D are not supported by the statements.
5. The answer is B: all pens are files.

Q2. Answer: (A)

1. The tablets that are phones are also devices, because all phones are devices.
2. So some tablets are devices, and I follows.
3. Nothing is said about tablets that are not phones, so II does not follow.
4. The answer is A: only I follows.

Q3. Answer: (A)

1. The red roses are not stones, so some roses are not stones. I follows.
2. The roses that are not red are not mentioned, and some of them could be stones.
3. So II does not follow.
4. The answer is A: only I follows.

Q4. Answer: (A)

1. The library is open until 10 pm. The evening hours fall before that closing time, so students can use it in the evening. I follows.
2. The statement gives the opening hours only. It does not say what every student will do.
3. So II does not follow.
4. The answer is A: only I follows.

Q5. Answer: (A)

1. The readers who are writers are not singers, so some readers are not singers. I follows.
2. The writers among the readers need not be engineers, so II does not follow.
3. Engineers could also be singers through some other link, so III is not forced.
4. The answer is A: only I follows.

Q6. Answer: (A)

1. Asking for an ID card at the gate only makes sense if the card can identify the student. I is implicit.
2. The notice says nothing about mobile phones.
3. So II is not implicit.
4. The answer is A: only I is implicit.

Q7. Answer: 2

1. Bolts are nuts and nuts are not screws, so no bolt is a screw. Conclusion 1 follows.
2. The washers that are screws cannot be nuts, so some washers are not nuts. Conclusion 2 follows.
3. Nothing links nuts and washers directly, so conclusion 3 does not follow.

4. The washers that are screws are only some washers. Nothing rules out a bolt being one of the other washers, so conclusion 4 does not follow.
5. Two conclusions follow, so the answer is 2.

Q8. Answer: (C)

1. The metal rocks may or may not be stars, so I alone is not certain.
2. For the same reason II alone is not certain.
3. I (some stars are metals) and II (no star is a metal) are a complementary pair: a particular affirmative and a universal negative on the same two terms. They cannot both be true, and they cannot both be false.
4. By the usual rule, when neither conclusion of such a pair follows alone, either I or II follows.
5. The answer is C.

Q9. Answer: (C)

1. Asking low scorers to attend an extra class assumes the class can help them. I is implicit.
2. Using the test score to pick students assumes the score reflects understanding. II is implicit.
3. The rule applies only to those who score below 60%, so it does not assume everyone will.
4. III is not implicit.
5. The answer is C: only I and II are implicit.

Q10. Answer: 5

1. The D that are A are also B, since all A are B. Conclusions 1 and 6 follow.
2. Those same D are B and so C. Conclusions 2 and 5 follow.
3. A is inside B and B is inside C, so all A are C. Conclusion 3 follows.
4. The E that are C need not be A, so conclusion 4 does not follow.
5. Five conclusions follow, so the answer is 5.

Data sufficiency

Q1

What is the price of one pen?

Statement I: A pen costs Rs 4 less than a pencil.

Statement II: 5 pens cost Rs 60 in all.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q2

How old is Ravi?

Statement I: Ravi is 6 years older than his sister.

Statement II: Ravi's sister is 14 years old.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q3

A positive whole number x is given. Is x even?

Statement I: x + 3 is odd.

Statement II: x is a multiple of 3.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q4

A train crosses a signal pole in 12 seconds. What is the length of the train?

Statement I: The speed of the train is 54 km/h.

Statement II: The train crosses a platform in 22 seconds.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q5

What is the average mark of five students in a test?

Statement I: The highest mark and the lowest mark add up to 120.

Statement II: The median mark is 60.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q6

What is the cost price of a shirt?

Statement I: The marked price of the shirt is Rs 800.

Statement II: The shirt was sold at a profit of 20% for Rs 600.

(A) Statement I alone is sufficient; Statement II alone is not

(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q7

A and B together finish a job in 8 days. In how many days can A alone finish it?

Statement I: B alone takes 24 days to finish the job.

Statement II: A is faster than B.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q8

For two numbers a and b, is the product ab positive?

Statement I: a + b > 0.

Statement II: a - b > 0.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q9

A bag has red, green and blue balls only. How many green balls are in the bag?

Statement I: There are 34 balls in the bag.

Statement II: The red balls are twice the blue balls, and the green balls are 6 fewer than the red balls.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not
(C) Each statement alone is sufficient
(D) Both statements together are needed; neither is sufficient alone
(E) Both statements together are not sufficient

Q10

The present ages of A and B are in the ratio 3 : 5. What is A's present age?

Statement I: After 6 years, the ratio of their ages will be 2 : 3.

Statement II: The sum of their ages 4 years ago was 40 years.

(A) Statement I alone is sufficient; Statement II alone is not
(B) Statement II alone is sufficient; Statement I alone is not

(C) Each statement alone is sufficient

(D) Both statements together are needed; neither is sufficient alone

(E) Both statements together are not sufficient

Answers and working: data sufficiency

Q1. Answer: (B)

1. Statement I links the pen to a pencil, but no price is given for either, so it cannot fix the pen's price.
2. Statement II gives 5 pens for Rs 60, so one pen costs 60 / 5 = Rs 12.
3. Statement II alone is enough and Statement I alone is not. The answer is B.

Q2. Answer: (D)

1. Statement I gives only a gap of 6 years, with no age to start from.
2. Statement II gives the sister's age but says nothing about Ravi.
3. Together, Ravi is 14 + 6 = 20 years old. The answer is D.

Q3. Answer: (A)

1. Statement I: 3 is odd, and odd + even = odd, so x must be even. This settles the question.
2. Statement II: x could be 6 (even) or 9 (odd), so it does not settle the question.
3. Statement I alone is enough. The answer is A.

Q4. Answer: (A)

1. Crossing a pole means covering exactly the train's own length in 12 seconds.
2. Statement I: 54 km/h is 15 m/s, so the length is 15 × 12 = 180 m.
3. Statement II gives a time for the platform but not the platform's length, so it adds nothing usable.
4. Statement I alone is enough. The answer is A.

Q5. Answer: (E)

1. Neither statement gives the total of all five marks.
2. Try both together: marks 20, 50, 60, 60, 100 fit both and average 58.
3. Marks 20, 60, 60, 60, 100 also fit both and average 60.
4. The average changes, so even both statements together are not sufficient. The answer is E.

Q6. Answer: (B)

1. Statement I gives the marked price only. The cost price cannot be found from it.
2. Statement II: selling price is 120% of cost price, so cost price = 600 / 1.2 = Rs 500.
3. Statement II alone is enough. The answer is B.

Q7. Answer: (A)

1. Together they do 1/8 of the job a day.
2. Statement I: B does 1/24 a day, so A does 1/8 - 1/24 = 1/12 a day. A alone takes 12 days.
3. Statement II: since A is faster than B, A does more than half of 1/8 a day, so A takes fewer than 16 days. That is a range, not an exact number of days, so Statement II alone is not enough.
4. Statement I alone is enough. The answer is A.

Q8. Answer: (E)

1. Together the two statements give a + b > 0 and a - b > 0, so a is greater than the size of b. This makes a positive.
2. The sign of b is still open.

3. Take a = 3, b = 1: both hold and ab = 3 is positive.
4. Take a = 3, b = -1: both hold and ab = -3 is negative. So even both together are not sufficient. The answer is E.

Q9. Answer: (D)

1. Statement I gives the total only, with nothing about the colours.
2. Statement II gives a pattern: with b blue balls, red = 2b and green = 2b - 6, but no actual count.
3. Together: b + 2b + (2b - 6) = 34, so 5b = 40 and b = 8.
4. Red = 16 and green = 10. Both statements are needed. The answer is D.

Q10. Answer: (C)

1. Let the present ages be 3k and 5k.
2. Statement I: (3k + 6) / (5k + 6) = 2 / 3 gives 9k + 18 = 10k + 12, so k = 6 and A is 18.
3. Statement II: (3k - 4) + (5k - 4) = 40 gives 8k = 48, so k = 6 and A is 18.
4. Each statement alone gives A's age as 18 years. The answer is C.

Clocks and calendars

Q1

What is the angle between the hour hand and the minute hand of a clock at exactly 4:00?

(A) 90 degrees
(B) 100 degrees
(C) 120 degrees
(D) 150 degrees

Q2

Today is Wednesday. What day of the week will it be after 45 days?

(A) Thursday
(B) Friday
(C) Sunday
(D) Saturday

Q3

A leap year has 366 days. Five consecutive years contain exactly one leap year. How many odd days are there in these five years? (Odd days = days left over after removing complete weeks.)

Q4

Find the angle between the hands of a clock at 7:20.

(A) 90 degrees
(B) 100 degrees
(C) 110 degrees

(D) 120 degrees

Q5

After 4 o'clock, at what time will the hour hand and the minute hand first coincide?

(A) 20 minutes past 4

(B) 21 9/11 minutes past 4

(C) 22 2/11 minutes past 4

(D) 24 minutes past 4

Q6

1 January 2000 fell on a Saturday. On which day of the week did 1 January 2004 fall? (2000 was a leap year.)

(A) Tuesday

(B) Wednesday

(C) Thursday

(D) Friday

Q7

Find the angle, in degrees, between the hour hand and the minute hand at 10:24. Give the angle that is less than 180 degrees.

Q8

At what time between 8 and 9 o'clock will the two hands of a clock point in exactly opposite directions?

(A) 5 5/11 minutes past 8

(B) 16 4/11 minutes past 8

(C) 10 10/11 minutes past 8

(D) 43 7/11 minutes past 8

Q9

1 January 2024 was a Monday. 2024 is a leap year with 366 days. On which day of the week did 25 December 2024 fall?

(A) Monday

(B) Tuesday

(C) Wednesday

(D) Thursday

Q10

Between 6 and 7 o'clock the hands of a clock are at right angles (90 degrees) twice. Find, to two decimal places, how many minutes past 6 the second of these two moments occurs.

Answers and working: clocks and calendars

Q1. Answer: (C)

1. The hour hand moves 30 degrees per hour.
2. At 4:00 the minute hand is at 12 and the hour hand is at 4.
3. The angle is 4 x 30 = 120 degrees.
4. The answer is 120 degrees.

Q2. Answer: (D)

1. The week repeats every 7 days, so find the remainder of 45 divided by 7.
2. 45 = 6 x 7 + 3, so the remainder is 3.
3. Count 3 days after Wednesday: Thursday, Friday, Saturday.
4. The answer is Saturday.

Q3. Answer: 6

1. An ordinary year has 365 days, which is 52 weeks and 1 odd day.
2. A leap year has 366 days, which is 52 weeks and 2 odd days.
3. Total odd days = 4 x 1 + 2 = 6.
4. Six is less than 7, so no further reduction is needed. The answer is 6.

Q4. Answer: (B)

1. Use angle = |30H - 5.5M| with H = 7 and M = 20.
2. 30 x 7 = 210 and 5.5 x 20 = 110.
3. The difference is 210 - 110 = 100 degrees.
4. This is less than 180, so the answer is 100 degrees.

Q5. Answer: (B)

1. The hands coincide when 30H + 0.5M = 6M, which gives 5.5M = 30H.
2. For H = 4, 5.5M = 120.
3. M = 120 / 5.5 = 240/11 = 21 9/11 minutes.
4. The hands coincide at 21 9/11 minutes past 4.

Q6. Answer: (C)

1. From 1 Jan 2000 to 1 Jan 2004 the years 2000, 2001, 2002 and 2003 pass.
2. Days = 366 + 365 + 365 + 365 = 1461.
3. 1461 = 208 x 7 + 5, so there are 5 odd days.
4. Saturday + 5 days = Thursday.

Q7. Answer: 168

1. Use angle = |30H - 5.5M| with H = 10 and M = 24.
2. 30 x 10 = 300 and 5.5 x 24 = 132.
3. The difference is 300 - 132 = 168 degrees.
4. 168 is less than 180, so the answer is 168.

Q8. Answer: (C)

1. The angle is |30 x 8 - 5.5M| = |240 - 5.5M|.
2. Opposite hands need an angle of 180 degrees.
3. Between 8 and 9 the minute hand is behind, so 240 - 5.5M = 180 and 5.5M = 60.
4. M = 60 / 5.5 = 120/11 = 10 10/11 minutes past 8.

Q9. Answer: (C)

1. 31 December is the 366th day, so 25 December is the 360th day of the year.
2. From 1 January to 25 December is 359 days.
3. 359 = 51 x 7 + 2, so there are 2 odd days.
4. Monday + 2 days = Wednesday.

Q10. Answer: 49.09 (accepted range ± 0.01)

1. The angle is |180 - 5.5M| for times after 6:00, and it must equal 90 degrees.
2. First case: 180 - 5.5M = 90 gives M = 16.36, which is the earlier moment.
3. Second case: 5.5M - 180 = 90, so 5.5M = 270.
4. M = 270 / 5.5 = 540/11 = 49.09 minutes past 6.

Verbal ability

Grammar and error spotting

Q1

Find the part of the sentence that has an error.

(A) The books / (B) on the shelf / (C) is old / (D) and dusty.

(A) The books
(B) on the shelf
(C) is old
(D) and dusty

Q2

Find the part of the sentence that has an error.

(A) Yesterday evening, / (B) the engineer / (C) has finished / (D) the report.

(A) Yesterday evening,
(B) the engineer
(C) has finished
(D) the report

Q3

Find the part of the sentence that has an error.

(A) He is / (B) an university / (C) student at / (D) our college.

(A) He is
(B) an university
(C) student at
(D) our college

Q4

Find the part of the sentence that has an error.

(A) He likes the city / (B) and has been living / (C) there / (D) since five years.

(A) He likes the city
(B) and has been living
(C) there
(D) since five years

Q5

Find the part of the sentence that has an error.

(A) Between you and I, / (B) the plan / (C) will not / (D) work.

(A) Between you and I,

(B) the plan
(C) will not
(D) work

Q6

Find the part of the sentence that has an error.

(A) The number of applicants / (B) have increased / (C) this year / (D) by a wide margin.

(A) The number of applicants
(B) have increased
(C) this year
(D) by a wide margin

Q7

Find the part of the sentence that has an error.

(A) We shall start the meeting on time / (B) if he will come / (C) early / (D) tomorrow.

(A) We shall start the meeting on time
(B) if he will come
(C) early
(D) tomorrow

Q8

Find the part of the sentence that has an error.

(A) The teacher, / (B) along with her students, / (C) are going / (D) on a trip.

(A) The teacher,
(B) along with her students,
(C) are going
(D) on a trip

Q9

Find the part of the sentence that has an error.

(A) Moon moves / (B) around / (C) the Earth / (D) once a month.

(A) Moon moves
(B) around
(C) the Earth
(D) once a month

Q10

Find the part of the sentence that has an error.

(A) She is / (B) in the same department / (C) and is / (D) senior than me.

(A) She is
(B) in the same department

(C) and is

(D) senior than me

Answers and working: grammar and error spotting

Q1. Answer: (C)

1. The subject is the plural noun 'books'.
2. 'On the shelf' only tells us where they are; it does not change the subject.
3. A plural subject needs a plural verb: 'are old'.
4. So the error is in part C.

Q2. Answer: (C)

1. 'Yesterday evening' names a finished point in the past.
2. A finished time in the past needs the simple past tense, not the present perfect.
3. The correct form is 'finished'.
4. So the error is in part C.

Q3. Answer: (B)

1. The choice between 'a' and 'an' depends on the sound, not the spelling.
2. 'University' begins with a 'yoo' sound, which is a consonant sound.
3. So it takes 'a', not 'an': 'a university'.
4. So the error is in part B.

Q4. Answer: (D)

1. 'Five years' is a length of time, not a starting point.
2. 'Since' goes with a starting point, such as 'since 2019'.
3. 'For' goes with a length of time: 'for five years'.
4. So the error is in part D.

Q5. Answer: (A)

1. 'Between' is a preposition.
2. A pronoun after a preposition must be in the object form.
3. The object form of 'I' is 'me'.
4. So 'between you and me' is correct, and the error is in part A.

Q6. Answer: (B)

1. The subject is 'the number', which is one thing.
2. 'Of applicants' only describes the number.
3. A singular subject needs a singular verb: 'has increased'.
4. So the error is in part B.

Q7. Answer: (B)

1. This is a conditional sentence about a likely future event.
2. The 'if' clause takes the simple present tense, even for the future.
3. So 'if he will come' should be 'if he comes'.
4. So the error is in part B.

Q8. Answer: (C)

1. The subject is 'the teacher', which is singular.
2. 'Along with her students' is an extra phrase and does not make the subject plural.
3. The verb must agree with 'teacher': 'is going'.
4. So the error is in part C.

Q9. Answer: (A)

1. The Moon is one of a kind, so it needs 'the' before it, just as 'the Earth' has in part C.
2. Parts B, C and D are correct as they stand.
3. The correct beginning is 'The Moon moves'.
4. So the error is in part A.

Q10. Answer: (D)

1. Some adjectives from Latin, such as 'senior', 'junior' and 'superior', are not followed by 'than'.
2. They take the preposition 'to'.
3. The correct phrase is 'senior to me'.
4. So the error is in part D.

Vocabulary in context

Q1

Choose the word closest in meaning to "brief" as used here: "The teacher gave a brief reply to the long question."

(A) Short
(B) Rude
(C) Late
(D) Clear

Q2

Choose the word that best fills the blank: "After the long walk in the sun, the travellers were very _____ and asked for water."

(A) thirsty
(B) hungry
(C) noisy
(D) sleepy

Q3

Choose the word opposite in meaning to 'ancient' as used here: "The museum keeps an ancient clock beside a modern one."

(A) Old
(B) Modern
(C) Broken

(D) Costly

Q4

Choose the word closest in meaning to 'scarce' as used here: "Clean drinking water was scarce in the village during the drought."

(A) Plentiful
(B) Hard to find
(C) Dangerous
(D) Cheap

Q5

Choose the word that best fills the blank: "The manager's _____ remark about the report hurt the new intern, though he meant it only as a joke."

(A) tactless
(B) graceful
(C) generous
(D) humble

Q6

Choose the word that best fills the blank: "Ravi is frugal with money, but his brother is quite _____."

(A) thrifty
(B) careful
(C) extravagant
(D) honest

Q7

Choose the word closest in meaning to 'mitigate' as used here: "The new drains will mitigate the damage caused by heavy rain."

(A) Increase
(B) Predict
(C) Lessen
(D) Ignore

Q8

Choose the word that best fills the blank: "The engineer's explanation was so _____ that even the first-year students followed every step without help."

(A) lucid
(B) vague
(C) lengthy
(D) hasty

Q9

Read: "The judge was impartial, the critic was biased, the guard was vigilant, the clerk was careless." How many of the four describing words are opposite in meaning to 'prejudiced'? Give the number.

Q10

Choose the word closest in meaning to 'ephemeral' as used here: "The joy of the festival was ephemeral; by Monday the streets were quiet again."

(A) Lasting

(B) Short-lived

(C) Loud

(D) Hollow

Answers and working: vocabulary in context

Q1. Answer: (A)

1. The sentence sets 'brief' against 'long'.
2. So 'brief' must mean not long.
3. Rude, late and clear do not fit that contrast.
4. The answer is A, Short.

Q2. Answer: (A)

1. The travellers asked for water.
2. This shows the need was for a drink.
3. Only 'thirsty' links walking in the sun with asking for water.
4. The answer is A, thirsty.

Q3. Answer: (B)

1. 'Ancient' means very old.
2. The sentence itself pairs it with 'modern' as a contrast.
3. Old is a synonym, not an opposite.
4. The answer is B, Modern.

Q4. Answer: (B)

1. A drought means little rain.
2. So clean water would be in short supply.
3. 'Scarce' therefore means hard to find.
4. The answer is B, Hard to find.

Q5. Answer: (A)

1. The remark hurt someone but was meant as a joke.
2. So it showed a lack of care for feelings.
3. 'Tactless' means lacking care for others' feelings.
4. The answer is A, tactless.

Q6. Answer: (C)

1. 'Frugal' means careful about spending.
2. The word 'but' signals that the brother is the opposite of frugal.
3. Thrifty and careful mean the same as frugal, and honest has nothing to do with spending.
4. 'Extravagant' means spending freely, so the answer is C.

Q7. Answer: (C)

1. Drains are built to reduce flooding harm.
2. So 'mitigate' means to make something less severe.
3. Increase is the reverse, and predict or ignore do not fit.
4. The answer is C, Lessen.

Q8. Answer: (A)

1. Students followed every step without help.
2. So the explanation must have been easy to understand.
3. 'Lucid' means clear; 'vague' is its opposite.
4. The answer is A, lucid.

Q9. Answer: 1

1. Prejudiced means holding an unfair opinion in advance.
2. Its opposite is a word meaning fair, which is 'impartial'.
3. 'Biased' means the same as prejudiced, and 'vigilant' and 'careless' are unrelated to it.
4. Only 'impartial' qualifies, so the answer is 1.

Q10. Answer: (B)

1. The joy was gone by Monday.
2. So it lasted only a short time.
3. 'Ephemeral' means short-lived; 'lasting' is the opposite.
4. The answer is B, Short-lived.

Sentence completion and improvement

Q1

Choose the word that best fills the blank.

"The team worked hard, so the manager was _____ with the final report."

(A) satisfied
(B) satisfy
(C) satisfying
(D) satisfaction

Q2

Fill in the blank with the correct word.

"Neither of the two candidates _____ ready for the interview."

(A) were
(B) are
(C) was
(D) have been

Q3

Choose the best replacement for the part in square brackets.

"She [do not like] to travel by bus in the rain."

(A) do not like
(B) does not like
(C) did not liking

(D) is not like

Q4

Choose the word that best fills the blank.

"The new rule will _____ all employees, whether they are permanent or on contract."

(A) affect
(B) effect
(C) afflict
(D) infect

Q5

Choose the best replacement for the part in square brackets.

"The report was so long that I [could hardly to finish] it in one sitting."

(A) could hardly to finish
(B) could hardly finishing
(C) could hardly finish
(D) could hardly have finish

Q6

Fill in both blanks with the correct pair of words.

"The shop stays open _____ nine in the morning _____ eight at night."

(A) from, until
(B) between, to
(C) at, by
(D) at, till

Q7

Choose the best replacement for the part in square brackets.

"If the server [would have been restarted] earlier, the data would not have been lost."

(A) would have been restarted
(B) was restarted
(C) had been restarted
(D) has been restarted

Q8

Choose the pair of words that best fills the two blanks.

"The audience was _____ by the speaker's calm tone, but the very long speech left many feeling _____."

(A) impressed, restless
(B) impressing, restlessly
(C) impressive, restful

(D) impress, restlessness

Q9

Choose the best replacement for the part in square brackets.

"Having completed the project ahead of schedule, [the praise of the client was received by the team]."

(A) the praise of the client was received by the team

(B) the team received praise from the client

(C) the client's praise was what the team received

(D) praise was received by the team from the client

Q10

Choose the pair of words that best fills the two blanks.

"Although the plan looked _____ on paper, it proved _____ to carry out when the budget was cut."

(A) feasible, impractical

(B) feasible, practical

(C) impossible, impractical

(D) impractical, unfeasible

Answers and working: sentence completion and improvement

Q1. Answer: (A)

1. The blank follows 'was' and describes the manager, so it needs an adjective.
2. 'Satisfied' is the adjective used for a person who feels content.
3. 'Satisfying' describes a thing that gives satisfaction, not the person.
4. The answer is A.

Q2. Answer: (C)

1. 'Neither' is a singular subject, even when two people are named.
2. In formal grammar a singular subject takes a singular verb, so 'were' and 'are' are wrong.
3. 'Was' is the singular past form that fits the sentence.
4. The answer is C.

Q3. Answer: (B)

1. The subject 'She' is third person singular.
2. In the present tense, it needs 'does not' with the base verb.
3. 'Does not like' is correct and natural.
4. The answer is B.

Q4. Answer: (A)

1. The blank needs a verb meaning 'to have an influence on'.
2. 'Affect' is the verb with this meaning.
3. 'Effect' as a verb means 'to bring about', which does not fit here.
4. 'Afflict' and 'infect' do not fit the sense either.
5. The answer is A.

Q5. Answer: (C)

1. After 'could', the verb must be in its base form.
2. So 'to finish' and 'finishing' are wrong.
3. 'Could hardly have finish' is also wrong, as 'have' needs 'finished'.
4. 'Could hardly finish' is correct, so the answer is C.

Q6. Answer: (A)

1. A starting point of a period is marked with 'from'.
2. The end point is marked with 'until' or 'to'.
3. 'Between' needs 'and', and 'at' does not start a period, so B, C and D are wrong.
4. The answer is A.

Q7. Answer: (C)

1. The sentence is a third conditional: the main clause uses 'would not have been lost'.
2. The 'if' clause of this type must use the past perfect.
3. The past perfect passive is 'had been restarted'.
4. The answer is C.

Q8. Answer: (A)

1. The first blank follows 'was' and needs a past participle: 'impressed'.
2. The second blank follows 'feeling' and needs an adjective: 'restless'.
3. Only option A has both words in the right form.
4. The answer is A.

Q9. Answer: (B)

1. The opening phrase 'Having completed the project' must describe the subject that follows.
2. Only the team completed the project, so 'the team' must come right after the comma.
3. Option B does this and is also direct and active.
4. The answer is B.

Q10. Answer: (A)

1. 'Although' signals a contrast between the two parts of the sentence.
2. The plan looked good on paper, so the first blank needs a positive word: 'feasible'.
3. It then failed in practice, so the second blank needs a negative word: 'impractical'.
4. The answer is A.

Short reading passages

Q1

Read the passage.

Many families in crowded cities have started growing vegetables on their rooftops. A few large pots, some compost and an hour of care each morning are enough to begin. Tomatoes, chillies and spinach grow well in pots and need little space. Families say the fresh produce saves money and tastes better than market vegetables. Children learn where food comes from, and neighbours often swap what they grow. Rooftop plants also keep the top floor cooler in summer. The idea is simple, cheap and useful, and it asks for patience more than skill.

What is the main idea of the passage?

(A) Tomatoes, chillies and spinach are the best crops for city rooftops.
(B) Market vegetables are costly and not fresh.
(C) Growing vegetables on a rooftop is a simple and useful habit for city families.
(D) Rooftop gardening needs special skill and training.

Q2

Read the passage.

The town library changed its timings last month. It now opens at 8 in the morning instead of 10, and closes at 6 in the evening instead of 8. The change followed a survey in which most members said they preferred to read before work or college. Evening visits had been falling for two years, while the reading room was often full by mid-morning. The librarian says the new hours will be reviewed after six months. Members who borrow books may still return them at the drop box outside, at any hour, so late returns will not attract a fine because of the shorter evening.

For how many hours a day is the library open now?

Q3

Read the passage.

Ravi cycles to college every day, a distance of six kilometres. He started two years ago to save the Rs 40 he spent on a bus each way. The money was not the only gain. He now reaches class awake and calm, and he has not had a cold in a year. On rainy days he carries a raincoat and takes the longer, flatter road. His friends first laughed at the idea, but three of them now cycle too. Ravi says the hardest part was the first week, when his legs ached every evening.

According to the passage, what did Ravi find hardest about cycling?

(A) Riding on rainy days

(B) The first week, when his legs ached

(C) Paying the bus fare

(D) Facing the laughter of his friends

Q4

Read the passage.

A small shop in our lane stopped giving credit to customers last year. The owner explained that he had been waiting weeks for payments, and meanwhile he could not pay his own suppliers on time. Some regular buyers were upset and left. Yet his monthly sales have not fallen, because new customers who pay in cash have replaced them. He also no longer worries about dues, and he has started buying stock in larger lots at a lower price per piece.

Which of the following can be inferred from the passage?

(A) The shop owner's cash position is probably better now than it was before.

(B) The shop's monthly sales have risen since credit was stopped.

(C) Every supplier gives a lower price to small shops that buy in larger lots.

(D) The regular buyers who left are likely to return soon.

Q5

Read the passage.

Students often cut sleep to gain study hours before a test. Research on memory suggests this trade is poor. During sleep the brain sorts what was learnt in the day and stores the important parts. A student who sleeps six hours after revising may recall more than one who stays awake revising for those hours. Of course, some late work is unavoidable near a deadline. But if cutting sleep becomes a habit, the extra hours of study give back less than they take away. Steady revision followed by proper rest is the better plan.

What is the main idea of the passage?

(A) Students should never study at night.

(B) Research on memory is not reliable.

(C) Six hours of sleep is the ideal amount for every student.

(D) Sleep helps memory, so regularly giving up sleep to study is a poor trade.

Q6

Read the passage.

A village school ran a reading drive for thirty days. In the first ten days, pupils borrowed 120 books. In the next ten days, borrowing rose by a quarter of that number. In the last ten days, it fell back to the level of the first ten. The teachers had expected the final stretch to be the busiest, since the term tests were over. They later learnt that a festival break of three days had kept many pupils at home. The headmaster plans to run the drive again next year and to avoid any holiday period.

How many books were borrowed in the whole drive?

Q7

Read the passage.

The old bridge on the river road was declared unsafe in March, and heavy vehicles were told to use the new highway, a detour of twelve kilometres. Truck owners complained of higher fuel bills. The town council replied that repair would cost Rs 3 crore and take a year, while a new bridge would cost Rs 9 crore. Nothing has been decided. In the meantime, two-wheelers and cycles still cross the bridge, and the council has put up a board asking them to dismount.

Which of the following is a fair inference from the passage?

(A) The council has chosen to build a new bridge.

(B) The council thinks the bridge can still carry light traffic if users are careful.

(C) Truck owners have been paid for their extra fuel cost.

(D) Repair work has started because it costs less than a new bridge.

Q8

Read the passage.

A fitness app announced that users who log meals daily lose twice as much weight as those who do not. The claim sounds strong, but the app's data cannot show that logging causes the loss. People who are already serious about their health are probably the ones who log meals, and they would likely lose weight anyway. To test the claim fairly, one would need to ask a mixed group to log or not log at random and compare them later. Until such a test is done, the announcement shows a link, not a cause.

Which finding would best support the app's claim?

(A) Users who log meals also tend to exercise more than other users.

(B) The app has been downloaded more often in the last year.

(C) In a group where people were picked at random to log meals, the loggers lost more weight than the others.

(D) Most users who log meals were already fit when they joined the app.

Q9

Read the passage.

A translator once remarked that a good translation is like a good window: you forget it is there. By this test, the best translations are the ones that are never noticed. Readers seldom thank the person who made a foreign novel feel local, yet a clumsy phrase is remembered and blamed at once. The work is therefore judged by its failures, not its successes. This may be unfair, but it explains why skilled translators tend to take pride in quiet, careful choices that few will ever see.

Which of the following can be inferred about how readers treat translators?

(A) Readers prefer novels written in their own language.

(B) Readers thank translators more often than they blame them.

(C) Readers read translations only to check for mistakes.

(D) Readers usually notice a translator only when something goes wrong.

Q10

Read the passage. Its sentences are numbered.

(1) Every monsoon, the low streets of our town fill with water. (2) Shopkeepers lift their goods onto high shelves, and small children have to wade to school. (3) The town needs better drains, because the present ones are narrow and are choked with plastic. (4) Last year the municipality cleaned them only once, in May, and not again. (5) Even a short spell of rain this July left the main market under knee-deep water on two days. (6) Traders say each such day costs them sales they cannot recover.

Which numbered sentence states the main claim that the other sentences support? Enter the sentence number.

Answers and working: short reading passages

Q1. Answer: (C)

1. The passage describes how to start, what grows well and what families gain.
2. Every point supports one idea: rooftop gardening is simple, cheap and useful.
3. Option A is only a detail, B is a comparison, and D is opposed by the last line.
4. The answer is C.

Q2. Answer: 10

1. The library now opens at 8 in the morning.
2. It now closes at 6 in the evening, which is 18:00.
3. Hours open = 18 minus 8 = 10.
4. The answer is 10 hours.

Q3. Answer: (B)

1. The last sentence gives Ravi's own view of the hardest part.
2. He says it was the first week, when his legs ached every evening.
3. Ravi names the first week as the hardest part, not the rain or the laughter.
4. The answer is B.

Q4. Answer: (A)

1. He no longer waits for payments, so money comes in at once.
2. He can now buy stock in larger lots, which needs spare cash.
3. Sales have only 'not fallen', so B goes beyond the passage; C and D are never stated.
4. The answer is A.

Q5. Answer: (D)

1. The passage says the brain stores learning during sleep.
2. It then argues that regular loss of sleep costs more than the extra study gives.
3. A is too strong because late work is called unavoidable at times; B and C are not claimed.
4. The answer is D.

Q6. Answer: 390

1. First ten days: 120 books.
2. Next ten days: a quarter more, so 120 + 30 = 150 books.
3. Last ten days: back to the first level, so 120 books.
4. Total = 120 + 150 + 120 = 390 books.

Q7. Answer: (B)

1. Only heavy vehicles are barred, and light users may cross after dismounting.
2. This suggests the council sees the bridge as fit for light, careful use.
3. The passage says nothing has been decided, which rules out A and D.
4. No payment to truck owners is mentioned, so C fails. The answer is B.

Q8. Answer: (C)

1. The author says a fair test needs people assigned at random to log or not log.
2. Only option C describes such a test, and its result favours the claim.
3. A and D add to the author's doubt, since they suggest other causes.
4. B says nothing about weight loss. The answer is C.

Q9. Answer: (D)

1. Smooth work goes unnoticed and is rarely thanked.
2. A clumsy phrase is remembered and blamed at once.
3. So the translator is mostly noticed through failures, as the passage says.
4. B reverses this, and A and C are never stated. The answer is D.

Q10. Answer: 3

1. Sentences 1, 2, 5 and 6 describe the flooding and its effects.
2. Sentence 4 describes how the drains were cleaned last year.
3. Sentence 3 is the only one that argues for something, a need for better drains, and gives a reason.
4. The other sentences support it, so the answer is 3.

Sentence ordering

Q1

Put the sentences in the most logical order.

P: She boiled the water.
Q: Rina wanted a cup of tea.
R: Then she poured it over the tea leaves.
S: She enjoyed the tea on the balcony.

(A) QPRS
(B) PQRS
(C) QRPS
(D) QPSR

Q2

Put the sentences in the most logical order.

P: The bell rang at four.
Q: Students packed their bags.
R: They walked out of the classroom.
S: The corridor was soon empty.

(A) PRQS
(B) PQRS
(C) QPRS
(D) PQSR

Q3

Put the sentences in the most logical order.

P: Then he fixed it with a patch.
Q: Arun found a puncture in his cycle tyre.
R: He pumped the tyre and rode to college.
S: First he removed the tube and dipped it in water to find the hole.

(A) QPSR
(B) SQPR
(C) QSPR
(D) QSRP

Q4

Put the sentences in the most logical order.

P: Hence the town now depends on tankers for its water.
Q: The river that fed the town's wells dried up over a decade.
R: Farmers dug deeper borewells in response.
S: These borewells lowered the water table further.
T: The town had once drawn all its water from a single river.

(A) QTRSP
(B) TRQSP
(C) TQSRP
(D) TQRSP

Q5

Put the sentences in the most logical order.

P: It was therefore moved to a quieter lane.
Q: The old post office stood on the busiest road of the city.
R: Its trucks and vans blocked traffic every morning.
S: Residents complained to the municipal office.

(A) QSRP
(B) RQSP
(C) QRSP
(D) QRPS

Q6

Put the sentences in the most logical order.

P: This is why the opening minutes of a speech matter so much.
Q: Listeners decide within moments whether a speaker is worth hearing.
R: A weak opening makes them decide against the speaker.
S: Winning them back later takes far more effort.

(A) QSRP
(B) RQSP

(C) PQRS

(D) QRSP

Q7

Four sentences are given below.

P: After a week of this care, a green shoot appeared.
Q: Meena filled a pot with soil and planted a seed.
R: She watered the seed every morning.
S: By the second month, the plant was taller than the pot.

When the sentences are put in the most logical order, at which position (1, 2, 3 or 4) does sentence P stand?

Q8

Put the sentences in the most logical order.

P: Such restraint is therefore a strength, not a weakness.
Q: A scientist who doubts her own result tests it again before announcing it.
R: The cost is small beside the cost of a claim that must be withdrawn later.
S: The habit of doubt slows the announcement.

(A) QSPR

(B) QRSP

(C) QSRP

(D) SQRP

Q9

Put the sentences in the most logical order.

P: Public lending changed that by opening shelves to anyone with a membership card.
Q: Demand for books soon outgrew what a single building could hold.
R: Branches were therefore opened in neighbourhoods and villages.
S: Collections of this kind were consulted only by the owner's family and guests.
T: Libraries began as private collections of the wealthy.

(A) TPSQR

(B) TSPQR

(C) STPQR

(D) TSQPR

Q10

Five sentences are given below.

P: The committee therefore asked each ward to submit a revised estimate.
Q: The halt came because the footbridge's costs had risen sharply.
R: The original estimate had assumed steel at last year's rate.
S: Steel prices, however, had gone up by a fifth in the meantime.
T: Work on the footbridge was halted in March.

When the sentences are put in the most logical order, at which position (1 to 5) does sentence S stand?

Answers and working: sentence ordering

Q1. Answer: (A)

1. Q sets the wish, so it opens the passage.
2. P follows: the water is boiled first.
3. R starts with 'Then' and uses 'it' for the boiled water, so it comes after P.
4. S ends the passage with the drink being enjoyed. The order is QPRS.

Q2. Answer: (B)

1. The bell (P) is the signal, so it comes first.
2. Students pack their bags (Q) after the bell.
3. They then walk out (R).
4. The corridor is empty (S) only after they have left. The order is PQRS.

Q3. Answer: (C)

1. Q states the problem, so it comes first.
2. S begins with 'First' and describes the first step of the repair.
3. P begins with 'Then' and gives the next step, fixing the hole.
4. R is the result, riding to college. The order is QSPR.

Q4. Answer: (D)

1. T gives the starting situation: one river supplied the town.
2. Q says that river dried up.
3. R gives the response, deeper borewells.
4. S says 'These borewells', so it must follow R.
5. P begins with 'Hence' and states the outcome, so it is last. The order is TQRSP.

Q5. Answer: (C)

1. Q introduces the post office, so it opens.
2. R uses 'Its' and describes the problem the vans caused.
3. S gives the reaction of residents to that problem.
4. P says 'therefore' and gives the final action, the move. The order is QRSP.

Q6. Answer: (D)

1. Q states the general fact about listeners.
2. R links a weak opening to a negative decision.
3. S speaks of 'winning them back', which only makes sense after they have decided against the speaker.
4. P begins 'This is why' and draws the conclusion. The order is QRSP.

Q7. Answer: 3

1. Q comes first: Meena plants the seed, and R needs that seed before it.
2. R comes next: she waters the seed every morning.
3. P says 'After a week of this care', which refers back to the watering in R, so it follows R.
4. S is last: 'By the second month' comes after the first week. The order is QRPS.

5. P stands at position 3.

Q8. Answer: (C)

1. Q introduces the scientist and her habit, so it opens.
2. S says this habit slows the announcement; 'The habit of doubt' needs Q before it.
3. R speaks of 'the cost', which refers to the slowing in S, and weighs it against withdrawal.
4. P begins with 'therefore' and concludes from R, so it is last. The order is QSRP.

Q9. Answer: (B)

1. T introduces libraries as private collections.
2. S says 'Collections of this kind', so it follows T and shows who used them.
3. P says public lending 'changed that', meaning the limited access in S.
4. Q gives the result of open access: more demand.
5. R begins with 'therefore' and gives the answer to that demand. The order is TSPQR.

Q10. Answer: 4

1. T states the event, the halt, so it opens.
2. Q begins with 'The halt', which points back to T, and gives the cause: rising costs. So Q follows T.
3. R and S give the detail behind the cost rise. R gives the original assumption about steel.
4. S begins with 'however' and contrasts with R, so it follows R.
5. P begins with 'therefore' and gives the action taken after the halt, so it is last. The order is TQRSP, and S is at position 4.

Idioms and phrases

Q1

Read the sentence: "After months of rumours, Meena finally decided to spill the beans about her new job." What does "spill the beans" mean here?

(A) To waste food by accident
(B) To reveal a secret
(C) To cook for a large group
(D) To complain loudly

Q2

Choose the meaning of the idiom "piece of cake" in: "The final exam was a piece of cake for Arjun, so he left the hall early."

(A) Very easy
(B) Very sweet
(C) Very expensive
(D) Very long

Q3

"The manager asked the team to call off the meeting because of the heavy rain." What does "call off" mean here?

(A) Hold it outdoors
(B) Telephone from outside
(C) Cancel
(D) Shout at

Q4

"Rohit had been burning the midnight oil for a week before his campus test." What does the idiom mean?

(A) Wasting fuel at night
(B) Working or studying late into the night
(C) Starting a fire by mistake
(D) Sleeping with the lights on

Q5

"When the team lost the match, the captain had to face the music." What does "face the music" mean?

(A) Listen to a band play
(B) Leave the ground quietly
(C) Accept the unpleasant results of one's actions
(D) Celebrate with the fans

Q6

"The new software update was a blessing in disguise, since the older version had a serious flaw." What does "a blessing in disguise" mean?

(A) A good thing that first seemed bad
(B) A bad thing that first seemed good
(C) A holy event
(D) A gift wrapped in paper

Q7

"Sneha tried to butter up her professor before asking for an extension." What does "butter up" mean?

(A) To praise someone to gain a favour
(B) To feed someone breakfast
(C) To argue with someone
(D) To ignore someone

Q8

"The two partners decided to bury the hatchet after a long dispute over the shop." What does "bury the hatchet" mean?

(A) To hide a weapon

(B) To end a quarrel and make peace

(C) To start a fight

(D) To clear a garden

Q9

"Though the plan looked perfect, the engineers had to go back to the drawing board when the test failed." What does "go back to the drawing board" mean?

(A) To start designing again from the beginning

(B) To buy new drawing tools

(C) To return to the office

(D) To give up the project forever

Q10

"Everyone said the startup would fail, but its founder kept going and finally turned the tables on her critics." What does "turned the tables" mean?

(A) Rearranged the office furniture

(B) Lost her position to critics

(C) Reversed the situation in her own favour

(D) Asked the critics for money

Answers and working: idioms and phrases

Q1. Answer: (B)

1. "Spill the beans" is an idiom, not about real beans.
2. Meena had kept her job news hidden for months.
3. Deciding to "spill the beans" means she told the secret.
4. The answer is B.

Q2. Answer: (A)

1. "Piece of cake" describes something done without effort.
2. Arjun left the hall early, which fits an easy paper.
3. The answer is A.

Q3. Answer: (C)

1. "Call off" is a phrasal verb.
2. Heavy rain is a reason to stop a planned meeting.
3. So "call off" means to cancel it.
4. The answer is C.

Q4. Answer: (B)

1. The phrase is about effort before a test.
2. "Midnight oil" stands for work done very late.
3. So Rohit was studying late at night for a week.
4. The answer is B.

Q5. Answer: (C)

1. The team lost, so there is something unpleasant to deal with.
2. "Face the music" means to accept blame or criticism.
3. The captain must take responsibility for the loss.
4. The answer is C.

Q6. Answer: (A)

1. "Disguise" means hidden, so the good is not obvious at first.
2. An update can seem a nuisance, yet this one fixed a serious flaw, a good result that was not obvious at first.
3. So it was a good thing that first seemed bad.
4. The answer is A.

Q7. Answer: (A)

1. Sneha wants an extension from her professor.
2. She does something before asking, to win goodwill.
3. "Butter up" means to flatter someone for a favour.
4. The answer is A.

Q8. Answer: (B)

1. The partners had a long dispute.
2. The idiom describes what they decided after it.
3. "Bury the hatchet" means to stop fighting and become friends again.
4. The answer is B.

Q9. Answer: (A)

1. The test failed, so the first plan did not work.
2. The engineers must now make a new plan.
3. The idiom means to start again with a fresh design.
4. It does not mean giving up, so option D is wrong.
5. The answer is A.

Q10. Answer: (C)

1. Critics expected failure, so they seemed to be winning.
2. The founder kept going and succeeded.
3. "Turn the tables" means to reverse a situation so one gains the upper hand.
4. The answer is C.

Programming logic

Loops and conditions

In the pseudocode, for i = a to b runs i from a up to b, with b included.

Q1

What does this program print?

```
 int s = 0;
for (int i = 1; i <= 5; i++)
    s = s + i;
printf("%d", s);
```

(A) 10

(B) 15

(C) 21

(D) 5

Q2

What is printed by this pseudocode?

```
 x = 18
if x > 15:
    x = x - 9
if x > 8:
    x = x + 4
print x
```

(A) 9

(B) 18

(C) 22

(D) 13

Q3

What is printed by this pseudocode? In a loop written "for i = 1 to 20", i takes every value from 1 up to and including 20.

```
 count = 0
for i = 1 to 20:
    if i mod 4 == 0:
        count = count + 1
print count
```

Q4

What is the final value of a?

```
int a = 1, i = 0;
while (i < 4) {
  a = a * 2 + 1;
  i++;
}
```

(A) 15

(B) 31

(C) 16

(D) 63

Q5

What is the final value of r?

```
int n = 2506, r = 0;
while (n > 0) {
  r = r * 10 + n % 10;
  n = n / 10;
}
```

(A) 2506

(B) 6502

(C) 6052

(D) 6250

Q6

What is printed by this pseudocode?

```
t = 0
for i = 1 to 3:
  for j = i to 3:
    t = t + 1
print t
```

(A) 6

(B) 3

(C) 9

(D) 5

Q7

What is the final value of x after this code runs?

```
int x = 3, y = 5;
while (x < y * 3) {
  x = x + y;
  y = y - 1;
}
```

Q8

What is printed by this pseudocode?

```
 s = 0
for i = 1 to 10:
   if i mod 3 == 0:
      continue
   if s > 20:
      break
   s = s + i
print s
```

(A) 27

(B) 22

(C) 37

(D) 19

Q9

What does this program print?

```
 int f = 0, g = 1;
for (int i = 0; i < 6; i++) {
   int t = f + g;
   f = g;
   g = t;
}
printf("%d", f);
```

(A) 5

(B) 13

(C) 8

(D) 21

Q10

What is the final value of k?

```
 int k = 0;
for (int i = 1; i <= 4; i++)
   for (int j = 1; j <= i; j++)
      if ((i + j) % 2 == 0)
         k += i * j;
```

Answers and working: loops and conditions

Q1. Answer: (B)

1. The loop runs for i = 1, 2, 3, 4, 5.
2. Each pass adds i to s, starting from s = 0.
3. s = 1 + 2 + 3 + 4 + 5.
4. The program prints 15.

Q2. Answer: (D)

1. x = 18 and 18 > 15, so x becomes 18 - 9 = 9.
2. Now x = 9 and 9 > 8, so the second condition is true.
3. x becomes 9 + 4 = 13.
4. The output is 13.

Q3. Answer: 5

1. The condition is true when i is a multiple of 4.
2. Since 20 is included, the multiples of 4 from 1 to 20 are 4, 8, 12, 16 and 20.
3. count goes up once for each of them.
4. The output is 5.

Q4. Answer: (B)

1. The loop body runs 4 times, for i = 0, 1, 2, 3.
2. After pass 1, a = 1*2 + 1 = 3. After pass 2, a = 7.
3. After pass 3, a = 15. After pass 4, a = 31.
4. The final value of a is 31.

Q5. Answer: (C)

1. Pass 1: digit 6, r = 6, n = 250.
2. Pass 2: digit 0, r = 60, n = 25.
3. Pass 3: digit 5, r = 605, n = 2.
4. Pass 4: digit 2, r = 6052, n = 0 and the loop stops. The final value is 6052.

Q6. Answer: (A)

1. The inner loop runs from j = i up to 3.
2. For i = 1 it runs 3 times, for i = 2 it runs 2 times, for i = 3 it runs once.
3. t counts the total passes: 3 + 2 + 1.
4. The output is 6.

Q7. Answer: 12

1. Start: x = 3, y = 5. Check 3 < 15, true. Then x = 8, y = 4.
2. Check 8 < 12, true. Then x = 12, y = 3.
3. Check 12 < 9, false, so the loop stops.
4. The final value of x is 12.

Q8. Answer: (A)

1. i = 1, 2 give s = 3. i = 3 is skipped. i = 4, 5 give s = 12.
2. i = 6 is skipped. i = 7 gives s = 19.
3. i = 8: s = 19 is not above 20, so s = 27. i = 9 is skipped.
4. i = 10: s = 27 is above 20, so the loop breaks. The output is 27.

Q9. Answer: (C)

1. Each pass sets f to the old g and g to the old f + g.
2. After passes 1 to 3, (f, g) is (1, 1), (1, 2), (2, 3).
3. After passes 4 to 6, (f, g) is (3, 5), (5, 8), (8, 13).
4. The program prints f, which is 8.

Q10. Answer: 41

1. Only pairs with j <= i and i + j even are added.
2. i = 1: (1,1) adds 1. i = 2: (2,2) adds 4. i = 3: (3,1) adds 3 and (3,3) adds 9.
3. i = 4: (4,2) adds 8 and (4,4) adds 16.
4. k = 1 + 4 + 3 + 9 + 8 + 16 = 41.

Functions and recursion

In the pseudocode, for i = a to b runs i from a up to b, with b included.

Q1

What does `f(4)` return?

```
int f(int n) {
  if (n == 0) return 1;
  return n * f(n - 1);
}
```

(A) 10
(B) 16
(C) 24
(D) 120

Q2

What does `s(4096)` return?

```
int s(int n) {
  if (n == 0) return 0;
  return n % 10 + s(n / 10);
}
```

(A) 15
(B) 18
(C) 19
(D) 20

Q3

What does `p(3, 4)` return?

```
int p(int b, int e) {
  if (e == 0) return 1;
  return b * p(b, e - 1);
}
```

(A) 12

(B) 64

(C) 81

(D) 243

Q4

The function below is called as `fib(5)`. Counting that first call, how many calls to `fib` are made in total?

```
int fib(int n) {
  if (n <= 1) return n;
  return fib(n - 1) + fib(n - 2);
}
```

Q5

What is printed by `show(5)`?

```
void show(int n) {
  if (n > 0) {
    printf("%d ", n);
    show(n - 2);
    printf("%d ", n);
  }
}
```

(A) 5 3 1 3 5

(B) 5 3 1 1 3 5

(C) 1 3 5 5 3 1

(D) 5 3 1 -1 1 3 5

Q6

What does `g(84, 36)` return?

```
int g(int a, int b) {
  if (b == 0) return a;
  return g(b, a % b);
}
```

(A) 6

(B) 12

(C) 18

(D) 36

Q7

What does `pw(2, 9)` return?

```
int pw(int b, int e) {
  if (e == 0) return 1;
  int h = pw(b, e / 2);
  if (e % 2 == 0) return h * h;
  return h * h * b;
}
```

(A) 256

(B) 512

(C) 1024

(D) 18

Q8

What does `h(9875)` return?

```
int h(int n) {
  if (n < 10) return n;
  return h(n / 10 + n % 10);
}
```

Q9

What does `f(15)` return?

```
int f(int n) {
  if (n > 20) return n - 5;
  return f(f(n + 8));
}
```

(A) 10

(B) 16

(C) 18

(D) 21

Q10

What does `f(7)` return?

```
int f(int n) {
  if (n <= 2) return n;
  return f(n - 1) + f(n - 3);
}
```

(A) 7

(B) 10

(C) 12

(D) 15

Answers and working: functions and recursion

Q1. Answer: (C)

1. f(0) = 1.
2. f(1) = 1 *f(0) = 1, f(2) = 2* 1 = 2.
3. f(3) = 3 * 2 = 6.
4. f(4) = 4 * 6 = 24. The answer is 24.

Q2. Answer: (C)

1. Each call adds the last digit and passes on the rest.
2. s(4096) = 6 + s(409) = 6 + 9 + s(40).
3. s(40) = 0 + s(4) = 0 + 4 + s(0) = 4.
4. Total = 6 + 9 + 0 + 4 = 19. The answer is 19.

Q3. Answer: (C)

1. The function multiplies b once for each step down from e to 0.
2. p(3, 0) = 1, p(3, 1) = 3, p(3, 2) = 9.
3. p(3, 3) = 27, p(3, 4) = 81. The answer is 81.

Q4. Answer: 15

1. Let c(n) be the number of calls made by fib(n). Then c(0) = c(1) = 1.
2. For n >= 2, c(n) = 1 + c(n-1) + c(n-2).
3. c(2) = 3, c(3) = 1 + 3 + 1 = 5, c(4) = 1 + 5 + 3 = 9.
4. c(5) = 1 + 9 + 5 = 15. The answer is 15.

Q5. Answer: (B)

1. show(5) prints 5, then calls show(3).
2. show(3) prints 3, then calls show(1). show(1) prints 1, then calls show(-1), which prints nothing.
3. On the way back, show(1) prints 1, show(3) prints 3, show(5) prints 5.
4. Output: 5 3 1 1 3 5. The answer is B.

Q6. Answer: (B)

1. g(84, 36) calls g(36, 84 % 36) = g(36, 12).
2. g(36, 12) calls g(12, 36 % 12) = g(12, 0).
3. b is 0, so g(12, 0) returns 12. The answer is 12.

Q7. Answer: (B)

1. The chain of exponents is 9, 4, 2, 1, 0. pw(2, 0) = 1.
2. pw(2, 1): odd, so 1 *1* 2 = 2. pw(2, 2): even, so 2 * 2 = 4.
3. pw(2, 4): even, so 4 * 4 = 16.
4. pw(2, 9): odd, so 16 *16* 2 = 512. The answer is 512.

Q8. Answer: 2

1. h(9875) = h(987 + 5) = h(992).
2. h(992) = h(99 + 2) = h(101).

3. h(101) = h(10 + 1) = h(11).
4. h(11) = h(1 + 1) = h(2), and 2 < 10 so it returns 2. The answer is 2.

Q9. Answer: (B)

1. f(15) = f(f(23)). Here f(23) = 23 - 5 = 18, so f(15) = f(18).
2. f(18) = f(f(26)). f(26) = 21, so f(18) = f(21).
3. f(21) = 21 - 5 = 16, since 21 > 20.
4. So f(18) = 16 and f(15) = 16. The answer is 16.

Q10. Answer: (B)

1. Base values: f(0) = 0, f(1) = 1, f(2) = 2.
2. f(3) = f(2) + f(0) = 2. f(4) = f(3) + f(1) = 3.
3. f(5) = f(4) + f(2) = 5. f(6) = f(5) + f(3) = 7.
4. f(7) = f(6) + f(4) = 7 + 3 = 10. The answer is 10.

Arrays and strings

In the pseudocode, for i = a to b runs i from a up to b, with b included.

Q1

Indexing starts at 0. What does the code print?

```
 A = [3, 7, 2, 9, 5, 6]
s = 0
for i = 0; i < 6; i = i + 2:
   s = s + A[i]
print s
```

(A) 10
(B) 22
(C) 12
(D) 15

Q2

A program counts the vowels (a, e, i, o, u) in the string "education". What count does it print?

(A) 4
(B) 5
(C) 6
(D) 9

Q3

The array is [12, 5, 18, 10, 7, 25, 10, 11]. A loop counts the elements that are strictly greater than 10. What is the final count?

Q4

Indexing starts at 0. What does the code print?

```
 a = [1, 2, 3, 4, 5, 6]
for i = 0; i < 2; i = i + 1:
   swap a[i] and a[5 - i]
print a
```

(A) [6, 5, 4, 3, 2, 1]

(B) [6, 5, 3, 4, 2, 1]

(C) [2, 1, 3, 4, 6, 5]

(D) [1, 2, 5, 6, 3, 4]

Q5

Indexing starts at 0. What does the code print?

```
 s = "banana"
count = 0
for i = 0; i < 4; i = i + 1:
   if s[i] == s[i + 2]:
      count = count + 1
print count
```

(A) 2

(B) 3

(C) 4

(D) 6

Q6

Indexing starts at 0. What does the code print?

```
 A = [2, 5, 9, 9, 14, 12, 20]
i = 1
while i < 7 and A[i] >= A[i - 1]:
   i = i + 1
print i + A[i]
```

(A) 5

(B) 12

(C) 17

(D) 14

Q7

The code reads "hello world" from left to right. It skips every space and every letter l. Each other character is added to the front of t. What is t at the end?

```
 s = "hello world"
t = ""
for each character c in s:
   if c != ' ' and c != 'l':
      t = c + t
print t
```

(A) heoword

(B) drowoeh

(C) dlrowolleh

(D) hweorod

Q8

Indexing starts at 0. Each step uses the value of a[i] already updated by the previous step. What does the code print?

```
 a = [2, 5, 3, 8, 4]
for i = 0; i < 4; i = i + 1:
   a[i + 1] = a[i + 1] - a[i]
print a[0] + a[1] + a[2] + a[3] + a[4]
```

(A) 22

(B) 0

(C) 9

(D) 13

Q9

The array A is [3, 1, 4, 1, 5, 9, 2, 6]. Indexing starts at 0. The code counts pairs of positions (i, j) with i < j whose elements add up to 10. What does it print?

```
 count = 0
for i = 0; i < 8; i = i + 1:
   for j = i + 1; j < 8; j = j + 1:
      if A[i] + A[j] == 10:
         count = count + 1
print count
```

Q10

What does the code print?

```
 s = "mmnooopppp"
n = 10
out = ""
i = 0
while i < n:
   j = i
   while j < n and s[j] == s[i]:
      j = j + 1
   out = out + s[i] + str(j - i)
   i = j
print out
```

(A) m2n1o3p4

(B) m2n1o3p3

(C) m2no3p4

(D) m2n1o2p4

Answers and working: arrays and strings

Q1. Answer: (A)

1. The loop goes through i = 0, 2 and 4.
2. Those elements are A[0] = 3, A[2] = 2 and A[4] = 5.
3. Their sum is 3 + 2 + 5 = 10.
4. The program prints 10.

Q2. Answer: (B)

1. The letters of education are e, d, u, c, a, t, i, o, n.
2. The vowels are e, u, a, i and o.
3. The consonants d, c, t and n are not counted.
4. The count is 5.

Q3. Answer: 4

1. Check each element against 10.
2. 12, 18, 25 and 11 are greater than 10.
3. 5, 10, 7 and 10 are not greater than 10.
4. The count is 4.

Q4. Answer: (B)

1. The loop runs only for i = 0 and i = 1.
2. i = 0 swaps a[0] and a[5], giving [6, 2, 3, 4, 5, 1].
3. i = 1 swaps a[1] and a[4], giving [6, 5, 3, 4, 2, 1].
4. The middle two elements are never swapped, so the output is [6, 5, 3, 4, 2, 1].

Q5. Answer: (B)

1. The characters are b(0), a(1), n(2), a(3), n(4), a(5).
2. i = 0: b and n differ. i = 1: a and a match.
3. i = 2: n and n match. i = 3: a and a match.
4. The count is 3.

Q6. Answer: (C)

1. The loop stops at the first i where A[i] is less than A[i - 1].
2. For i = 1 to 4 each element is at least the one before it, since 9 >= 9 also holds.
3. At i = 5, A[5] = 12 is less than A[4] = 14, so the loop stops.
4. The program prints 5 + 12 = 17.

Q7. Answer: (B)

1. The characters kept, in order, are h, e, o, w, o, r, d.
2. Adding each one to the front reverses their order.
3. The reverse of heoword is drowoeh.
4. The program prints drowoeh.

Q8. Answer: (C)

1. i = 0: a[1] = 5 - 2 = 3.
2. i = 1: a[2] = 3 - 3 = 0.
3. i = 2: a[3] = 8 - 0 = 8, then i = 3: a[4] = 4 - 8 = -4.
4. The array is [2, 3, 0, 8, -4] and its sum is 9.

Q9. Answer: 3

1. Pairs are counted by position, so equal values at different positions count separately.
2. 4 at index 2 and 6 at index 7 add up to 10.
3. The 9 at index 5 pairs with the 1 at index 1 and the 1 at index 3.
4. No other pair works, so the count is 3.

Q10. Answer: (A)

1. The code writes each run of equal characters as the letter and its length.
2. The runs are mm, n, ooo and pppp.
3. Their lengths are 2, 1, 3 and 4, and a run of length 1 still prints its count.
4. The output is m2n1o3p4.

Operators and number logic

In the pseudocode, for i = a to b runs i from a up to b, with b included.

Q1

In integer arithmetic, $47/5$ gives the quotient and $47\%5$ gives the remainder. What is the value of $(47/5) + (47\%5)$?

(A) 9
(B) 11
(C) 12
(D) 2

Q2

What is the value of the expression `12 & 10`, where `&` is bitwise AND on integers?

(A) 6
(B) 14
(C) 8
(D) 10

Q3

Convert the binary number 101101 to decimal. Enter the decimal value.

Q4

In a C-like language, bitwise `&` has higher precedence than `^`, and `^` has higher precedence than `|`. What is the value of the following expression?

```
9 | 6 & 3 ^ 5
```

(A) 15
(B) 7
(C) 11
(D) 13

Q5

What is the hexadecimal form of the decimal number 156?

(A) 96
(B) C9
(C) 9C
(D) 8C

Q6

In C, integer division truncates towards zero, and the remainder takes the sign of the dividend. What is the value of `-17 % 5`?

(A) -2
(B) 2
(C) 3
(D) -3

Q7

For an integer `x`, the expression `x & (x - 1)` is evaluated. If `x = 236`, what is the value of `x & (x - 1)`?

Q8

A program runs the following code with 5-bit unsigned values.

```
x = 26
y = x ^ (x >> 1)
```

What is the value of `y`?

(A) 27
(B) 13
(C) 31
(D) 23

Q9

In C, `*`, `/` and `%` bind tighter than `+` and `-`, which bind tighter than `<<`. All use integer arithmetic and group left to right. What is the value of the following expression?

```
7 + 3 * 4 % 5 - 8 / 3 << 1
```

(A) 12
(B) 14

(C) 7

(D) 28

Q10

Let `v = 0xB7`, an 8-bit unsigned value. Compute `(v >> 3) ^ 0x0F` and enter the result in decimal.

Answers and working: operators and number logic

Q1. Answer: (B)

1. Integer division: 47 / 5 = 9, since 5 x 9 = 45.
2. Remainder: 47 % 5 = 47 - 45 = 2.
3. Sum = 9 + 2 = 11.
4. The answer is B.

Q2. Answer: (C)

1. 12 in binary is 1100 and 10 is 1010.
2. AND gives 1 only where both bits are 1: 1100 & 1010 = 1000.
3. 1000 in binary is 8.
4. The answer is C.

Q3. Answer: 45

1. Place values from the left are 32, 16, 8, 4, 2, 1.
2. Bits 101101 select 32, 8, 4 and 1.
3. 32 + 8 + 4 + 1 = 45.
4. The answer is 45.

Q4. Answer: (A)

1. `&` first: 6 & 3 = 110 & 011 = 010 = 2.
2. Then `^`: 2 ^ 5 = 010 ^ 101 = 111 = 7.
3. Then `|`: 9 | 7 = 1001 | 0111 = 1111 = 15.
4. The answer is A.

Q5. Answer: (C)

1. Divide by 16: 156 = 9 x 16 + 12.
2. The quotient 9 is the higher digit.
3. The remainder 12 is the hex digit C.
4. So 156 = 0x9C. The answer is C.

Q6. Answer: (A)

1. -17 / 5 truncates towards zero to -3.
2. Remainder = -17 - (-3 x 5) = -17 + 15 = -2.
3. The remainder has the sign of the dividend, which is negative.
4. The answer is A.

Q7. Answer: 232

1. 236 in binary is 11101100. Subtracting 1 turns the lowest set bit to 0 and the zeros below it to 1, so x - 1 = 235 is 11101011.
2. AND: 11101100 & 11101011 = 11101000. The expression clears the lowest set bit of x.
3. 11101000 = 128 + 64 + 32 + 8 = 232.
4. The answer is 232.

Q8. Answer: (D)

1. 26 in binary is 11010.
2. x >> 1 = 01101, which is 13.
3. 11010 ^ 01101 = 10111.
4. 10111 = 16 + 4 + 2 + 1 = 23. The answer is D.

Q9. Answer: (B)

1. 3 * 4 % 5 = 12 % 5 = 2.
2. 8 / 3 = 2 in integer division.
3. 7 + 2 - 2 = 7.
4. Shift is last: 7 << 1 = 14. The answer is B.

Q10. Answer: 25

1. 0xB7 in binary is 10110111.
2. Shifting right by 3 gives 10110, which is 22.
3. 0x0F is 01111, so 10110 ^ 01111 = 11001.
4. 11001 = 16 + 8 + 1 = 25.

Stacks, queues and basic data structures

In the pseudocode, for i = a to b runs i from a up to b, with b included.

Q1

A stack is empty at the start. The following operations are done in order: push 4, push 9, pop, push 6, push 2, pop. Which element is now on top of the stack?

(A) 2
(B) 4
(C) 6
(D) 9

Q2

A queue is empty at the start. The operations are: enqueue 5, enqueue 8, enqueue 3, dequeue, enqueue 7, dequeue. Which element is now at the front of the queue?

(A) 8
(B) 3
(C) 7
(D) 5

Q3

A stack is empty at the start. The operations are: push 10, push 20, push 30, push 40, pop, pop, push 50. What is the sum of all elements left in the stack?

Q4

How many times does the print statement run in this loop when n = 100?

```
for (i = 1; i <= n; i = i * 2)
  print(i);
```

(A) 7

(B) 6

(C) 5

(D) 8

Q5

A singly linked list holds 3, 8, 1, 6, 9 from head to tail. First, the node that comes right after the node holding 8 is deleted. Then a new node holding 4 is inserted right after the head node. What is the list from head to tail now?

(A) 4, 3, 8, 6, 9

(B) 3, 4, 8, 6, 9

(C) 3, 4, 8, 1, 9

(D) 3, 8, 4, 6, 9

Q6

The numbers 1, 2, 3, 4 are pushed onto a stack in that order. Then every element is popped from the stack, and each popped element is immediately enqueued into an empty queue. Then two dequeues are done. What does the second dequeue return?

(A) 1

(B) 2

(C) 4

(D) 3

Q7

What is the final value of count after this code runs? Both loop bounds are inclusive.

```
count = 0
for i = 1 to 6
  for j = i to 6
    count = count + 1
```

Q8

A singly linked list holds 2, 5, 7, 9 from head to tail. A new list starts empty. The first node of the old list is taken out and placed at the front of the new list. This is done three times. What does the new list hold from head to tail?

(A) 2, 5, 7

(B) 9, 7, 5, 2

(C) 7, 5, 2

(D) 5, 2, 7

Q9

How many times does work() run in this code when n = 32? Division is integer division.

```
for (i = n; i >= 1; i = i / 2)
  for (j = 1; j <= i; j++)
    work();
```

Q10

A postfix expression is evaluated with a stack. Each number is pushed. For an operator, the top two values are popped, the operator is applied with the lower value on the left, and the result is pushed. What is the final result for this expression?

```
6 2 3 + * 4 -
```

(A) -26

(B) 22

(C) 34

(D) 26

Answers and working: stacks, queues and basic data structures

Q1. Answer: (C)

1. After push 4 and push 9, the stack is 4, 9 with 9 on top.
2. Pop removes 9, so only 4 is left.
3. Push 6 and push 2 give 4, 6, 2 with 2 on top.
4. The last pop removes 2, so the top is 6.

Q2. Answer: (B)

1. After the three enqueues the queue is 5, 8, 3 from front to rear.
2. The first dequeue removes 5, leaving 8, 3.
3. Enqueue 7 gives 8, 3, 7.
4. The second dequeue removes 8, so the front is 3.

Q3. Answer: 80

1. After four pushes the stack is 10, 20, 30, 40.
2. Two pops remove 40 and then 30, leaving 10, 20.
3. Push 50 gives 10, 20, 50.
4. The sum is 10 + 20 + 50 = 80.

Q4. Answer: (A)

1. The value of i doubles each time: 1, 2, 4, 8, 16, 32, 64.
2. The next value is 128, which is more than 100, so the loop stops.
3. Each of the seven values gives one print.
4. The statement runs 7 times.

Q5. Answer: (B)

1. The node after 8 is the node holding 1, so deleting it gives 3, 8, 6, 9.
2. The head node holds 3.
3. Inserting 4 right after the head gives 3, 4, 8, 6, 9.

Q6. Answer: (D)

1. The stack has 4 on top, so the pops return 4, 3, 2, 1 in that order.
2. The queue therefore holds 4, 3, 2, 1 from front to rear.
3. The first dequeue returns 4.
4. The second dequeue returns 3.

Q7. Answer: 21

1. For i = 1, j runs from 1 to 6 (both included), so 6 times.
2. For i = 2 to 6 the inner loop runs 5, 4, 3, 2 and 1 times.
3. The total is 6 + 5 + 4 + 3 + 2 + 1.
4. So count = 21.

Q8. Answer: (C)

1. Move 2 to the front of the empty new list: 2.

2. Move 5 to the front: 5, 2.
3. Move 7 to the front: 7, 5, 2.
4. After three moves the new list is 7, 5, 2, and 9 is still in the old list.

Q9. Answer: 63

1. The outer loop takes i = 32, 16, 8, 4, 2, 1.
2. For each i, the inner loop runs i times.
3. The total is 32 + 16 + 8 + 4 + 2 + 1.
4. So work() runs 63 times.

Q10. Answer: (D)

1. Push 6, 2 and 3. The operator + pops 3 and 2 and pushes 5, so the stack is 6, 5.
2. The operator * pops 5 and 6 and pushes 30.
3. Push 4. The operator - pops 4 and then 30, and computes 30 - 4.
4. The final result is 26.

C language basics

In the pseudocode, for i = a to b runs i from a up to b, with b included.

Q1

Assume the code is inside main and stdio.h is included. What does this program print?

```
 int a = 5;
int b = a++;
printf("%d %d", a, b);
```

(A) 5 5
(B) 6 5
(C) 6 6
(D) 5 6

Q2

Assume the code is inside main and stdio.h is included. What does this program print?

```
 int x = 7;
printf("%d", ++x * 2);
```

(A) 14
(B) 15
(C) 16
(D) 18

Q3

Assume the code is inside main and stdio.h is included. What does this program print?

```
 int a = 17, b = 5;
printf("%d %d", a / b, a % b);
```

(A) 3 2

(B) 3.4 2

(C) 2 3

(D) 3 3

Q4

Assume the code is inside main and stdio.h is included. What does this program print?

```
 int a = 3, b = 8;
int *p = &a;
int *q = &b;
*p = *q - *p;
*q = *p + 1;
printf("%d %d", a, b);
```

(A) 3 8

(B) 5 6

(C) 5 9

(D) 6 6

Q5

Assume the code is inside main and stdio.h is included. What does this program print?

```
 int n = 255;
printf("%x", n);
```

(A) 255

(B) ff

(C) FF

(D) 0xff

Q6

Assume the code is inside main and stdio.h is included, and that the machine uses ASCII, where 'A' has the code 65. What does this program print?

```
 char c = 'A' + 3;
printf("%c %d", c, c);
```

(A) D 68

(B) D 3

(C) 68 D

(D) A 68

Q7

Assume the code is inside main and stdio.h is included. An unsigned char holds values from 0 to 255. What does this program print?

```
 unsigned char u = 250;
u = u + 10;
printf("%d", u);
```

(A) 260

(B) 4

(C) 10

(D) 0

Q8

Assume the code is inside main and stdio.h is included. What number does this program print?

```
 int s = 0;
for (int i = 0; i < 10; i += 3)
    s += i;
printf("%d", s);
```

Q9

Assume the code is inside main and stdio.h is included. What does this program print?

```
 int a = 2;
int b = a++ * 3;
int c = ++a * 3;
printf("%d %d %d", a, b, c);
```

(A) 4 6 12

(B) 3 6 12

(C) 4 9 12

(D) 4 6 9

Q10

Assume stdio.h is included. What number does this program print?

```
 void f(int *p, int *q) {
    int t = *p;
    *p = *q;
    *q = t + *q;
}

int main() {
    int x = 4, y = 9;
    f(&x, &y);
    printf("%d", x * y);
    return 0;
}
```

Answers and working: c language basics

Q1. Answer: (B)

1. a++ gives the old value of a first.
2. So b gets 5.
3. After that, a becomes 6.
4. The program prints 6 5, option B.

Q2. Answer: (C)

1. ++x increases x to 8 before it is used.
2. The value of ++x is therefore 8.
3. 8 * 2 = 16.
4. The program prints 16, option C.

Q3. Answer: (A)

1. Both operands are int, so a / b is integer division.
2. 17 / 5 = 3, the fractional part is dropped.
3. 17 % 5 is the remainder, which is 2.
4. The program prints 3 2, option A.

Q4. Answer: (B)

1. p points to a and q points to b.
2. *p = *q - *p means a = 8 - 3 = 5.
3. *q = *p + 1 means b = 5 + 1 = 6.
4. The program prints 5 6, option B.

Q5. Answer: (B)

1. The format %x prints an int in hexadecimal.
2. It uses lowercase letters and adds no 0x prefix.
3. 255 = 15 * 16 + 15, and 15 is f in hexadecimal.
4. The program prints ff, option B.

Q6. Answer: (A)

1. 'A' + 3 = 65 + 3 = 68.
2. So c holds the code 68.
3. %c prints the character with code 68, which is D.
4. %d prints the number 68, so the output is D 68, option A.

Q7. Answer: (B)

1. u + 10 is computed as the int 260.
2. Storing 260 in an unsigned char keeps the value modulo 256.
3. 260 - 256 = 4.
4. The program prints 4, option B.

Q8. Answer: 18

1. i takes the values 0, 3, 6, 9 and stops at 12.
2. The loop adds 0 + 3 + 6 + 9.
3. The sum is 18.
4. The program prints 18.

Q9. Answer: (A)

1. In the second line a++ uses 2, so b = 2 * 3 = 6, and then a becomes 3.
2. In the third line ++a makes a 4 first, so c = 4 * 3 = 12.
3. The final value of a is 4.
4. The program prints 4 6 12, option A.

Q10. Answer: 117

1. Inside f, p points to x and q points to y, and t = 4.
2. *p = *q sets x to 9.
3. *q = t + *q sets y to 4 + 9 = 13.
4. x *y = 9* 13 = 117.
5. The program prints 117.

FROM IAE ACADEMY

Preparing for GATE or placements?

IAE Academy teaches GATE in seven papers in Ballygunge, Kolkata, and online. Counselling is free: ask us about batches, fees or your preparation.

FREE COUNSELLING

Chat on WhatsApp

Call +91 84204 36524

Open every day, 10:30 am to 7:30 pm.

Scan to chat on WhatsApp

GATE COURSES

Classroom batches in Ballygunge and online batches. Fees and details are on the course pages.

Scan: courses

See the courses

FREE ON IAEACADEMY.IN

Notes and solved previous-year questions for every GATE subject, topic by topic.

Scan: study library

Open the study library

Found this useful? Send it to a friend preparing for placement tests.

Send to a friend on WhatsApp

IAE Academy free study material. Companies do not publish their test papers; these questions are ours. Prepared and published by IAE Academy, Kolkata. Free to read and free to share, unaltered and with attribution.

IAE ACADEMY INSTITUTE FOR ENGINEERS

GATE coaching in Kolkata since 2012 · EC, EE, IN, CS and IT, DA, BT and CE · in the classroom and online

227A Rash Behari Ave, Ballygunge, Kolkata 700019

+91 84204 36524 · iaeacademy.in · Updated 30 October 2026

Get directions