IBSAT Quantitative Aptitude

Sample Paper – 9

Duration: 26 Minutes **Maximum Marks: 30**

Instructions

- This paper contains **30** Multiple Choice Questions (Single Correct Answer), modelled on the Quantitative Aptitude section of **IBSAT** (ICFAI Business School Aptitude Test).
- Each correct answer carries **+1 mark**. There is **no negative marking** for incorrect or unattempted answers, so attempt every question.
- Only **one** option is correct. Choose the most appropriate answer.
- IBSAT is a computer-based test with no sectional time limit; attempt this practice paper in one timed sitting of about **26 minutes**.
- Use of mobile phones, calculators, log tables, or electronic gadgets is strictly prohibited.

Part A: Arithmetic

Q1. In an examination, 720 students appeared and 540 of them passed. What is the pass percentage?

(A) 70%

(B) 72%

(C) 75%

(D) 80%

Q2. A dishonest dealer sells goods at cost price but uses a weight of 800 grams in place of 1 kilogram. What is his profit percentage?

(A) 20%

(B) 25%

(C) 30%

(D) 40%

Q3. The ratio of a man's income to his expenditure is 9 : 7. What is the ratio of his savings to his income?

(A) 2 : 9

(B) 7 : 9

(C) 2 : 7

(D) 9 : 2

Q4. What is the average of all integers from 15 to 25 (both inclusive)?

(A) 18

(B) 19

(C) 21

(D) 20

Q5. Find the simple interest on Rs. 7200 at 5% per annum for 8 months.

(A) Rs. 200

(B) Rs. 240

(C) Rs. 288

(D) Rs. 300

Q6. Find the compound interest on Rs. 12000 at 5% per annum for 2 years, compounded annually.

(A) Rs. 1200

(B) Rs. 1250

(C) Rs. 1260

(D) Rs. 1230

Q7. The average age of the boys in a class is 15 years and that of the girls is 12 years. If the average age of the whole class is 14 years, in what ratio are the boys and the girls?

(A) 2 : 1

(B) 1 : 2

(C) 3 : 2

(D) 2 : 3

Q8. A and B invest Rs. 5000 and Rs. 7000 respectively in a business for the same period. If A's share of the profit is Rs. 1500, what is the total profit?

(A) Rs. 3000

(B) Rs. 3500

(C) Rs. 3600

(D) Rs. 4200

Q9. A shirt is marked at Rs. 1000 and sold after two successive discounts of 20% and 10%. What is its selling price?

(A) Rs. 700

(B) Rs. 720

(C) Rs. 750

(D) Rs. 680

Q10. A company's annual sales are Rs. 20000 and they grow at a fixed rate of 20% every year. What will the sales be after 2 years?

(A) Rs. 24000

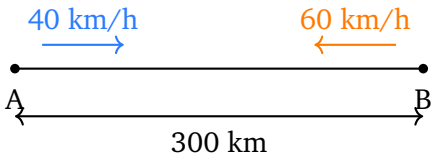
(B) Rs. 28000

(C) Rs. 29000

(D) Rs. 28800

Part B: Speed, Time and Work

Q11. Two cars start at the same time from towns A and B, which are 300 km apart, and move towards each other at 40 km/h and 60 km/h respectively. After how many hours will they meet?



(A) 2

(B) 2.5

(C) 3

(D) 3.5

Q12. A boat covers 24 km downstream in 2 hours and the same 24 km upstream in 3 hours. What is the speed of the boat in still water?

(A) 10 km/h

(B) 9 km/h

(C) 8 km/h

(D) 11 km/h

Q13. A can finish a piece of work in 10 days and B can finish the same work in 15 days. They work on alternate days, with A starting on the first day. In how many days is the work completed?

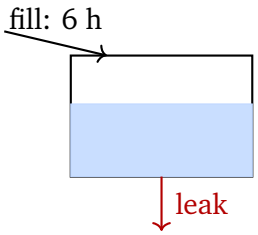
(A) 11

(B) 12

(C) 13

(D) 10

Q14. A pipe can fill a tank in 6 hours, but because of a leak at the bottom it actually takes 8 hours to fill. If the tank is full and the filling pipe is closed, how long will the leak alone take to empty it?



(A) 20 hours

(B) 18 hours

(C) 12 hours

(D) 24 hours

Part C: Number System

Q15. What is the remainder when 8642 is divided by 11?

(A) 7

(B) 4

(C) 9

(D) 3

Q16. Four bells toll at intervals of 6, 8, 12 and 18 seconds respectively. If they all toll together at a certain instant, after how many seconds will they next toll together?

(A) 48

(B) 36

(C) 72

(D) 144

Q17. What is the unit digit of 6^{47}?

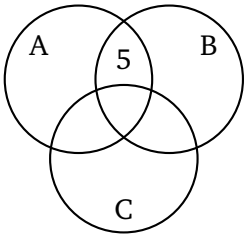
(A) 2

(B) 6

(C) 4

(D) 8

Q18. In a survey of 100 people, 40 read newspaper A, 35 read B and 30 read C. Also, 12 read both A and B, 8 read both A and C, 10 read both B and C, and 5 read all three. How many people read exactly one of the three newspapers?



(A) 55

(B) 65

(C) 50

(D) 60

Part D: Algebra

Q19. A shopkeeper blends two varieties of tea costing Rs. 180 and Rs. 240 per kilogram in the ratio 2 : 1. What is the cost price per kilogram of the mixture?

(A) Rs. 200

(B) Rs. 210

(C) Rs. 190

(D) Rs. 220

Q20. Solve the equation $x^2 - 9x + 20 = 0$. What is the larger of its two roots?

(A) 4

(B) 5

(C) 6

(D) 10

Q21. For the inequality $\frac{x}{2} + \frac{x}{3} < 10$, what is the greatest integer value of x that satisfies it?

(A) 10

(B) 12

(C) 9

(D) 11

Q22. What is the sum of all even numbers from 1 to 50 (both inclusive)?

(A) 600

(B) 625

(C) 650

(D) 700

Q23. In a geometric progression of positive terms, the third term is 18 and the fifth term is 162. What is the first term?

(A) 2

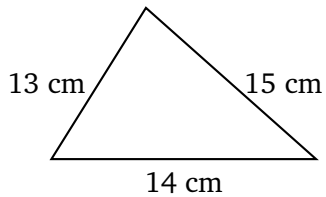
(B) 3

(C) 6

(D) 9

Part E: Geometry and Mensuration

Q24. Find the area of a triangle whose sides measure 13 cm, 14 cm and 15 cm.



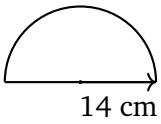
(A) 80 cm^2

(B) 84 cm^2

(C) 72 cm^2

(D) 90 cm^2

Q25. What is the area of a semicircle whose radius is 14 cm? (Take $\pi = \frac{22}{7}$.)



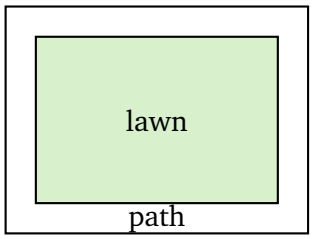
(A) 154 cm^2

(B) 616 cm^2

(C) 308 cm^2

(D) 300 cm^2

Q26. A rectangular lawn 20 m long and 15 m wide is surrounded on the outside by a uniform path 2 m wide. What is the area of the path?



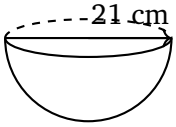
(A) 150 m^2

(B) 160 m^2

(C) 140 m^2

(D) 156 m^2

Q27. What is the volume of a solid hemisphere of radius 21 cm? (Take $\pi = \frac{22}{7}$.)



(A) 19404 cm^3

(B) 9702 cm^3

(C) 38808 cm^3

(D) 20000 cm^3

Part F: Permutation, Combination and Probability

Q28. In how many ways can the letters of the word "CHAIR" be arranged so that the two vowels A and I always come together?

(A) 24

(B) 48

(C) 60

(D) 120

Q29. In a lottery, a player must choose any 3 numbers out of the numbers 1 to 10. In how many different ways can this selection be made?

(A) 30

(B) 100

(C) 120

(D) 720

Q30. A number is chosen at random from the first 30 natural numbers. What is the probability that it is divisible by 5?

(A) $\frac{1}{6}$

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

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

(D) $\frac{1}{5}$

Detailed Solutions

Q1.

Solution

Concept — Percentage: The pass percentage is the number of students who passed written as a fraction of the number who appeared, multiplied by 100.

Step 1 — Write the fraction of students who passed:

$$\frac{\text{passed}}{\text{appeared}} = \frac{540}{720}.$$

Step 2 — Simplify the fraction:

$$\frac{540}{720} = \frac{3}{4}.$$

Step 3 — Convert to a percentage:

$$\frac{3}{4} \times 100 = 75\%.$$

Why other options are wrong:

- Option A: 70% uses 504 passed, not 540.
- Option B: 72% uses about 518 passed.
- Option D: 80% uses 576 passed.

Final Answer: Pass percentage $= \frac{540}{720} \times 100 = 75\% \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q1

Q2.

Solution

Concept — Dishonest Dealer: By giving less weight than charged, the dealer makes a profit; profit% $= \dfrac{\text{error in weight}}{\text{weight actually given}} \times 100$.

Step 1 — Find the shortfall in weight:

$$1000 - 800 = 200 \text{ grams}.$$

Step 2 — The dealer profits on the 200 g he does not give, over the 800 g he

does give:

$$\text{Profit\%} = \frac{200}{800} \times 100.$$

Step 3 — Simplify:

$$\frac{200}{800} \times 100 = \frac{1}{4} \times 100 = 25\%.$$

Why other options are wrong:

- Option A: 20% wrongly divides 200 by 1000 instead of 800.
- Option C: 30% does not match any correct base here.
- Option D: 40% uses a shortfall of 400 g, not 200 g.

Final Answer: Profit $= \frac{200}{800} \times 100 = 25\% \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q2

Q3.

Solution

Concept — Ratio: Savings = income − expenditure; keep the same number of parts to form the required ratio.

Step 1 — Take income and expenditure in parts:

$$\text{Income} = 9 \text{ parts}, \qquad \text{Expenditure} = 7 \text{ parts}.$$

Step 2 — Savings in the same parts:

$$\text{Savings} = 9 - 7 = 2 \text{ parts}.$$

Step 3 — Form the ratio of savings to income:

$$\text{Savings} : \text{Income} = 2 : 9.$$

Why other options are wrong:

- Option B: 7 : 9 is expenditure to income, not savings to income.
- Option C: 2 : 7 is savings to expenditure.
- Option D: 9 : 2 inverts the correct ratio.

Final Answer: Savings : Income $= 2 : 9 \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q3

Q4.

Solution

Concept — Average of Consecutive Integers: For a run of consecutive integers, the average equals the average of the first and last terms.

Step 1 — Identify the first and last terms:

$$\text{First} = 15, \qquad \text{Last} = 25.$$

Step 2 — Average of the two ends:

$$\frac{15 + 25}{2} = \frac{40}{2}.$$

Step 3 — Simplify:

$$\frac{40}{2} = 20.$$

Why other options are wrong:

- Option A: 18 is below the middle of the range.
- Option B: 19 sits one short of the true centre.
- Option C: 21 sits one above the true centre.

Final Answer: Average $= \frac{15+25}{2} = 20 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q4

Q5.

Solution

Concept — Simple Interest: SI $= \dfrac{P \times R \times T}{100}$, where the time T must be expressed in years.

Step 1 — Convert 8 months into years:

$$T = \frac{8}{12} = \frac{2}{3} \text{ year}.$$

Step 2 — Substitute into the formula:

$$\text{SI} = \frac{7200 \times 5 \times \frac{2}{3}}{100}.$$

Step 3 — Multiply the numerator:

$$7200 \times 5 = 36000, \qquad 36000 \times \frac{2}{3} = 24000.$$

Step 4 — Divide by 100:

$$\frac{24000}{100} = 240.$$

Why other options are wrong:

- Option A: Rs. 200 undercounts the period.
- Option C: Rs. 288 uses 9.6 months by mistake.
- Option D: Rs. 300 treats the time as 10 months.

Final Answer: Simple interest = Rs. 240 $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q5

Q6.

Solution

Concept — Compound Interest: Amount $= P\left(1 + \frac{R}{100}\right)^T$, and CI = Amount $- P$.

Step 1 — Write the growth factor:

$$1 + \frac{5}{100} = 1.05.$$

Step 2 — Raise it to the power 2:

$$(1.05)^2 = 1.1025.$$

Step 3 — Find the amount:

$$12000 \times 1.1025 = 13230.$$

Step 4 — Subtract the principal:

$$13230 - 12000 = 1230.$$

Why other options are wrong:

- Option A: Rs. 1200 is the simple interest, ignoring interest on interest.
- Option B: Rs. 1250 has no valid basis here.
- Option C: Rs. 1260 overstates the second-year interest.

Final Answer: Compound interest $= 13230 - 12000 =$ Rs. 1230 $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q6

Q7.

Solution

Concept — Alligation: When two groups are combined, the ratio of their sizes is the inverse ratio of the distances of their means from the overall mean.

Step 1 — List the three averages:

$$\text{Boys} = 15, \quad \text{Girls} = 12, \quad \text{Whole class} = 14.$$

Step 2 — Distance of each group mean from the overall mean:

$$\text{Boys side} = 14 - 12 = 2, \qquad \text{Girls side} = 15 - 14 = 1.$$

Step 3 — Ratio of boys to girls equals these distances (inverted):

$$\text{Boys} : \text{Girls} = 2 : 1.$$

Why other options are wrong:

- Option B: 1 : 2 would pull the class average below 13.5.
- Option C: 3 : 2 gives a class average above 14.
- Option D: 2 : 3 gives a class average of 13.2, not 14.

Final Answer: Boys : Girls $= 2 : 1 \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q7

Q8.

Solution

Concept — Partnership: With equal investment periods, profit is shared in the ratio of the capitals; a known share fixes the total.

Step 1 — Ratio of investments:

$$5000 : 7000 = 5 : 7.$$

Step 2 — Total number of parts:

$$5 + 7 = 12.$$

Step 3 — A's share is 5 parts, and this equals Rs. 1500, so one part is:

$$\frac{1500}{5} = 300.$$

Step 4 — Total profit is 12 parts:

$$12 \times 300 = 3600.$$

Why other options are wrong:

- Option A: Rs. 3000 uses 10 parts instead of 12.
- Option B: Rs. 3500 does not fit the 5 : 7 split.
- Option D: Rs. 4200 is B's-based total, treating 1500 as one part of 7.

Final Answer: Total profit $= 12 \times 300 =$ Rs. 3600 $\Rightarrow$ C

Answer: (C) Go Back to Q8

Q9.

Solution

Concept — Successive Discounts: Apply each discount one after the other as a multiplying factor on the running price.

Step 1 — Apply the first discount of 20%:

$$1000 \times (1 - 0.20) = 1000 \times 0.80 = 800.$$

Step 2 — Apply the second discount of 10% on Rs. 800:

$$800 \times (1 - 0.10) = 800 \times 0.90.$$

Step 3 — Compute the selling price:

$$800 \times 0.90 = 720.$$

Why other options are wrong:

- Option A: Rs. 700 wrongly adds the discounts to 30%.
- Option C: Rs. 750 applies only a single 25% discount.
- Option D: Rs. 680 overstates the total discount.

Final Answer: Selling price $= 1000 \times 0.8 \times 0.9 =$ Rs. 720 $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q9

Q10.

Solution

Concept — Fixed-Rate Growth: A quantity growing at a fixed yearly rate follows $P\left(1 + \dfrac{R}{100}\right)^{T}$.

Step 1 — Write the yearly growth factor:

$$1 + \frac{20}{100} = 1.2.$$

Step 2 — Apply it for 2 years:

$$20000 \times (1.2)^2 = 20000 \times 1.44.$$

Step 3 — Compute the product:

$$20000 \times 1.44 = 28800.$$

Why other options are wrong:

- Option A: Rs. 24000 adds only one year's 20% growth.
- Option B: Rs. 28000 adds a flat 40% without compounding.

- Option C: Rs. 29000 has no valid basis here.

Final Answer: Sales after 2 years $= 20000 \times 1.44 =$ Rs. 28800 $\Rightarrow$ D

Answer: (D) Go Back to Q10

Q11.

Solution

Concept — Relative Speed (approach): When two bodies move towards each other, their speeds add up; time to meet $= \dfrac{\text{distance apart}}{\text{sum of speeds}}$.

Step 1 — Add the two speeds:

$$40 + 60 = 100 \text{ km/h}.$$

Step 2 — Divide the distance by the combined speed:

$$\frac{300}{100}.$$

Step 3 — Compute the time:

$$\frac{300}{100} = 3 \text{ hours}.$$

Why other options are wrong:

- Option A: 2 hours uses a combined speed of 150 km/h.
- Option B: 2.5 hours uses 120 km/h.
- Option D: 3.5 hours uses a combined speed below 100 km/h.

Final Answer: They meet after $\frac{300}{100} = 3$ hours $\Rightarrow$ C

Answer: (C) Go Back to Q11

Q12.

Solution

Concept — Boats and Streams: Still-water speed $= \dfrac{\text{downstream speed} + \text{upstream speed}}{2}$.

Step 1 — Downstream speed from 24 km in 2 hours:

$$\frac{24}{2} = 12 \text{ km/h}.$$

Step 2 — Upstream speed from 24 km in 3 hours:

$$\frac{24}{3} = 8 \text{ km/h}.$$

Step 3 — Average the two speeds:

$$\frac{12+8}{2} = \frac{20}{2} = 10 \text{ km/h}.$$

Why other options are wrong:

- Option B: 9 km/h averages the two times instead of the speeds.
- Option C: 8 km/h is only the upstream speed.
- Option D: 11 km/h has no valid basis here.

Final Answer: Speed in still water $= \frac{12+8}{2} = 10$ km/h $\Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q12

Q13.

Solution

Concept — Alternate-Day Work: Add the work done over one full pair of days, then count how many pairs are needed to reach the whole job.

Step 1 — One-day work of each:

$$A = \frac{1}{10}, \qquad B = \frac{1}{15}.$$

Step 2 — Work done in one pair of days (A then B):

$$\frac{1}{10} + \frac{1}{15} = \frac{3}{30} + \frac{2}{30} = \frac{5}{30} = \frac{1}{6}.$$

Step 3 — Number of pairs to finish the whole work:

$$1 \div \frac{1}{6} = 6 \text{ pairs}.$$

Step 4 — Each pair is 2 days:

$$6 \times 2 = 12 \text{ days}.$$

Why other options are wrong:

- Option A: 11 days leaves $\frac{1}{15}$ of the work undone.
- Option C: 13 days exceeds the exact finishing point.
- Option D: 10 days completes only $\frac{5}{6}$ of the work.

Final Answer: The work is completed in 12 days $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q13

Q14.

Solution

Concept — Pipes with a Leak: The leak's emptying rate is the difference between the pipe's filling rate and the slower net filling rate observed with the leak.

Step 1 — Filling rate of the pipe:

$$\frac{1}{6} \text{ tank per hour}.$$

Step 2 — Net filling rate with the leak:

$$\frac{1}{8} \text{ tank per hour}.$$

Step 3 — Leak's emptying rate is the difference:

$$\frac{1}{6} - \frac{1}{8} = \frac{4}{24} - \frac{3}{24} = \frac{1}{24}.$$

Step 4 — Time for the leak to empty the full tank:

$$1 \div \frac{1}{24} = 24 \text{ hours}.$$

Why other options are wrong:

- Option A: 20 hours understates the leak's slowness.
- Option B: 18 hours uses the wrong difference of rates.

- Option C: 12 hours doubles the leak's true rate.

Final Answer: The leak empties the tank in 24 hours $\Rightarrow$ D

Answer: (D) Go Back to Q14

Q15.

Solution

Concept — Divisibility by 11: The remainder on division by 11 is found from the alternating sum of the digits, taken from the right.

Step 1 — Write the digits of 8642 with alternating signs from the right:

$$2 - 4 + 6 - 8.$$

Step 2 — Evaluate the alternating sum:

$$2 - 4 + 6 - 8 = -4.$$

Step 3 — Convert the negative result to a remainder between 0 and 10:

$$-4 + 11 = 7.$$

Step 4 — Check by direct division:

$$11 \times 785 = 8635, \qquad 8642 - 8635 = 7.$$

Why other options are wrong:

- Option B: 4 forgets to add 11 to the negative alternating sum.
- Option C: 9 comes from a sign error in the alternating sum.
- Option D: 3 does not match the division check.

Final Answer: The remainder is 7 $\Rightarrow$ A

Answer: (A) Go Back to Q15

Q16.

Solution

Concept — Bells and LCM: Bells that start together next coincide after a time equal to the LCM of their tolling intervals.

Step 1 — Prime-factorise each interval:

$$6 = 2 \cdot 3, \quad 8 = 2^3, \quad 12 = 2^2 \cdot 3, \quad 18 = 2 \cdot 3^2.$$

Step 2 — Take the highest power of each prime:

$$2^3 = 8, \qquad 3^2 = 9.$$

Step 3 — Multiply for the LCM:

$$8 \times 9 = 72.$$

Why other options are wrong:

- Option A: 48 is not a multiple of 18.
- Option B: 36 is not a multiple of 8.
- Option D: 144 is a common multiple but not the least one.

Final Answer: They next toll together after 72 seconds $\Rightarrow$ C

Answer: (C) Go Back to Q16

Q17.

Solution

Concept — Unit Digit of Powers of 6: Every positive power of 6 ends in the digit 6.

Step 1 — Look at the first few powers of 6:

$$6^1 = 6, \quad 6^2 = 36, \quad 6^3 = 216.$$

Step 2 — Note the pattern of unit digits:

$$6,\ 6,\ 6,\ \ldots \text{ (always 6)}.$$

Step 3 — Apply the pattern to the 47th power:

$$\text{Unit digit of } 6^{47} = 6.$$

Why other options are wrong:

- Option A: 2 never appears as a unit digit of a power of 6.
- Option C: 4 is the unit digit of certain powers of 2, not 6.
- Option D: 8 does not arise for powers of 6.

Final Answer: The unit digit of 6^{47} is 6 $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q17

Q18.

Solution

Concept — Three-Set Regions: People in exactly one set $= \sum n(\text{single}) - 2\sum n(\text{pairwise}) + 3\,n(\text{all three})$.

Step 1 — Sum of the single-set totals:

$$40 + 35 + 30 = 105.$$

Step 2 — Sum of the three pairwise overlaps:

$$12 + 8 + 10 = 30.$$

Step 3 — Apply the exactly-one formula:

$$105 - 2 \times 30 + 3 \times 5.$$

Step 4 — Simplify term by term:

$$105 - 60 + 15 = 60.$$

Why other options are wrong:

- Option A: 55 subtracts the triple region once too often.
- Option B: 65 adds the triple term with the wrong sign.
- Option C: 50 removes the pairwise overlaps only once each.

Final Answer: People reading exactly one newspaper $= 60 \Rightarrow$ D

Answer: (D) Go Back to Q18

Q19.

Solution

Concept — Weighted Blend: The cost of a mixture is the weighted average of the component costs, weighted by their quantity ratio.

Step 1 — Take the quantities as 2 parts and 1 part:

$$\text{Tea } 1 = 2 \text{ kg at Rs. } 180, \qquad \text{Tea } 2 = 1 \text{ kg at Rs. } 240.$$

Step 2 — Total cost of the blend:

$$2 \times 180 + 1 \times 240 = 360 + 240 = 600.$$

Step 3 — Divide by the total quantity (3 kg):

$$\frac{600}{3} = 200.$$

Why other options are wrong:

- Option B: Rs. 210 is the simple average of 180 and 240, ignoring the $2:1$ weighting.
- Option C: Rs. 190 under-weights the costlier tea.
- Option D: Rs. 220 over-weights the costlier tea.

Final Answer: Cost of the mixture $= \frac{600}{3} =$ Rs. 200 per kg $\Rightarrow$ A

Answer: (A) Go Back to Q19

Q20.

Solution

Concept — Factorising a Quadratic: Split the middle term into two numbers whose sum is the coefficient of x and whose product is the constant term.

Step 1 — Find two numbers with sum -9 and product 20:

$$-4 \text{ and } -5, \text{ since } (-4) + (-5) = -9, \ (-4)(-5) = 20.$$

Step 2 — Write the factorised form:

$$x^2 - 9x + 20 = (x - 4)(x - 5).$$

Step 3 — Set each factor to zero:

$$x - 4 = 0 \Rightarrow x = 4, \qquad x - 5 = 0 \Rightarrow x = 5.$$

Step 4 — Pick the larger root:

$$\max(4, 5) = 5.$$

Why other options are wrong:

- Option A: 4 is the smaller root.
- Option C: 6 is not a root of this equation.
- Option D: 10 is the product of the roots, not a root.

Final Answer: The larger root is 5 $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q20

Q21.

Solution

Concept — Inequality with Fractions: Combine the fractional terms, solve for x, then read off the greatest integer allowed.

Step 1 — Add the two fractions on the left:

$$\frac{x}{2} + \frac{x}{3} = \frac{3x}{6} + \frac{2x}{6} = \frac{5x}{6}.$$

Step 2 — Rewrite the inequality:

$$\frac{5x}{6} < 10.$$

Step 3 — Multiply both sides by 6:

$$5x < 60.$$

Step 4 — Divide by 5:

$$x < 12.$$

Step 5 — The greatest integer strictly below 12:

$$x = 11.$$

Why other options are wrong:

- Option A: 10 is allowed but not the greatest such integer.
- Option B: 12 makes the left side equal to 10, not less than 10.
- Option C: 9 is smaller than the true maximum.

Final Answer: The greatest integer value is 11 $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q21

Q22.

Solution

Concept — Sum of an AP: The even numbers form an arithmetic progression; their sum $= \frac{n}{2}(\text{first} + \text{last})$, where n is the count.

Step 1 — Identify the even numbers from 1 to 50:

$$2,\ 4,\ 6,\ \ldots,\ 50.$$

Step 2 — Count how many there are:

$$n = \frac{50}{2} = 25.$$

Step 3 — Apply the sum formula:

$$S = \frac{25}{2}\,(2 + 50) = \frac{25}{2} \times 52.$$

Step 4 — Simplify:

$$\frac{25}{2} \times 52 = 25 \times 26 = 650.$$

Why other options are wrong:

- Option A: 600 omits the last term 50.

- Option B: 625 uses 25 terms of average 25 by mistake.
- Option D: 700 counts an extra even number.

Final Answer: Sum of even numbers $= 25 \times 26 = 650 \Rightarrow$ C

Answer: (C) Go Back to Q22

Q23.

Solution

Concept — Terms of a GP: The nth term is $a\,r^{n-1}$; dividing two given terms removes a and gives the common ratio.

Step 1 — Write the third and fifth terms:

$$ar^2 = 18, \qquad ar^4 = 162.$$

Step 2 — Divide the fifth term by the third:

$$\frac{ar^4}{ar^2} = \frac{162}{18} \;\Rightarrow\; r^2 = 9.$$

Step 3 — Take the positive root (terms are positive):

$$r = 3.$$

Step 4 — Substitute back to find a:

$$a \times 3^2 = 18 \;\Rightarrow\; 9a = 18 \;\Rightarrow\; a = 2.$$

Why other options are wrong:

- Option B: 3 is the common ratio, not the first term.
- Option C: 6 is the second term of the progression.
- Option D: 9 uses $r = 2$ by mistake.

Final Answer: The first term is $a = 2 \Rightarrow$ A

Answer: (A) Go Back to Q23

Q24.

Solution

Concept — Heron's Formula: Area $= \sqrt{s(s-a)(s-b)(s-c)}$, where s is the semi-perimeter $\frac{a+b+c}{2}$.

Step 1 — Find the semi-perimeter:

$$s = \frac{13+14+15}{2} = \frac{42}{2} = 21.$$

Step 2 — Compute the three differences:

$$s-a = 21-13 = 8, \quad s-b = 21-14 = 7, \quad s-c = 21-15 = 6.$$

Step 3 — Multiply inside the root:

$$21 \times 8 \times 7 \times 6 = 7056.$$

Step 4 — Take the square root:

$$\sqrt{7056} = 84 \text{ cm}^2.$$

Why other options are wrong:

- Option A: 80 cm^2 does not match $\sqrt{7056}$.
- Option C: 72 cm^2 underestimates the product under the root.
- Option D: 90 cm^2 overestimates the area.

Final Answer: Area $= \sqrt{7056} = 84 \text{ cm}^2 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q24

Q25.

Solution

Concept — Area of a Semicircle: A semicircle is half a full circle, so its area $= \frac{1}{2}\pi r^2$.

Step 1 — Square the radius:

$$14^2 = 196.$$

Step 2 — Multiply by $\pi = \frac{22}{7}$:

$$\frac{22}{7} \times 196 = 22 \times 28 = 616.$$

Step 3 — Take half for the semicircle:

$$\frac{616}{2} = 308 \text{ cm}^2.$$

Why other options are wrong:

- Option A: 154 cm^2 uses radius 7, not 14.
- Option B: 616 cm^2 is the full circle's area, not the half.
- Option D: 300 cm^2 rounds the result incorrectly.

Final Answer: Area $= \frac{1}{2} \times 616 = 308 \text{ cm}^2 \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q25

Q26.

Solution

Concept — Area of a Border: The path's area equals the outer rectangle's area minus the inner lawn's area.

Step 1 — Outer dimensions include the 2 m path on both sides:

$$\text{Length} = 20 + 2 \times 2 = 24, \qquad \text{Width} = 15 + 2 \times 2 = 19.$$

Step 2 — Area of the outer rectangle:

$$24 \times 19 = 456.$$

Step 3 — Area of the inner lawn:

$$20 \times 15 = 300.$$

Step 4 — Subtract to get the path area:

$$456 - 300 = 156 \text{ m}^2.$$

Why other options are wrong:

- Option A: 150 m^2 adds only one width of path to each side.
- Option B: 160 m^2 overstates the outer area.
- Option C: 140 m^2 understates the outer dimensions.

Final Answer: Area of the path $= 456 - 300 = 156$ $m^2 \Rightarrow \boxed{D}$

Answer: (D) Go Back to Q26

Q27.

Solution

Concept — Volume of a Hemisphere: A hemisphere is half a sphere, so its volume $= \frac{2}{3}\pi r^3$.

Step 1 — Cube the radius:

$$21^3 = 21 \times 21 \times 21 = 9261.$$

Step 2 — Multiply by $\pi = \frac{22}{7}$:

$$\frac{22}{7} \times 9261 = 22 \times 1323 = 29106.$$

Step 3 — Multiply by $\frac{2}{3}$:

$$\frac{2}{3} \times 29106 = 2 \times 9702 = 19404 \text{ cm}^3.$$

Why other options are wrong:

- Option B: 9702 cm^3 multiplies by $\frac{1}{3}$ instead of $\frac{2}{3}$.
- Option C: 38808 cm^3 uses the full-sphere factor $\frac{4}{3}$.
- Option D: 20000 cm^3 is only a rough estimate.

Final Answer: Volume $= \frac{2}{3} \times \frac{22}{7} \times 9261 = 19404$ $cm^3 \Rightarrow \boxed{A}$

Answer: (A) Go Back to Q27

Q28.

Solution

Concept — Permutation with a Restriction: When certain letters must stay together, treat them as one block, arrange the blocks, then arrange within the block.

Step 1 — Tie the two vowels A and I into a single block:

$$[\text{AI}],\ \text{C},\ \text{H},\ \text{R} \ \Rightarrow\ 4 \text{ units to arrange.}$$

Step 2 — Arrange the 4 units:

$$4! = 24.$$

Step 3 — Arrange the two vowels inside their block:

$$2! = 2.$$

Step 4 — Multiply the two counts:

$$24 \times 2 = 48.$$

Why other options are wrong:

- Option A: 24 forgets to arrange the vowels within the block.
- Option C: 60 has no valid basis here.
- Option D: 120 is the total arrangements with no restriction $(5!)$.

Final Answer: Number of arrangements $= 4! \times 2! = 48 \Rightarrow$ B

Answer: (B) Go Back to Q28

Q29.

Solution

Concept — Combinations: Choosing numbers where order does not matter uses $\binom{n}{r} = \dfrac{n!}{r!\,(n-r)!}$.

Step 1 — Substitute $n = 10$, $r = 3$:

$$\binom{10}{3} = \frac{10!}{3!\,7!}.$$

Step 2 — Cancel and write the short form:

$$\frac{10 \times 9 \times 8}{3 \times 2 \times 1}.$$

Step 3 — Multiply the numerator and the denominator:

$$\frac{720}{6}.$$

Step 4 — Divide:

$$\frac{720}{6} = 120.$$

Why other options are wrong:

- Option A: 30 divides by too large a factor.
- Option B: 100 has no valid basis here.
- Option D: 720 counts ordered selections (permutations), not combinations.

Final Answer: Number of selections $= \binom{10}{3} = 120 \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q29

Q30.

Solution

Concept — Probability: Probability $= \dfrac{\text{favourable outcomes}}{\text{total outcomes}}$ for equally likely results.

Step 1 — Total outcomes (numbers 1 to 30):

$$30 \text{ numbers.}$$

Step 2 — List the numbers divisible by 5:

$$5,\ 10,\ 15,\ 20,\ 25,\ 30 \ \Rightarrow\ 6 \text{ numbers.}$$

Step 3 — Form and simplify the ratio:

$$\frac{6}{30} = \frac{1}{5}.$$

Why other options are wrong:

- Option A: $\frac{1}{6}$ counts only five favourable numbers.
- Option B: $\frac{1}{3}$ counts ten favourable numbers.
- Option C: $\frac{2}{5}$ counts twelve favourable numbers.

Final Answer: $P(\text{divisible by } 5) = \frac{6}{30} = \frac{1}{5} \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q30

Answer Key

IBSAT Quantitative Aptitude – Sample Paper 9									
Q	**Ans**	**Q**	**Ans**	**Q**	**Ans**	**Q**	**Ans**	**Q**	**Ans**
1	C	2	B	3	A	4	D	5	B
6	D	7	A	8	C	9	B	10	D
11	C	12	A	13	B	14	D	15	A
16	C	17	B	18	D	19	A	20	B
21	D	22	C	23	A	24	B	25	C
26	D	27	A	28	B	29	C	30	D