

# IBSAT Quantitative Aptitude

## Sample Paper – 6

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.** Fresh grapes contain 80% water by weight, while dried grapes contain 20% water. How many kilograms of dried grapes can be obtained from 100 kg of fresh grapes?
- (A) 20 kg  
(B) 30 kg  
(C) 25 kg  
(D) 40 kg
- Q2.** A trader buys an article for Rs. 680 and wants a profit of 25% after allowing a discount of 15% on the marked price. What should the marked price be?
- (A) Rs. 1000



- (B) Rs. 950
- (C) Rs. 900
- (D) Rs. 1020

**Q3.** Two numbers are in the ratio 3 : 4. When 6 is added to each of them, the ratio becomes 5 : 6. What is the larger of the two original numbers?

- (A) 9
- (B) 15
- (C) 18
- (D) 12

**Q4.** A cyclist covers a certain distance at 40 km/h and returns over the same distance at 60 km/h. What is the average speed for the whole journey?

- (A) 50 km/h
- (B) 48 km/h
- (C) 45 km/h
- (D) 52 km/h

**Q5.** Find the amount (principal plus interest) on Rs. 6000 at 5% per annum simple interest for 4 years.

- (A) Rs. 7200
- (B) Rs. 7000
- (C) Rs. 7500
- (D) Rs. 6800

**Q6.** A sum of Rs. 5000 amounts to Rs. 6050 in 2 years under compound interest, compounded annually. What is the annual rate of interest?

- (A) 8%
- (B) 12%
- (C) 5%



(D) 10%

**Q7.** A person invests Rs. 2000 that returns 10% and Rs. 3000 that returns 20% in a year. What is the average rate of return on the total investment?

(A) 15%

(B) 14%

(C) 16%

(D) 18%

**Q8.** A invests Rs. 9000 and B invests Rs. 15000 in a business for the same period. In what ratio should the profit be divided between A and B?

(A) 3 : 5

(B) 5 : 3

(C) 3 : 8

(D) 9 : 5

**Q9.** The length of a rectangle is increased by 10% and its breadth is increased by 20%. What is the percentage change in its area?

(A) 30% increase

(B) 32% increase

(C) 33% increase

(D) 20% increase

**Q10.** An investment of Rs. 20000 appreciates at 10% per year. What will its value be after 2 years?

(A) Rs. 24000

(B) Rs. 22000

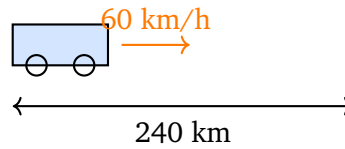
(C) Rs. 24200

(D) Rs. 25000



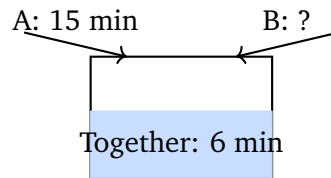
**Part B: Speed, Time and Work**

**Q11.** A car travels a distance of 240 km at a steady speed of 60 km/h. How many hours does the journey take?



- (A) 4  
(B) 5  
(C) 3  
(D) 6
- Q12.** The speed of a boat in still water is 12 km/h and the speed of the stream is 3 km/h. What distance will the boat cover downstream in 2 hours?
- (A) 24 km  
(B) 18 km  
(C) 36 km  
(D) 30 km
- Q13.** If 15 men can complete a piece of work in 20 days, how many days will 25 men take to complete the same work?
- (A) 10  
(B) 12  
(C) 15  
(D) 18
- Q14.** Pipe A alone can fill a tank in 15 minutes. When pipe A and pipe B are opened together they fill the tank in 6 minutes. How long would pipe B alone take to fill the tank?





- (A) 10 minutes
- (B) 12 minutes
- (C) 9 minutes
- (D) 20 minutes

### Part C: Number System

**Q15.** What are the last two digits of  $2^{10}$ ?

- (A) 12
- (B) 48
- (C) 24
- (D) 32

**Q16.** The product of two numbers is 2028 and their HCF is 13. What is their LCM?

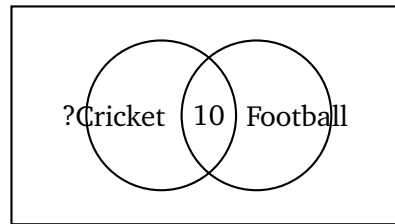
- (A) 150
- (B) 156
- (C) 169
- (D) 144

**Q17.** What is the unit digit of  $4^{15}$ ?

- (A) 6
- (B) 2
- (C) 8
- (D) 4



- Q18.** In a group of 40 students, 25 play cricket, 20 play football, and 10 play both games. How many students play only cricket?



- (A) 15
- (B) 10
- (C) 20
- (D) 5

### Part D: Algebra

- Q19.** A father is at present three times as old as his son. In 12 years, the father will be twice as old as his son. What is the son's present age?

- (A) 10 years
- (B) 8 years
- (C) 12 years
- (D) 15 years

- Q20.** For the quadratic equation  $x^2 - 5x + 6 = 0$ , what is the sum of the squares of its roots?

- (A) 12
- (B) 13
- (C) 25
- (D) 11

- Q21.** Find the range of  $x$  that satisfies the inequality  $3 < 2x + 1 \leq 9$ .

- (A)  $1 < x \leq 4$
- (B)  $1 \leq x < 4$



(C)  $2 < x \leq 4$

(D)  $1 < x \leq 5$

**Q22.** In an arithmetic progression, the first term is 7 and the common difference is 4. What is the 10th term?

(A) 40

(B) 47

(C) 39

(D) 43

**Q23.** What is the sum of the first five terms of the geometric progression 3, 6, 12, ...?

(A) 90

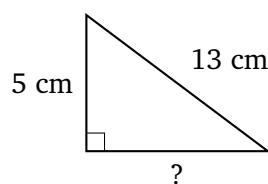
(B) 96

(C) 93

(D) 48

### Part E: Geometry and Mensuration

**Q24.** In the right-angled triangle shown, the hypotenuse is 13 cm and one leg is 5 cm. What is the length of the other leg?



(A) 10 cm

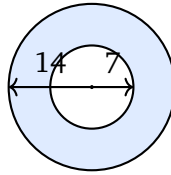
(B) 12 cm

(C) 8 cm

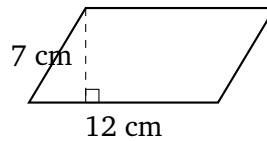
(D) 11 cm



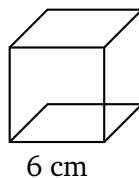
- Q25.** Two circles are concentric. The outer circle has radius 14 cm and the inner circle has radius 7 cm. What is the area of the ring between them? (Take  $\pi = \frac{22}{7}$ .)



- (A)  $450 \text{ cm}^2$   
(B)  $154 \text{ cm}^2$   
(C)  $616 \text{ cm}^2$   
(D)  $462 \text{ cm}^2$
- Q26.** A parallelogram has a base of 12 cm and a corresponding height of 7 cm. What is its area?



- (A)  $80 \text{ cm}^2$   
(B)  $96 \text{ cm}^2$   
(C)  $84 \text{ cm}^2$   
(D)  $72 \text{ cm}^2$
- Q27.** What is the total surface area of a cube whose edge measures 6 cm?



- (A)  $216 \text{ cm}^2$   
(B)  $200 \text{ cm}^2$   
(C)  $180 \text{ cm}^2$



(D)  $150 \text{ cm}^2$

**Part F: Permutation, Combination and Probability**

- Q28.** How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 if no digit is repeated?
- (A) 120  
(B) 60  
(C) 125  
(D) 20
- Q29.** In how many ways can a team of 3 players be selected from a squad of 8 players?
- (A) 336  
(B) 24  
(C) 56  
(D) 28
- Q30.** Two fair coins are tossed together once. What is the probability of getting at least one head?
- (A)  $\frac{1}{2}$   
(B)  $\frac{1}{4}$   
(C)  $\frac{2}{3}$   
(D)  $\frac{3}{4}$



## Detailed Solutions

**Q1.**

### Solution

**Concept — Percentage (Drying):** The pulp (non-water) content stays the same before and after drying; only the water content changes.

**Step 1 — Pulp in the fresh grapes:**

$$\text{Fresh water} = 80\%, \text{ so pulp} = 100\% - 80\% = 20\%.$$

**Step 2 — Weight of the pulp:**

$$20\% \text{ of } 100 = \frac{20}{100} \times 100 = 20 \text{ kg.}$$

**Step 3 — In dried grapes pulp is**  $100\% - 20\% = 80\%$ :

$$80\% \text{ of (dry weight)} = 20 \text{ kg.}$$

**Step 4 — Solve for the dry weight:**

$$\text{Dry weight} = \frac{20}{0.80} = 25 \text{ kg.}$$

**Why other options are wrong:**

- Option A: 20 kg is only the pulp weight, ignoring the 20% water still present.
- Option B: 30 kg overstates the retained water.
- Option D: 40 kg keeps half the water instead of matching the 20% figure.

**Final Answer:** Dried grapes =  $\frac{20}{0.8} = 25 \text{ kg} \Rightarrow \boxed{\text{C}}$

**Answer: (C)** [Go Back to Q1](#)

**Q2.**

### Solution

**Concept — Marked Price:** Selling price = cost  $\times \left(1 + \frac{\text{profit}\%}{100}\right)$  and selling price = marked price  $\times \left(1 - \frac{\text{discount}\%}{100}\right)$ .



**Step 1 — Required selling price from the profit:**

$$SP = 680 \times \left(1 + \frac{25}{100}\right) = 680 \times 1.25 = 850.$$

**Step 2 — Relate selling price to marked price:**

$$850 = MP \times \left(1 - \frac{15}{100}\right) = MP \times 0.85.$$

**Step 3 — Solve for the marked price:**

$$MP = \frac{850}{0.85} = 1000.$$

**Why other options are wrong:**

- Option B: Rs. 950 applies the discount to the cost price instead of the marked price.
- Option C: Rs. 900 ignores part of the profit requirement.
- Option D: Rs. 1020 uses a smaller discount than 15%.

**Final Answer:** Marked price =  $\frac{850}{0.85} = \text{Rs. } 1000 \Rightarrow \boxed{\text{A}}$

**Answer: (A)** [Go Back to Q2](#)

**Q3.**

### Solution

**Concept — Ratio Change:** Write the numbers as multiples of a common factor and use the new ratio to form an equation.

**Step 1 — Let the numbers be  $3k$  and  $4k$ :**

$$\frac{3k + 6}{4k + 6} = \frac{5}{6}.$$

**Step 2 — Cross-multiply:**

$$6(3k + 6) = 5(4k + 6).$$

**Step 3 — Expand both sides:**

$$18k + 36 = 20k + 30.$$



**Step 4 — Solve for  $k$ :**

$$36 - 30 = 20k - 18k \Rightarrow 6 = 2k \Rightarrow k = 3.$$

**Step 5 — Larger number is  $4k$ :**

$$4 \times 3 = 12.$$

**Why other options are wrong:**

- Option A: 9 is the smaller number  $3k$ , not the larger.
- Option B: 15 does not satisfy the new ratio.
- Option C: 18 uses  $k = 4.5$ , which fails the check.

**Final Answer:** The larger original number is  $4k = 12 \Rightarrow$  D

Answer: (D) [Go Back to Q3](#)

**Q4.**

### Solution

**Concept — Average Speed:** For two equal distances at speeds  $u$  and  $v$ , the average speed is the harmonic mean  $\frac{2uv}{u+v}$ .

**Step 1 — Write the two speeds:**

$$u = 40, \quad v = 60.$$

**Step 2 — Substitute in the formula:**

$$\text{Average} = \frac{2 \times 40 \times 60}{40 + 60}.$$

**Step 3 — Simplify numerator and denominator:**

$$\frac{4800}{100} = 48 \text{ km/h.}$$

**Why other options are wrong:**

- Option A: 50 km/h is the plain arithmetic mean, which is wrong for equal distances.



- Option C: 45 km/h has no valid basis here.
- Option D: 52 km/h overstates the average.

**Final Answer:** Average speed =  $\frac{2 \times 40 \times 60}{100} = 48$  km/h  $\Rightarrow$  **B**

**Answer: (B)** [Go Back to Q4](#)

**Q5.**

### Solution

**Concept — Simple Interest & Amount:**  $SI = \frac{P \times R \times T}{100}$  and Amount =  $P + SI$ .

**Step 1 — Compute the simple interest:**

$$SI = \frac{6000 \times 5 \times 4}{100}.$$

**Step 2 — Multiply the numerator:**

$$6000 \times 5 = 30000, \quad 30000 \times 4 = 120000.$$

**Step 3 — Divide by 100:**

$$\frac{120000}{100} = 1200.$$

**Step 4 — Add the principal:**

$$\text{Amount} = 6000 + 1200 = 7200.$$

**Why other options are wrong:**

- Option B: Rs. 7000 uses a smaller time or rate.
- Option C: Rs. 7500 overstates the interest.
- Option D: Rs. 6800 forgets a full year of interest.

**Final Answer:** Amount =  $6000 + 1200 = \text{Rs. } 7200 \Rightarrow$  **A**

**Answer: (A)** [Go Back to Q5](#)



Q6.

**Solution**

**Concept — Compound Interest (Rate):** Amount =  $P \left(1 + \frac{R}{100}\right)^T$ ; solve for  $R$  using the growth factor.

**Step 1 — Form the growth factor:**

$$\left(1 + \frac{R}{100}\right)^2 = \frac{6050}{5000} = 1.21.$$

**Step 2 — Take the square root of both sides:**

$$1 + \frac{R}{100} = \sqrt{1.21} = 1.1.$$

**Step 3 — Solve for  $R$ :**

$$\frac{R}{100} = 0.1 \Rightarrow R = 10\%.$$

**Why other options are wrong:**

- Option A: 8% gives an amount of Rs. 5832, not Rs. 6050.
- Option B: 12% gives Rs. 6272, which is too high.
- Option C: 5% gives only Rs. 5512.50.

**Final Answer:**  $\sqrt{1.21} = 1.1$ , so the rate is 10%  $\Rightarrow$  **D**

**Answer: (D)** [Go Back to Q6](#)

Q7.

**Solution**

**Concept — Average Return:** The average rate equals the total return divided by the total amount invested, expressed as a percentage.

**Step 1 — Return on the first investment:**

$$10\% \text{ of } 2000 = \frac{10}{100} \times 2000 = 200.$$

**Step 2 — Return on the second investment:**

$$20\% \text{ of } 3000 = \frac{20}{100} \times 3000 = 600.$$



**Step 3 — Total return and total investment:**

$$\text{Return} = 200 + 600 = 800, \quad \text{Invested} = 2000 + 3000 = 5000.$$

**Step 4 — Average rate of return:**

$$\frac{800}{5000} \times 100 = 16\%.$$

**Why other options are wrong:**

- Option A: 15% is the plain average of 10% and 20%, which ignores the unequal amounts.
- Option B: 14% understates the weight of the larger investment.
- Option D: 18% overstates the return.

**Final Answer:** Average return =  $\frac{800}{5000} \times 100 = 16\% \Rightarrow \boxed{\text{C}}$

**Answer: (C)** [Go Back to Q7](#)

**Q8.**

**Solution**

**Concept — Partnership:** With capitals invested for the same period, profit is shared in the ratio of the capitals, reduced to lowest terms.

**Step 1 — Write the ratio of investments:**

$$9000 : 15000.$$

**Step 2 — Divide both by the common factor 3000:**

$$\frac{9000}{3000} : \frac{15000}{3000} = 3 : 5.$$

**Why other options are wrong:**

- Option B: 5 : 3 reverses A's and B's shares.
- Option C: 3 : 8 uses the total instead of B's capital.
- Option D: 9 : 5 fails to reduce the ratio correctly.

**Final Answer:** Profit ratio =  $9000 : 15000 = 3 : 5 \Rightarrow \boxed{\text{A}}$

**Answer: (A)** [Go Back to Q8](#)



Q9.

**Solution**

**Concept — Percentage Change in Area:** Multiply the two dimension factors; the area factor gives the overall percentage change.

**Step 1 — Write each dimension factor:**

$$\text{Length} = 1 + \frac{10}{100} = 1.10, \quad \text{Breadth} = 1 + \frac{20}{100} = 1.20.$$

**Step 2 — Multiply the factors for the new area:**

$$1.10 \times 1.20 = 1.32.$$

**Step 3 — Convert to a percentage change:**

$$1.32 - 1 = 0.32 \Rightarrow 32\% \text{ increase.}$$

**Why other options are wrong:**

- Option A: 30% simply adds the two percentages, missing the product term.
- Option C: 33% has no valid basis here.
- Option D: 20% counts only the breadth increase.

**Final Answer:** New area factor = 1.32, so a 32% increase  $\Rightarrow$  **B**

**Answer: (B)** [Go Back to Q9](#)

Q10.

**Solution**

**Concept — Appreciation:** A value rising at a fixed rate each year follows

$$P \left( 1 + \frac{R}{100} \right)^T.$$

**Step 1 — Write the yearly growth factor:**

$$1 + \frac{10}{100} = 1.1.$$

**Step 2 — Raise it to the power of 2 years:**

$$(1.1)^2 = 1.21.$$



**Step 3 — Multiply by the initial value:**

$$20000 \times 1.21 = 24200.$$

**Why other options are wrong:**

- Option A: Rs. 24000 adds a flat 20% without compounding.
- Option B: Rs. 22000 counts only one year of growth.
- Option D: Rs. 25000 overstates the appreciation.

**Final Answer:** Value =  $20000 \times 1.21 = \text{Rs. } 24200 \Rightarrow \boxed{\text{C}}$

**Answer: (C)** [Go Back to Q10](#)

**Q11.**

### Solution

**Concept — Time, Speed and Distance:**  $\text{Time} = \frac{\text{distance}}{\text{speed}}$ .

**Step 1 — Write the distance and speed:**

$$\text{Distance} = 240 \text{ km}, \quad \text{Speed} = 60 \text{ km/h.}$$

**Step 2 — Divide distance by speed:**

$$\text{Time} = \frac{240}{60}.$$

**Step 3 — Simplify:**

$$\frac{240}{60} = 4 \text{ hours.}$$

**Why other options are wrong:**

- Option B: 5 hours uses a speed of 48 km/h.
- Option C: 3 hours uses a speed of 80 km/h.
- Option D: 6 hours uses a speed of 40 km/h.

**Final Answer:** Time =  $\frac{240}{60} = 4 \text{ hours} \Rightarrow \boxed{\text{A}}$

**Answer: (A)** [Go Back to Q11](#)



Q12.

**Solution**

**Concept — Boats and Streams:** Downstream speed = boat speed + stream speed, and distance = speed  $\times$  time.

**Step 1 — Find the downstream speed:**

$$12 + 3 = 15 \text{ km/h.}$$

**Step 2 — Multiply by the time:**

$$\text{Distance} = 15 \times 2.$$

**Step 3 — Compute:**

$$15 \times 2 = 30 \text{ km.}$$

**Why other options are wrong:**

- Option A: 24 km uses the still-water speed of 12 km/h.
- Option B: 18 km uses the upstream speed of 9 km/h.
- Option C: 36 km uses a downstream speed of 18 km/h.

**Final Answer:** Distance =  $15 \times 2 = 30 \text{ km} \Rightarrow \boxed{\text{D}}$

**Answer: (D)** [Go Back to Q12](#)

Q13.

**Solution**

**Concept — Men and Days:** The total work in man-days is constant, so  $M_1 \times D_1 = M_2 \times D_2$ .

**Step 1 — Total work in man-days:**

$$15 \times 20 = 300.$$

**Step 2 — Set up the equation for 25 men:**

$$25 \times D = 300.$$



**Step 3 — Solve for the number of days:**

$$D = \frac{300}{25} = 12.$$

**Why other options are wrong:**

- Option A: 10 days would need 30 men.
- Option C: 15 days keeps only 20 men on the job.
- Option D: 18 days is slower than the original crew, which is impossible with more men.

**Final Answer:** Days =  $\frac{300}{25} = 12 \Rightarrow$  **B**

**Answer: (B)** [Go Back to Q13](#)

**Q14.**

### Solution

**Concept — Pipes and Cisterns:** Combined rate = sum of individual rates, so pipe B's rate = combined rate – pipe A's rate.

**Step 1 — Write the known per-minute rates:**

$$\text{Together} = \frac{1}{6}, \quad A = \frac{1}{15}.$$

**Step 2 — Pipe B's rate is the difference:**

$$\frac{1}{B} = \frac{1}{6} - \frac{1}{15}.$$

**Step 3 — Take the common denominator 30:**

$$\frac{1}{6} = \frac{5}{30}, \quad \frac{1}{15} = \frac{2}{30}.$$

**Step 4 — Subtract:**

$$\frac{5}{30} - \frac{2}{30} = \frac{3}{30} = \frac{1}{10}.$$

**Step 5 — Invert to get B's time:**

$$B = 10 \text{ minutes.}$$



**Why other options are wrong:**

- Option B: 12 minutes gives a combined time of about 6.7 minutes.
- Option C: 9 minutes makes the pair too fast.
- Option D: 20 minutes wrongly assumes B equals A.

**Final Answer:** Pipe B alone fills the tank in 10 minutes  $\Rightarrow$  **A**

**Answer: (A)** [Go Back to Q14](#)

**Q15.**

### Solution

**Concept — Last Two Digits:** The last two digits of a number are its remainder when divided by 100.

**Step 1 — Evaluate the power:**

$$2^{10} = 1024.$$

**Step 2 — Read the last two digits:**

$$1024 \Rightarrow \text{last two digits } 24.$$

**Step 3 — Confirm using the remainder:**

$$1024 = 10 \times 100 + 24 \Rightarrow 1024 \bmod 100 = 24.$$

**Why other options are wrong:**

- Option A: 12 halves the correct value.
- Option B: 48 is  $2^{10}$  read incorrectly.
- Option D: 32 is  $2^5$ , not  $2^{10}$ .

**Final Answer:**  $2^{10} = 1024$ , so the last two digits are 24  $\Rightarrow$  **C**

**Answer: (C)** [Go Back to Q15](#)



Q16.

**Solution**

**Concept — HCF and LCM:** For any two numbers, product of the numbers = HCF  $\times$  LCM.

**Step 1 — Write the relation:**

$$\text{Product} = \text{HCF} \times \text{LCM}.$$

**Step 2 — Substitute the known values:**

$$2028 = 13 \times \text{LCM}.$$

**Step 3 — Solve for the LCM:**

$$\text{LCM} = \frac{2028}{13} = 156.$$

**Why other options are wrong:**

- Option A: 150 does not divide the product exactly.
- Option C: 169 is  $13^2$ , unrelated to the LCM here.
- Option D: 144 gives a product of 1872, not 2028.

**Final Answer:**  $\text{LCM} = \frac{2028}{13} = 156 \Rightarrow \boxed{\text{B}}$

**Answer: (B)** [Go Back to Q16](#)

Q17.

**Solution**

**Concept — Unit Digit of Powers of 4:** The unit digit of  $4^n$  is 4 when  $n$  is odd and 6 when  $n$  is even.

**Step 1 — Write the short cycle:**

$$4^1 = 4, \quad 4^2 = 16, \quad 4^3 = 64, \quad \text{so the cycle is } 4, 6.$$

**Step 2 — Check whether the exponent is odd or even:**

15 is odd.



**Step 3 — Odd exponent gives unit digit 4:**

$$\text{Unit digit of } 4^{15} = 4.$$

**Why other options are wrong:**

- Option A: 6 is the unit digit for even exponents.
- Option B: 2 never appears as a unit digit of a power of 4.
- Option C: 8 never appears as a unit digit of a power of 4.

**Final Answer:** 15 is odd, so the unit digit of  $4^{15}$  is 4  $\Rightarrow$  **D**

**Answer: (D)** [Go Back to Q17](#)

**Q18.**

### Solution

**Concept — Sets:** Students playing only one game = total in that game – those playing both.

**Step 1 — Note the given counts:**

$$n(\text{Cricket}) = 25, \quad n(\text{both}) = 10.$$

**Step 2 — Subtract the overlap:**

$$\text{Only cricket} = 25 - 10.$$

**Step 3 — Compute:**

$$25 - 10 = 15.$$

**Why other options are wrong:**

- Option B: 10 counts those who play both, not only cricket.
- Option C: 20 is the football total, not the only-cricket count.
- Option D: 5 subtracts twice the overlap.

**Final Answer:** Only cricket =  $25 - 10 = 15 \Rightarrow$  **A**

**Answer: (A)** [Go Back to Q18](#)



Q19.

**Solution**

**Concept — Linear Equations (Ages):** Set up expressions for present ages, then translate the future condition into an equation.

**Step 1 — Let the son's age be  $S$ ; father =  $3S$ :**

$$\text{Father} = 3S, \quad \text{Son} = S.$$

**Step 2 — Write the condition after 12 years:**

$$3S + 12 = 2(S + 12).$$

**Step 3 — Expand the right side:**

$$3S + 12 = 2S + 24.$$

**Step 4 — Solve for  $S$ :**

$$3S - 2S = 24 - 12 \Rightarrow S = 12.$$

**Why other options are wrong:**

- Option A: 10 gives father 30, and in 12 years 42 is not twice 22.
- Option B: 8 gives father 24, failing the future condition.
- Option D: 15 gives father 45, which is more than twice the son's future age.

**Final Answer:** The son is 12 years old  $\Rightarrow$   C

**Answer: (C)** [Go Back to Q19](#)

Q20.

**Solution**

**Concept — Roots of a Quadratic:** For  $ax^2 + bx + c = 0$ , sum of roots =  $-\frac{b}{a}$ , product =  $\frac{c}{a}$ , and  $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$ .

**Step 1 — Read the coefficients:**

$$a = 1, \quad b = -5, \quad c = 6.$$



**Step 2 — Sum and product of the roots:**

$$\alpha + \beta = 5, \quad \alpha\beta = 6.$$

**Step 3 — Apply the identity:**

$$\alpha^2 + \beta^2 = 5^2 - 2 \times 6.$$

**Step 4 — Simplify:**

$$25 - 12 = 13.$$

**Why other options are wrong:**

- Option A: 12 is the product of the roots, not the sum of their squares.
- Option C: 25 forgets to subtract  $2\alpha\beta$ .
- Option D: 11 subtracts the wrong quantity.

**Final Answer:**  $\alpha^2 + \beta^2 = 25 - 12 = 13 \Rightarrow$  B

Answer: (B) [Go Back to Q20](#)

**Q21.**

### Solution

**Concept — Compound Inequality:** Perform the same operation on all three parts to isolate  $x$ .

**Step 1 — Start from the given inequality:**

$$3 < 2x + 1 \leq 9.$$

**Step 2 — Subtract 1 from each part:**

$$2 < 2x \leq 8.$$

**Step 3 — Divide each part by 2:**

$$1 < x \leq 4.$$

**Why other options are wrong:**



- Option B:  $1 \leq x < 4$  swaps which bound is strict.
- Option C:  $2 < x \leq 4$  subtracts 1 from only the lower bound.
- Option D:  $1 < x \leq 5$  divides the upper bound incorrectly.

**Final Answer:** The solution is  $1 < x \leq 4 \Rightarrow$  **A**

**Answer: (A)** [Go Back to Q21](#)

**Q22.**

### Solution

**Concept — Arithmetic Progression:** The  $n$ th term is  $a_n = a + (n - 1)d$ .

**Step 1 — Write the known values:**

$$a = 7, \quad d = 4, \quad n = 10.$$

**Step 2 — Substitute into the formula:**

$$a_{10} = 7 + (10 - 1) \times 4.$$

**Step 3 — Simplify the bracket:**

$$a_{10} = 7 + 9 \times 4.$$

**Step 4 — Compute:**

$$7 + 36 = 43.$$

**Why other options are wrong:**

- Option A: 40 uses  $(n - 1) = 8$  by mistake.
- Option B: 47 uses  $n = 11$ .
- Option C: 39 adds eight common differences.

**Final Answer:** The 10th term is  $7 + 9 \times 4 = 43 \Rightarrow$  **D**

**Answer: (D)** [Go Back to Q22](#)



Q23.

**Solution**

**Concept — Geometric Progression:** The sum of the first  $n$  terms is  $S_n = a \frac{r^n - 1}{r - 1}$  for  $r > 1$ .

**Step 1 — Identify  $a$  and  $r$ :**

$$a = 3, \quad r = \frac{6}{3} = 2.$$

**Step 2 — Substitute with  $n = 5$ :**

$$S_5 = 3 \times \frac{2^5 - 1}{2 - 1}.$$

**Step 3 — Evaluate the power:**

$$2^5 = 32, \quad 32 - 1 = 31.$$

**Step 4 — Multiply:**

$$S_5 = 3 \times 31 = 93.$$

**Why other options are wrong:**

- Option A: 90 has no valid basis here.
- Option B: 96 counts an extra term.
- Option D: 48 is only the fifth term ( $3 \times 2^4$ ), not the sum.

**Final Answer:**  $S_5 = 3 \times 31 = 93 \Rightarrow \boxed{C}$

**Answer: (C)** [Go Back to Q23](#)

Q24.

**Solution**

**Concept — Pythagoras Theorem:**  $(\text{leg})^2 = (\text{hypotenuse})^2 - (\text{other leg})^2$ .

**Step 1 — Square the hypotenuse and the known leg:**

$$13^2 = 169, \quad 5^2 = 25.$$



**Step 2 — Subtract to find the square of the missing leg:**

$$169 - 25 = 144.$$

**Step 3 — Take the square root:**

$$\sqrt{144} = 12 \text{ cm.}$$

**Why other options are wrong:**

- Option A: 10 cm gives a hypotenuse of  $\sqrt{125}$ , not 13.
- Option C: 8 cm gives a hypotenuse of  $\sqrt{89}$ .
- Option D: 11 cm gives a hypotenuse of  $\sqrt{146}$ .

**Final Answer:** Other leg =  $\sqrt{13^2 - 5^2} = 12 \text{ cm} \Rightarrow \boxed{\text{B}}$

**Answer:** (B) [Go Back to Q24](#)

**Q25.**

### Solution

**Concept — Area of a Ring (Annulus):** Area =  $\pi (R^2 - r^2)$ , the outer circle area minus the inner circle area.

**Step 1 — Square the two radii:**

$$R^2 = 14^2 = 196, \quad r^2 = 7^2 = 49.$$

**Step 2 — Find the difference of the squares:**

$$196 - 49 = 147.$$

**Step 3 — Multiply by  $\pi = \frac{22}{7}$ :**

$$\frac{22}{7} \times 147 = 22 \times 21.$$

**Step 4 — Compute:**

$$22 \times 21 = 462 \text{ cm}^2.$$

**Why other options are wrong:**



- Option A:  $450 \text{ cm}^2$  rounds the answer incorrectly.
- Option B:  $154 \text{ cm}^2$  is the area of the inner circle alone.
- Option C:  $616 \text{ cm}^2$  is the area of the outer circle alone.

**Final Answer:** Ring area =  $\frac{22}{7}(196 - 49) = 462 \text{ cm}^2 \Rightarrow \boxed{\text{D}}$

**Answer: (D)** [Go Back to Q25](#)

**Q26.**

### Solution

**Concept — Area of a Parallelogram:** Area = base  $\times$  height, using the perpendicular height.

**Step 1 — Write the base and height:**

$$\text{Base} = 12 \text{ cm}, \quad \text{Height} = 7 \text{ cm}.$$

**Step 2 — Multiply them:**

$$\text{Area} = 12 \times 7.$$

**Step 3 — Compute:**

$$12 \times 7 = 84 \text{ cm}^2.$$

**Why other options are wrong:**

- Option A:  $80 \text{ cm}^2$  has no valid basis here.
- Option B:  $96 \text{ cm}^2$  uses a height of 8 cm.
- Option D:  $72 \text{ cm}^2$  uses a height of 6 cm.

**Final Answer:** Area =  $12 \times 7 = 84 \text{ cm}^2 \Rightarrow \boxed{\text{C}}$

**Answer: (C)** [Go Back to Q26](#)

**Q27.**

### Solution

**Concept — Total Surface Area of a Cube:** A cube has 6 equal square faces, so  $\text{TSA} = 6 \times \text{edge}^2$ .

**Step 1 — Square the edge:**

$$6^2 = 36.$$



**Step 2 — Multiply by the 6 faces:**

$$6 \times 36.$$

**Step 3 — Compute:**

$$6 \times 36 = 216 \text{ cm}^2.$$

**Why other options are wrong:**

- Option B:  $200 \text{ cm}^2$  has no valid basis for edge 6.
- Option C:  $180 \text{ cm}^2$  uses only 5 faces.
- Option D:  $150 \text{ cm}^2$  uses an edge of 5 cm.

**Final Answer:**  $\text{TSA} = 6 \times 6^2 = 216 \text{ cm}^2 \Rightarrow \boxed{\text{A}}$

**Answer: (A)** [Go Back to Q27](#)

**Q28.**

### Solution

**Concept — Permutations:** With no repetition, the number of  $r$ -digit arrangements from  $n$  distinct digits is  $n \times (n - 1) \times \dots$  for  $r$  factors.

**Step 1 — Count the choices for each place:**

$$\text{Hundreds} = 5, \quad \text{Tens} = 4, \quad \text{Units} = 3.$$

**Step 2 — Multiply the choices:**

$$5 \times 4 \times 3.$$

**Step 3 — Compute:**

$$5 \times 4 = 20, \quad 20 \times 3 = 60.$$

**Why other options are wrong:**

- Option A: 120 is  $5!$ , arranging all five digits, not three.
- Option C: 125 is  $5^3$ , which allows repetition.
- Option D: 20 stops after two places.

**Final Answer:** Number of 3-digit numbers =  $5 \times 4 \times 3 = 60 \Rightarrow \boxed{\text{B}}$



**Answer: (B)** [Go Back to Q28](#)

Q29.

### Solution

**Concept — Combinations:** The number of ways to choose  $r$  from  $n$ , order not mattering, is  $\binom{n}{r} = \frac{n!}{r!(n-r)!}$ .

**Step 1 — Substitute  $n = 8, r = 3$ :**

$$\binom{8}{3} = \frac{8 \times 7 \times 6}{3 \times 2 \times 1}$$

**Step 2 — Multiply the numerator:**

$$8 \times 7 \times 6 = 336.$$

**Step 3 — Divide by  $3! = 6$ :**

$$\frac{336}{6} = 56.$$

**Why other options are wrong:**

- Option A: 336 is the permutation count, before dividing by 3!.
- Option B: 24 has no valid basis here.
- Option D: 28 is  $\binom{8}{2}$ , choosing 2 players not 3.

**Final Answer:** Number of teams =  $\binom{8}{3} = 56 \Rightarrow \boxed{\text{C}}$

**Answer: (C)** [Go Back to Q29](#)

Q30.

### Solution

**Concept — Probability (Complement):**  $P(\text{at least one head}) = 1 - P(\text{no head})$ .

**Step 1 — List the equally likely outcomes of two coins:**

$$\{HH, HT, TH, TT\} \Rightarrow 4 \text{ outcomes.}$$



**Step 2 — Probability of no head (both tails):**

$$P(TT) = \frac{1}{4}.$$

**Step 3 — Subtract from 1:**

$$P(\text{at least one head}) = 1 - \frac{1}{4} = \frac{3}{4}.$$

**Why other options are wrong:**

- Option A:  $\frac{1}{2}$  counts only the outcomes with exactly one head.
- Option B:  $\frac{1}{4}$  is the probability of no head.
- Option C:  $\frac{2}{3}$  has no basis for two coins.

**Final Answer:**  $P(\text{at least one head}) = 1 - \frac{1}{4} = \frac{3}{4} \Rightarrow \boxed{D}$

**Answer: (D)** [Go Back to Q30](#)



**Answer Key**

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

