

# Symbiosis Entrance Test (SET)

## Quantitative Aptitude — Sample Paper 8

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|                  |            |                 |                                            |
|------------------|------------|-----------------|--------------------------------------------|
| Total Questions: | 16         | Maximum Marks:  | 16                                         |
| Duration:        | 16 minutes | Marking Scheme: | +1 per correct answer, no negative marking |
| Mode:            | Online CBT |                 |                                            |

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### Instructions

1. This paper contains **16 multiple-choice questions** carrying **1 mark each**.
2. Each question has **four options** (A)–(D). Choose the single best answer.
3. There is **no negative marking** for wrong answers.
4. Attempt all questions within the stipulated time of **16 minutes**.
5. Syllabus: Arithmetic, Algebra, Geometry, Data Interpretation, and Probability — class 9–10 level, as tested in SET (Symbiosis Entrance Test).

### SECTION: Quantitative Aptitude (16 Questions × 1 Mark)

- Q1.** The price of item A is Rs. 400 and the price of item B is Rs. 600. Both prices are increased by 10%. By how many rupees does the price increase of item B exceed the price increase of item A?
- (A) Rs. 10  
(B) Rs. 15  
(C) Rs. 18  
(D) Rs. 20
- Q2.** The mean of 6 numbers is 14. If 2 is added to each of the 6 numbers, what is the new mean?
- (A) 16  
(B) 12  
(C) 14

(D) 28

**Q3.** The population of a city was 2,00,000 in 2021. It increased by 10% in 2022 and then decreased by 5% in 2023. What was the population at the end of 2023?

(A) 2,05,000

(B) 2,09,000

(C) 2,10,000

(D) 2,15,000

**Q4.** A two-digit number is such that the product of its digits is 18. If 27 is added to the number, the digits get interchanged. Find the original number.

(A) 18

(B) 24

(C) 36

(D) 63

**Q5.** How many perfect squares lie strictly between 100 and 400 (i.e., excluding 100 and 400)?

(A) 7

(B) 8

(C) 10

(D) 9

**Q6.**  $y$  varies directly as  $x$  and inversely as  $z^2$ . When  $x = 4$  and  $z = 2$ ,  $y = 6$ . Find  $y$  when  $x = 9$  and  $z = 3$ .

(A) 6

(B) 8

(C) 10

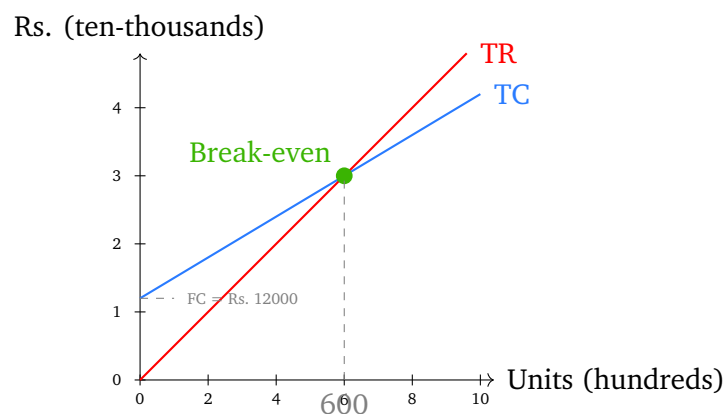
(D) 4



**Q7.** A and B enter a business partnership with investments of Rs. 15 000 and Rs. 10 000 respectively. At the end of the year, B receives Rs. 500 as a management salary from the total profit. If the total profit is Rs. 5500, what is A's share of the remaining profit?

- (A) Rs. 2500
- (B) Rs. 3000
- (C) Rs. 3500
- (D) Rs. 4000

**Q8.** A company has fixed costs of Rs. 12 000 per month and a variable cost of Rs. 30 per unit. Each unit is sold at Rs. 50. How many units must be sold per month to break even?



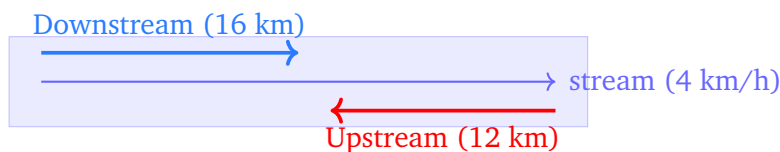
- (A) 400 units
- (B) 500 units
- (C) 600 units
- (D) 700 units

**Q9.** A company sold goods to a distributor at Rs. 2400, making a 20% profit. The distributor then sold the goods to a retailer at a 15% profit. How much did the retailer pay?

- (A) Rs. 2400
- (B) Rs. 2500
- (C) Rs. 2600
- (D) Rs. 2760

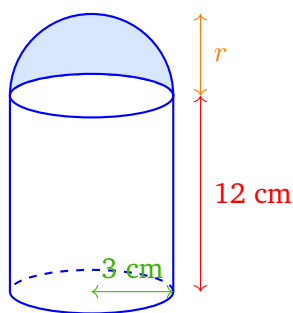


- Q10.** A motorboat travels 16 km downstream and 12 km upstream in the same time. The stream flows at 4 km/h. What is the speed of the boat in still water?



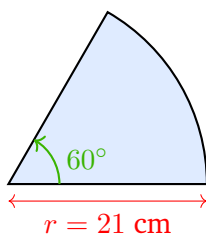
- (A) 28 km/h  
(B) 20 km/h  
(C) 24 km/h  
(D) 32 km/h
- Q11.** Runner A can run at 400 m/min. Runner B starts 400 m ahead and runs at 300 m/min in the same direction. How many minutes will it take for Runner A to catch Runner B?
- (A) 3 minutes  
(B) 4 minutes  
(C) 5 minutes  
(D) 6 minutes
- Q12.** If  $a + b = 10$  and  $a - b = 4$ , find the value of  $a^2 - b^2$ .
- (A) 20  
(B) 30  
(C) 40  
(D) 50
- Q13.** A solid consists of a cylinder of radius 3 cm and height 12 cm, with a hemisphere of the same radius placed on top. Find the total volume of the solid. (Use  $\pi = 22/7$ )





- (A)  $308 \text{ cm}^3$
- (B)  $352 \text{ cm}^3$
- (C)  $374 \text{ cm}^3$
- (D)  $396 \text{ cm}^3$

**Q14.** A sector has radius 21 cm and the arc subtends an angle of  $60^\circ$  at the centre. Find the perimeter of the sector. (Use  $\pi = 22/7$ )



- (A) 64 cm
- (B) 70 cm
- (C) 78 cm
- (D) 84 cm

**Q15.** The frequency distribution below shows the marks of 40 students. What is the **median class**?

| Marks | Frequency | Cumulative Freq. |
|-------|-----------|------------------|
| 0–10  | 5         | 5                |
| 10–20 | 8         | 13               |
| 20–30 | 10        | 23               |
| 30–40 | 12        | 35               |
| 40–50 | 5         | 40               |

- (A) 10–20



- (B) 20–30
- (C) 30–40
- (D) 0–10

**Q16.** In a group of 40 students, 25 play cricket and 20 play football. 10 students play both. How many students play **neither** cricket nor football?

- (A) 3
- (B) 4
- (C) 5
- (D) 7



## DETAILED SOLUTIONS

Sol. 1.

## Solution

**Topic: Percentages / Price Increase**

Increase in price of A = 10% of 400 = Rs. 40.

Increase in price of B = 10% of 600 = Rs. 60.

Difference = 60 - 40 = **Rs. 20.****Answer: (D)** [Go Back to Q 1](#)

Sol. 2.

## Solution

**Topic: Averages / Uniform Shift**When the same constant  $k$  is added to every number in a set, the mean increases by  $k$ .New mean =  $14 + 2 = 16$ .**Answer: (A)** [Go Back to Q 2](#)

Sol. 3.

## Solution

**Topic: Percentages / Successive Changes**After 10% increase in 2022:  $200000 \times 1.10 = 220000$ .After 5% decrease in 2023:  $220000 \times 0.95 = 2,09,000$ .**Answer: (B)** [Go Back to Q 3](#)

Sol. 4.

## Solution

**Topic: Number System / Digit Puzzle**Let the number be  $\overline{ab} = 10a + b$ , where  $a \times b = 18$ .Adding 27 reverses the digits:  $10a + b + 27 = 10b + a$  $\Rightarrow 9a - 9b = -27 \Rightarrow a - b = -3 \Rightarrow b = a + 3$ .Substituting:  $a(a + 3) = 18 \Rightarrow a^2 + 3a - 18 = 0 \Rightarrow (a - 3)(a + 6) = 0$ . $a = 3$  (taking positive digit),  $b = 6$ . Number = **36**.Check:  $3 \times 6 = 18\checkmark$ ;  $36 + 27 = 63$  (digits reversed) $\checkmark$ .**Answer: (C)** [Go Back to Q 4](#)

Sol. 5.

**Solution****Topic: Number System / Perfect Squares** $10^2 = 100$  (excluded) and  $20^2 = 400$  (excluded).

Perfect squares strictly between 100 and 400:

 $11^2, 12^2, 13^2, 14^2, 15^2, 16^2, 17^2, 18^2, 19^2$ Count =  $19 - 10 + 1 = 10$ .**Answer: (D)** [Go Back to Q 5](#)

Sol. 6.

**Solution****Topic: Variation / Direct and Inverse** $y = k \cdot \frac{x}{z^2}$  for some constant  $k$ .Using  $x = 4, z = 2, y = 6$ :  $6 = k \cdot \frac{4}{4} = k \Rightarrow k = 6$ .When  $x = 9, z = 3$ :  $y = 6 \cdot \frac{9}{9} = 6$ .**Answer: (A)** [Go Back to Q 6](#)

Sol. 7.

**Solution****Topic: Partnership / Salary then Profit Split**Profit available for sharing =  $5500 - 500 = \text{Rs. } 5000$ .Investment ratio A:B =  $15000 : 10000 = 3 : 2$ . Total parts = 5.A's share =  $\frac{3}{5} \times 5000 = \text{Rs. } 3000$ .**Answer: (B)** [Go Back to Q 7](#)

Sol. 8.

**Solution****Topic: Profit and Loss / Break-Even Analysis**Contribution per unit = Selling price – Variable cost =  $50 - 30 = \text{Rs. } 20$ .Break-even units =  $\frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{12000}{20} = 600$  units.(At 600 units: TR =  $600 \times 50 = 30000$ ; TC =  $12000 + 600 \times 30 = 30000$ . ✓)**Answer: (C)** [Go Back to Q 8](#)

Sol. 9.

**Solution****Topic: Profit and Loss / Supply Chain**

The company sold to the distributor at Rs. 2400.

Retailer's price = Distributor's SP =  $2400 \times 1.15 = \text{Rs. } 2760$ .

(The manufacturer's CP is  $2400/1.20 = 2000$ , but the question asks for the retailer's purchase price.)

Answer: (D) [Go Back to Q 9](#)

Sol. 10.

**Solution****Topic: Boats and Streams / Different Distances Same Time**

Let boat's speed in still water =  $v$  km/h.

Downstream speed =  $v + 4$ ; Upstream speed =  $v - 4$ .

Time is equal:

$$\frac{16}{v + 4} = \frac{12}{v - 4}$$

$$16(v - 4) = 12(v + 4)$$

$$16v - 64 = 12v + 48$$

$$4v = 112 \Rightarrow v = 28 \text{ km/h.}$$

Answer: (A) [Go Back to Q 10](#)

Sol. 11.

**Solution****Topic: Time, Speed and Distance / Head Start**

Relative speed of A w.r.t. B =  $400 - 300 = 100$  m/min.

Head start = 400 m.

$$\text{Time} = \frac{400}{100} = 4 \text{ minutes.}$$

Answer: (B) [Go Back to Q 11](#)

Sol. 12.

**Solution****Topic: Algebra / Difference of Squares**

$$a^2 - b^2 = (a + b)(a - b) = 10 \times 4 = 40.$$

Answer: (C) [Go Back to Q 12](#)



Sol. 13.

**Solution****Topic: Mensuration / Combined Solids**

$$\text{Volume of cylinder} = \pi r^2 h = \frac{22}{7} \times 9 \times 12 = \frac{22 \times 108}{7} = \frac{2376}{7}$$

$$\text{Volume of hemisphere} = \frac{2}{3} \pi r^3 = \frac{2}{3} \times \frac{22}{7} \times 27 = \frac{44 \times 9}{7} = \frac{396}{7}$$

$$\text{Total volume} = \frac{2376 + 396}{7} = \frac{2772}{7} = 396 \text{ cm}^3.$$

**Answer: (D)** [Go Back to Q 13](#)

Sol. 14.

**Solution****Topic: Mensuration / Perimeter of Sector**

$$\text{Arc length} = \frac{\theta}{360} \times 2\pi r = \frac{60}{360} \times 2 \times \frac{22}{7} \times 21 = \frac{1}{6} \times 2 \times 22 \times 3 = \frac{132}{6} = 22 \text{ cm.}$$

$$\text{Perimeter} = \text{Arc} + 2r = 22 + 2 \times 21 = 22 + 42 = 64 \text{ cm.}$$

**Answer: (A)** [Go Back to Q 14](#)

Sol. 15.

**Solution****Topic: Data Interpretation / Median Class**

$n = 40$ , so the median lies at the  $\frac{40}{2} = 20$ th observation.

From the cumulative frequency table:

— Up to 10–20: CF = 13 (20th not yet reached)

— Up to 20–30: CF = 23 (20th observation falls here)

The **median class** is 20–30.

**Answer: (B)** [Go Back to Q 15](#)

Sol. 16.

**Solution****Topic: Probability / Inclusion-Exclusion**

$$\begin{aligned} \text{Students playing at least one sport} &= n(\text{Cricket}) + n(\text{Football}) - n(\text{Both}) \\ &= 25 + 20 - 10 = 35. \end{aligned}$$

$$\text{Students playing neither} = 40 - 35 = 5.$$

**Answer: (C)** [Go Back to Q 16](#)

## ANSWER KEY

| Q  | Ans | Q  | Ans | Q  | Ans | Q  | Ans | Q  | Ans |
|----|-----|----|-----|----|-----|----|-----|----|-----|
| 1  | D   | 2  | A   | 3  | B   | 4  | C   | 5  | D   |
| 6  | A   | 7  | B   | 8  | C   | 9  | D   | 10 | A   |
| 11 | B   | 12 | C   | 13 | D   | 14 | A   | 15 | B   |
| 16 | C   |    |     |    |     |    |     |    |     |

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