

TANCET — Quantitative Aptitude

Sample Paper 8

Tamil Nadu Common Entrance Test | Quantitative Aptitude Section

Questions	Total Marks	Duration	Marking Scheme
20	20	24 minutes	+1 correct $-\frac{1}{4}$ wrong 0 unattempted

Instructions

1. This section contains **20 multiple-choice questions**, each carrying **1 mark**.
2. Each question has **four options** (A), (B), (C), (D); only **one** is correct.
3. A correct answer awards +1 mark; an incorrect answer deducts $\frac{1}{4}$ mark.
4. Unattempted questions carry **zero** marks.
5. Use of calculators or electronic devices is **not** permitted.

SECTION: Quantitative Aptitude (Q1 – Q20)

Q1. Find the HCF of 252 and 594 using the Euclidean algorithm.

- (A) 6
(B) 9
(C) 12
(D) 18

Solution

Apply the Euclidean algorithm step by step:

$$594 = 2 \times 252 + 90$$

$$252 = 2 \times 90 + 72$$

$$90 = 1 \times 72 + 18$$

$$72 = 4 \times 18 + 0$$

Since the remainder is 0, $\text{HCF}(252, 594) = \boxed{18}$.

Answer: (D)



Q2. What is the highest power of 2 that divides $32!$?

- (A) 31
- (B) 16
- (C) 28
- (D) 30

Solution

Using Legendre's formula, the highest power of a prime p in $n!$ is $\sum_{i=1}^{\infty} \left\lfloor \frac{n}{p^i} \right\rfloor$.

$$\left\lfloor \frac{32}{2} \right\rfloor + \left\lfloor \frac{32}{4} \right\rfloor + \left\lfloor \frac{32}{8} \right\rfloor + \left\lfloor \frac{32}{16} \right\rfloor + \left\lfloor \frac{32}{32} \right\rfloor = 16 + 8 + 4 + 2 + 1 = \boxed{31}$$

Answer: (A)

Q3. If $a + b + c = 0$, find the value of $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab}$.

- (A) 0
- (B) 3
- (C) -3
- (D) 1

Solution

When $a + b + c = 0$, the identity $a^3 + b^3 + c^3 = 3abc$ holds.

Dividing both sides by abc :

$$\frac{a^3}{abc} + \frac{b^3}{abc} + \frac{c^3}{abc} = 3 \implies \frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = \boxed{3}$$

Answer: (B)

Q4. If $f(x) = 2x + 3$, find $f(f(2))$.

- (A) 11
- (B) 14
- (C) 17



(D) 10

Solution

Step 1: $f(2) = 2(2) + 3 = 7$.

Step 2: $f(f(2)) = f(7) = 2(7) + 3 = \boxed{17}$.

Answer: (C)

Q5. The price of an article is Rs. 1180, which *includes* 18% GST. Find the price before GST.

(A) Rs. 1062

(B) Rs. 980

(C) Rs. 1100

(D) Rs. 1000

Solution

Let the pre-GST price be P . Then $P \times 1.18 = 1180$.

$$P = \frac{1180}{1.18} = \frac{1180 \times 100}{118} = \boxed{\text{Rs. 1000}}$$

Answer: (D)

Q6. Person A invests Rs. 5000 at 12% p.a. simple interest for 2 years. Person B invests Rs. 4000 at 15% p.a. SI for 2 years. Who earns more interest, and by how much?

(A) Equal earnings

(B) A earns Rs. 200 more

(C) B earns Rs. 200 more

(D) A earns Rs. 400 more

Solution

$$SI_A = \frac{5000 \times 12 \times 2}{100} = \text{Rs. 1200} \quad SI_B = \frac{4000 \times 15 \times 2}{100} = \text{Rs. 1200}$$

Both earn **Rs. 1200**, so their earnings are **equal**.



Answer: (A)

Q7. In a business, X invests Rs. 6000 for 8 months and Y invests Rs. 9000 for 6 months. In what ratio should they share the profit?

- (A) 2 : 3
- (B) 8 : 9
- (C) 3 : 4
- (D) 4 : 5

Solution

$$X : Y = 6000 \times 8 : 9000 \times 6 = 48000 : 54000 = \boxed{8 : 9}$$

Answer: (B)

Q8. A 60-litre container holds pure milk. 12 litres are removed and replaced with water; the process is repeated once more. Find the amount of milk remaining after two replacements.

- (A) 36 L
- (B) 37.5 L
- (C) 38.4 L
- (D) 40 L

Solution

After each replacement, the fraction of milk remaining is $\frac{60 - 12}{60} = \frac{4}{5}$.

After two replacements:

$$\text{Milk} = 60 \times \left(\frac{4}{5}\right)^2 = 60 \times \frac{16}{25} = \boxed{38.4 \text{ L}}$$

Answer: (C)

Q9. The first term of an AP is 5 and the last term is 55. If there are 11 terms, find the average of the AP.

- (A) 25
- (B) 27
- (C) 28
- (D) 30

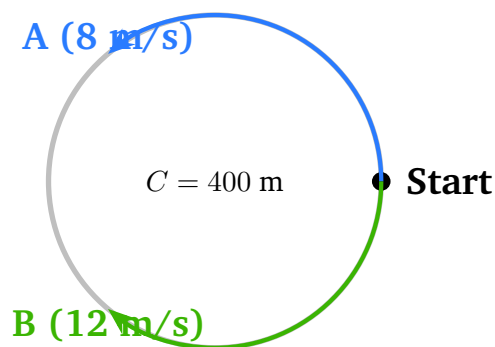
Solution

For any AP, the average equals the average of the first and last terms:

$$\text{Average} = \frac{a_1 + a_n}{2} = \frac{5 + 55}{2} = \boxed{30}$$

Answer: (D)

Q10. A and B start from the same point on a circular track of circumference 400 m. A runs at 8 m/s and B runs at 12 m/s in *opposite* directions. After how many seconds do they first meet?



- (A) 20 s
- (B) 25 s
- (C) 40 s
- (D) 50 s



Solution

Since A and B move in **opposite** directions, their relative speed is the *sum* of their speeds:

$$v_{\text{rel}} = 8 + 12 = 20 \text{ m/s}$$

Time to first meeting:

$$t = \frac{\text{Circumference}}{v_{\text{rel}}} = \frac{400}{20} = \boxed{20 \text{ s}}$$

Answer: (A)

Q11. A bus travels the first 120 km at 60 km/h, the next 150 km at 75 km/h, and the last 80 km at 40 km/h. Find the total time for the journey.

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

Solution

$$t_{\text{total}} = \frac{120}{60} + \frac{150}{75} + \frac{80}{40} = 2 + 2 + 2 = \boxed{6 \text{ h}}$$

Answer: (B)

Q12. A and B can complete a job alone in 10 days and 15 days respectively. They work on alternate days with A starting on Day 1. How many days does it take to complete the work?

- (A) 10 days
- (B) 11 days
- (C) 12 days
- (D) 13 days

Solution

$$\text{Work done by A in 1 day} = \frac{1}{10}; \quad \text{work done by B in 1 day} = \frac{1}{15}.$$



Work done in every 2-day cycle (A then B):

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

In $6 \times 2 = 12$ days, the work done $= 6 \times \frac{1}{6} = 1$ (complete).

Hence the job is finished in exactly **12 days**.

Answer: (C)

Q13. Pipe X fills a tank in 4 hours, Pipe Y fills it in 6 hours, and Pipe Z empties it in 3 hours. All three are opened simultaneously. How long will it take to fill the tank?

- (A) 4 h
- (B) 6 h
- (C) 8 h
- (D) 12 h

Solution

Net filling rate per hour:

$$\frac{1}{4} + \frac{1}{6} - \frac{1}{3} = \frac{3}{12} + \frac{2}{12} - \frac{4}{12} = \frac{1}{12}$$

Time to fill the tank $= \frac{1}{1/12} = \mathbf{12 \text{ h}}$.

Answer: (D)

Q14. A shopkeeper sells goods at cost price but uses a weight of 800 g instead of 1 kg (1000 g). What is his profit percentage?

- (A) 25%
- (B) 20%
- (C) 16.67%
- (D) 12.5%



Solution

The shopkeeper gives 800 g but charges for 1000 g.

$$\text{Profit\%} = \frac{1000 - 800}{800} \times 100 = \frac{200}{800} \times 100 = \boxed{25\%}$$

Answer: (A)

Q15. Find the compound interest on Rs. 20,000 at 8% p.a. compounded quarterly for 6 months.

- (A) Rs. 800
- (B) Rs. 808
- (C) Rs. 820
- (D) Rs. 832

Solution

Rate per quarter = $\frac{8\%}{4} = 2\%$; number of quarters in 6 months = 2.

$$A = 20000 \times (1 + 0.02)^2 = 20000 \times 1.0404 = \text{Rs. } 20,808$$

$$\text{CI} = 20808 - 20000 = \boxed{\text{Rs. } 808}$$

Answer: (B)

Q16. Find 4 arithmetic means between 3 and 23, and state their sum.

- (A) 48
- (B) 50
- (C) 52
- (D) 56

Solution

With 4 means inserted between 3 and 23, there are 6 terms in total.

$$d = \frac{23 - 3}{5} = 4$$



The four arithmetic means are: $3 + 4 = 7$, $7 + 4 = 11$, $11 + 4 = 15$, $15 + 4 = 19$.

$$\text{Sum} = 7 + 11 + 15 + 19 = \boxed{52}$$

Answer: (C)

Q17. The sum of an infinite GP is 27 and the first term is 18. Find the common ratio.

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

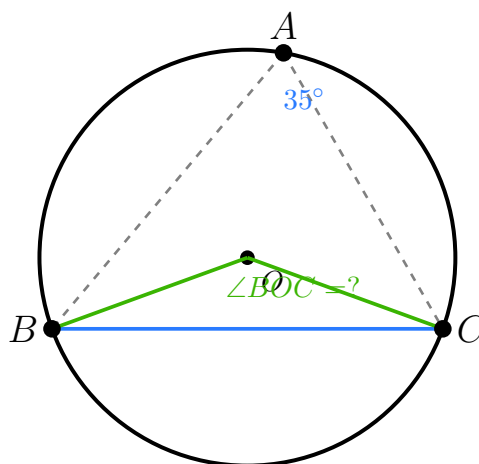
Solution

For an infinite GP with $|r| < 1$:

$$S_{\infty} = \frac{a}{1-r} \Rightarrow 27 = \frac{18}{1-r} \Rightarrow 1-r = \frac{18}{27} = \frac{2}{3} \Rightarrow r = \boxed{\frac{1}{3}}$$

Answer: (D)

Q18. O is the centre of a circle. Points A , B , and C lie on the circle. If $\angle BAC = 35^\circ$, find $\angle BOC$.



- (A) 70°
 (B) 35°
 (C) 140°
 (D) 105°

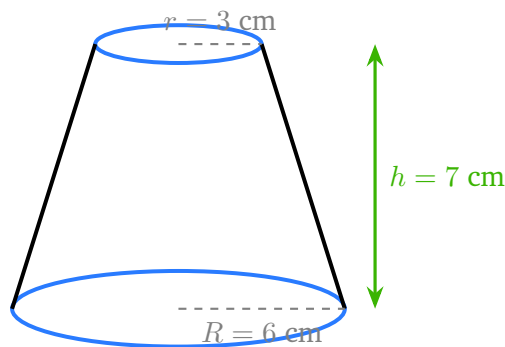
Solution

By the **Inscribed Angle Theorem**, the central angle is twice the inscribed angle subtending the same arc:

$$\angle BOC = 2 \times \angle BAC = 2 \times 35^\circ = \boxed{70^\circ}$$

Answer: (A)

Q19. A frustum of a cone has bottom radius $R = 6$ cm, top radius $r = 3$ cm, and height $h = 7$ cm. Find its volume. (Use $V = \frac{\pi h}{3}(R^2 + Rr + r^2)$, $\pi = \frac{22}{7}$)



- (A) 396 cm^3
 (B) 462 cm^3
 (C) 528 cm^3
 (D) 594 cm^3

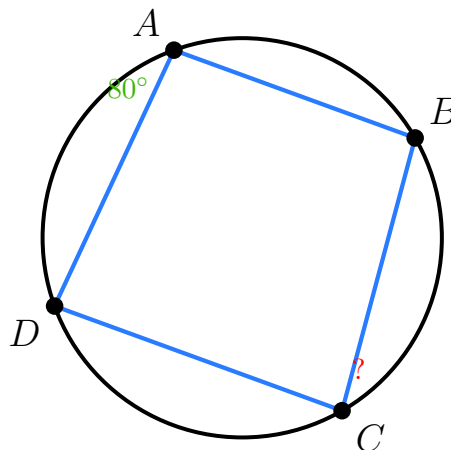
Solution

$$V = \frac{\pi h}{3}(R^2 + Rr + r^2) = \frac{22}{7} \cdot \frac{7}{3} \cdot (36 + 18 + 9) = \frac{22}{3} \times 63 = 22 \times 21 = \boxed{462 \text{ cm}^3}$$

Answer: (B)



Q20. $ABCD$ is a cyclic quadrilateral with $\angle A = 80^\circ$. Find $\angle C$.



- (A) 80°
- (B) 90°
- (C) 100°
- (D) 120°

Solution

In a cyclic quadrilateral, **opposite angles are supplementary**:

$$\angle A + \angle C = 180^\circ \implies \angle C = 180^\circ - 80^\circ = \boxed{100^\circ}$$

Answer: (C)

ANSWER KEY

Quick Reference Answer Key

Q	1	2	3	4	5	6	7	8	9	10
Ans	D	A	B	C	D	A	B	C	D	A
Q	11	12	13	14	15	16	17	18	19	20
Ans	B	C	D	A	B	C	D	A	B	C

Distribution: $A \times 5$ (Q2, Q6, Q10, Q14, Q18) | $B \times 5$ (Q3, Q7, Q11, Q15, Q19) | $C \times 5$ (Q4, Q8, Q12, Q16, Q20) | $D \times 5$ (Q1, Q5, Q9, Q13, Q17)



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