

TANCET Quantitative Aptitude

Sample Paper – 5

Duration: 24 Minutes

Maximum Marks: 20

Instructions

- This paper contains **20 MCQs** (single correct answer), modelled on the Quantitative Aptitude section of the **TANCET MBA** entrance examination.
- Each correct answer carries **+1 mark**. Each wrong answer carries a penalty of $-\frac{1}{4}$ **mark** (0.25 marks deducted). Unattempted questions carry **no penalty**.
- **Only one** option is correct for each question.
- **Syllabus:** Class 10–12 level Arithmetic, Algebra, and Number Theory.
- Personal calculators, mobile phones, and electronic gadgets are **strictly prohibited**. Rough work may be done in the space provided on the question paper.

Section: Quantitative Aptitude (20 Questions, 20 Marks)

Q1. Two numbers have $\text{HCF} = 12$ and $\text{LCM} = 180$. If one of the numbers is 36, what is the other number?

- (A) 60
- (B) 48
- (C) 72
- (D) 90

Q2. What is the smallest 3-digit number that is exactly divisible by 9?

- (A) 100
- (B) 108
- (C) 117
- (D) 126

Q3. For the quadratic equation $2x^2 - 5x + 3 = 0$, the nature of the roots is:

- (A) Real and equal



- (B) Complex (imaginary)
- (C) Real and distinct
- (D) Irrational and unequal

Q4. When the polynomial $p(x) = x^3 - 4x^2 + x + 6$ is divided by $(x - 3)$, the remainder is:

- (A) 3
- (B) 6
- (C) -3
- (D) 0

Q5. A product is marked up 40% above its cost price and then sold at a discount of 20% on the marked price. What is the net profit percentage?

- (A) 12%
- (B) 14%
- (C) 8%
- (D) 20%

Q6. The population of a town is 50,000. In the first year it increases by 10%, and in the second year it decreases by 5%. What is the population at the end of the two years?

- (A) 52,000
- (B) 52,250
- (C) 53,000
- (D) 47,500

Q7. Find the fourth proportional to 3, 7, and 15.

- (A) 21
- (B) 30
- (C) 35



(D) 45

Q8. Solution A contains 30% milk (70% water) and Solution B contains 60% milk. If 4 litres of Solution A are mixed with 8 litres of Solution B, what is the percentage of milk in the resulting mixture?

(A) 40%

(B) 45%

(C) 48%

(D) 50%

Q9. The average of 7 consecutive integers is 25. What is the largest of these integers?

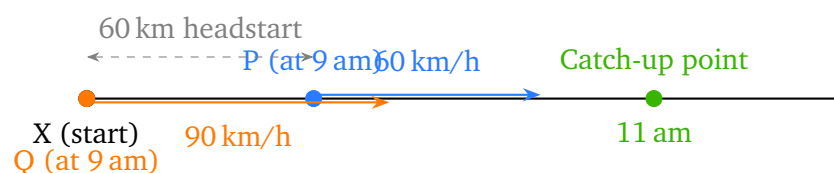
(A) 28

(B) 27

(C) 29

(D) 31

Q10. Car P starts from city X at 8 am travelling at 60 km/h. Car Q starts from the same city X at 9 am travelling in the same direction at 90 km/h. At what time does Car Q catch up with Car P?



(A) 10 am

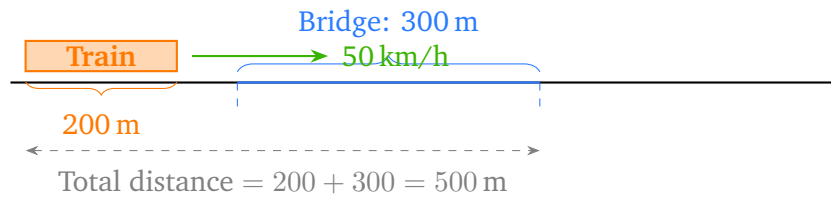
(B) 11 am

(C) 11:30 am

(D) 12 noon

Q11. A train 200 m long crosses a bridge 300 m long at a speed of 50 km/h. How many seconds does it take to cross the bridge completely?





- (A) 24 s
- (B) 30 s
- (C) 36 s
- (D) 40 s

Q12. A is twice as efficient as B. Together they can complete a piece of work in 6 days. In how many days can B alone complete the work?

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

Q13. Pipe A can fill a tank in 12 minutes, Pipe B can fill it in 18 minutes, and Pipe C (a drain) can empty it in 36 minutes. If all three pipes are opened simultaneously, how many minutes will it take to fill the tank?

- (A) 9 min
- (B) 10 min
- (C) 12 min
- (D) 15 min

Q14. An article is bought for Rs. 750 and sold for Rs. 900. What is the profit percentage?

- (A) 15%
- (B) 20%
- (C) 25%
- (D) 30%



Q15. Find the compound interest on Rs. 8,000 at 5% per annum compounded annually for 3 years.

- (A) Rs. 1200
- (B) Rs. 1230
- (C) Rs. 1261
- (D) Rs. 1300

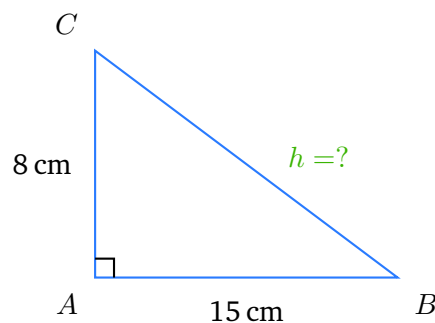
Q16. Find the sum of the arithmetic progression $5 + 10 + 15 + \dots + 100$.

- (A) 950
- (B) 1000
- (C) 1025
- (D) 1050

Q17. Find the sum of the first 5 terms of the geometric progression 2, 6, 18, 54, ...

- (A) 242
- (B) 162
- (C) 486
- (D) 364

Q18. A right-angled triangle has legs of length 8 cm and 15 cm. Find the length of the hypotenuse.



- (A) 15 cm
- (B) 17 cm
- (C) 18 cm



(D) 20 cm

Q19. Find the total surface area of a sphere with radius 7 cm. (Use $\pi = \frac{22}{7}$.)

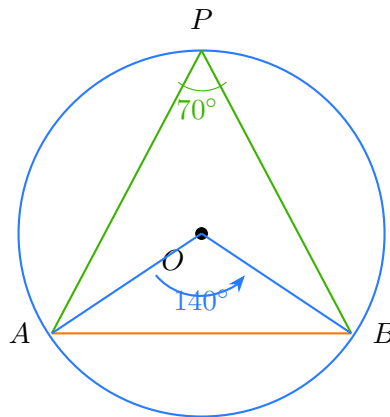
(A) 154 cm^2

(B) 308 cm^2

(C) 616 cm^2

(D) 1232 cm^2

Q20. A chord of a circle subtends an angle of 70° at a point on the circumference. What angle does the same chord subtend at the centre of the circle?



(A) 35°

(B) 70°

(C) 105°

(D) 140°



Detailed Solutions

Solution

Q1 — Number System: LCM–HCF Relation

Concept: For any two positive integers, Product of the two numbers = LCM $\times$ HCF.

Step 1 — Apply the formula.

Let the two numbers be $a = 36$ and $b = ?$, with HCF = 12 and LCM = 180.

$$a \times b = \text{LCM} \times \text{HCF}$$

$$36 \times b = 180 \times 12 = 2160$$

Step 2 — Solve for b .

$$b = \frac{2160}{36} = 60$$

Verification: HCF(36, 60) = 12 ✓ LCM(36, 60) = 180 ✓

Why other options are wrong:

- (B) 48: $36 \times 48 = 1728 \neq 2160$.
- (C) 72: $36 \times 72 = 2592 \neq 2160$.
- (D) 90: $36 \times 90 = 3240 \neq 2160$.

Answer: (A) [Go Back to Q 1](#)

Solution

Q2 — Number System: Divisibility by 9

Concept: A number is divisible by 9 if the sum of its digits is divisible by 9.

Step 1 — Start from the smallest 3-digit number (100) and check.

$1 + 0 + 0 = 1$ (not divisible by 9).

Step 2 — Find the nearest multiple of 9 at or above 100.

$$\left\lceil \frac{100}{9} \right\rceil = 12, \quad 9 \times 12 = 108$$

Step 3 — Verify: $1 + 0 + 8 = 9$ ✓.

Why other options are wrong:

- (A) 100: digit sum = 1, not divisible by 9.
- (C) 117: $9 \times 13 = 117$ is divisible by 9, but 108 is smaller.



- (D) 126: $9 \times 14 = 126$, also divisible by 9, but larger than 108.

Answer: (B) [Go Back to Q 2](#)

Solution

Q3 — Algebra: Nature of Roots (Discriminant)

Concept: For $ax^2 + bx + c = 0$, the discriminant $D = b^2 - 4ac$ determines the nature of roots: $D > 0 \Rightarrow$ real and distinct; $D = 0 \Rightarrow$ real and equal; $D < 0 \Rightarrow$ complex.

Step 1 — Identify coefficients of $2x^2 - 5x + 3 = 0$.

$$a = 2, \quad b = -5, \quad c = 3$$

Step 2 — Compute the discriminant.

$$D = (-5)^2 - 4(2)(3) = 25 - 24 = 1$$

Step 3 — Conclude. Since $D = 1 > 0$, the roots are **real and distinct**.

(The roots are $x = \frac{5 \pm 1}{4}$, i.e., $x = \frac{3}{2}$ and $x = 1$.)

Why other options are wrong:

- (A) Real and equal: requires $D = 0$, not the case here.
- (B) Complex: requires $D < 0$, but $D = 1 > 0$.
- (D) Irrational: $D = 1$ is a perfect square, so roots are rational.

Answer: (C) [Go Back to Q 3](#)

Solution

Q4 — Algebra: Remainder Theorem

Concept: The remainder when $p(x)$ is divided by $(x - a)$ equals $p(a)$.

Step 1 — Substitute $x = 3$ into $p(x) = x^3 - 4x^2 + x + 6$.

$$p(3) = (3)^3 - 4(3)^2 + (3) + 6 = 27 - 36 + 3 + 6 = 0$$

Step 2 — Interpret. The remainder is 0, which also means $(x - 3)$ is a *factor* of $p(x)$.

Why other options are wrong:

- (A) 3: would require $p(3) = 3$.



- (B) 6: would require $p(3) = 6$.
- (C) -3 : would require $p(3) = -3$.

Answer: (D) [Go Back to Q 4](#)

Solution

Q5 — Percentages: Mark-up and Discount

Concept: Net profit/loss multiplier = $(1 + \text{mark-up}\%) \times (1 - \text{discount}\%)$.

Step 1 — Set up. Let cost price = CP.

$$\text{Marked Price} = 1.40 \times \text{CP}$$

$$\text{Selling Price} = 1.40 \times \text{CP} \times (1 - 0.20) = 1.40 \times 0.80 \times \text{CP} = 1.12 \text{ CP}$$

Step 2 — Profit%.

$$\text{Profit}\% = (1.12 - 1) \times 100 = 12\%$$

Why other options are wrong:

- (B) 14%: incorrect multiplier; $1.4 \times 0.86 \neq 1.14$.
- (C) 8%: result of $1.2 \times 0.9 - 1$, a different problem.
- (D) 20%: that is just the mark-up, ignoring the discount.

Answer: (A) [Go Back to Q 5](#)

Solution

Q6 — Percentages: Population with Two Successive Changes

Concept: Apply each percentage change successively.

Step 1 — After Year 1 (+10%):

$$50,000 \times 1.10 = 55,000$$

Step 2 — After Year 2 (−5%):

$$55,000 \times 0.95 = 52,250$$

Net change:

$$\text{Net multiplier} = 1.10 \times 0.95 = 1.045 \implies +4.5\%$$



Why other options are wrong:

- (A) 52,000: ignores compounding, treating $+10\% - 5\% = +5\%$ giving $52,500 \neq 52,000$.
- (C) 53,000: overestimates; no valid calculation gives this.
- (D) 47,500: arises from subtracting instead of multiplying by 0.95.

Answer: (B) [Go Back to Q 6](#)

Solution

Q7 — Ratio & Proportion: Fourth Proportional

Concept: If $a : b = c : d$, then $d = \frac{b \times c}{a}$ is the fourth proportional to a, b, c .

Step 1 — Apply formula with $a = 3, b = 7, c = 15$.

$$d = \frac{7 \times 15}{3} = \frac{105}{3} = 35$$

Verification: $3 : 7 = 15 : 35$ ✓ (both simplify to $3 : 7$).

Why other options are wrong:

- (A) 21: this would give $3 : 7 = 15 : 21$ i.e. $3 : 7 = 5 : 7$, which is false.
- (B) 30: $3 : 7 \neq 15 : 30 = 1 : 2$.
- (D) 45: $3 : 7 \neq 15 : 45 = 1 : 3$.

Answer: (C) [Go Back to Q 7](#)

Solution

Q8 — Mixtures: Mixing Two Milk-Water Solutions

Concept: Weighted average of concentrations.

Step 1 — Total milk in the mixture.

$$\text{Milk from A} = 30\% \times 4 = 1.2 \text{ L}$$

$$\text{Milk from B} = 60\% \times 8 = 4.8 \text{ L}$$

$$\text{Total milk} = 1.2 + 4.8 = 6 \text{ L}$$



Step 2 — Total mixture volume.

$$\text{Total} = 4 + 8 = 12 \text{ L}$$

Step 3 — Percentage of milk.

$$\frac{6}{12} \times 100 = 50\%$$

Why other options are wrong:

- (A) 40%: simple average $(30 + 60)/2 = 45\%$, not the weighted average.
- (B) 45%: unweighted average ignoring the 1:2 volume ratio.
- (C) 48%: no valid calculation yields this.

Answer: (D) [Go Back to Q 8](#)

Solution

Q9 — Averages: Average of Consecutive Integers

Concept: For an odd count of consecutive integers, the average equals the middle term.

Step 1 — Identify the middle term. With 7 consecutive integers and average 25, the middle (4th) term is 25.

Step 2 — List the integers.

$$22, 23, 24, \underbrace{25}_{\text{middle}}, 26, 27, 28$$

Step 3 — Largest integer = 28.

Verification: $(22 + 23 + 24 + 25 + 26 + 27 + 28)/7 = 175/7 = 25 \checkmark$.

Why other options are wrong:

- (B) 27: that is the 6th term, not the largest.
- (C) 29: would make the middle term 26, not 25.
- (D) 31: would make the middle term 28, not 25.

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



Solution**Q10 — TSD: Relative Speed, Same Direction**

Concept: When two objects move in the same direction, relative speed = (faster speed) – (slower speed).

Step 1 — Headstart of P when Q departs (at 9 am).

$$\text{Headstart} = 60 \text{ km/h} \times 1 \text{ h} = 60 \text{ km}$$

Step 2 — Relative speed of Q over P.

$$90 - 60 = 30 \text{ km/h}$$

Step 3 — Time for Q to close the gap.

$$t = \frac{60 \text{ km}}{30 \text{ km/h}} = 2 \text{ hours after 9 am} = \mathbf{11 \text{ am}}$$

Why other options are wrong:

- (A) 10 am: only 1 h after Q's start; gap closed = $30 \times 1 = 30 \text{ km} < 60 \text{ km}$.
- (C) 11:30 am: 2.5 h; gap closed = 75 km, overshoots.
- (D) 12 noon: 3 h; gap closed = 90 km, far past the catch-up point.

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

Solution**Q11 — TSD: Train Crossing a Bridge**

Concept: To cross a bridge fully, the train must travel a distance equal to its own length plus the bridge length.

Step 1 — Total distance to cover.

$$d = 200 \text{ m} + 300 \text{ m} = 500 \text{ m}$$

Step 2 — Convert speed to m/s.

$$50 \text{ km/h} = 50 \times \frac{1000}{3600} = \frac{125}{9} \text{ m/s}$$



Step 3 — Time.

$$t = \frac{500}{\frac{125}{9}} = \frac{500 \times 9}{125} = \frac{4500}{125} = 36 \text{ s}$$

Why other options are wrong:

- (A) 24 s: corresponds to crossing only 300 m at the given speed.
- (B) 30 s: corresponds to 375 m, an incorrect distance.
- (D) 40 s: corresponds to 500 m at a lower speed of 45 km/h.

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

Solution

Q12 — Work & Time: Efficiency Ratio

Concept: If A is twice as efficient as B, A's rate = $2 \times$ B's rate.

Step 1 — Let B alone take b days. Then A alone takes $\frac{b}{2}$ days.

Step 2 — Combined rate equals $\frac{1}{6}$.

$$\frac{1}{b} + \frac{2}{b} = \frac{1}{6} \implies \frac{3}{b} = \frac{1}{6} \implies b = 18 \text{ days}$$

Why other options are wrong:

- (A) 9 days: B's rate = $1/9$; A's rate = $2/9$; combined = $3/9 = 1/3 \neq 1/6$.
- (B) 12 days: combined = $3/12 = 1/4 \neq 1/6$.
- (C) 15 days: combined = $3/15 = 1/5 \neq 1/6$.

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

Solution

Q13 — Pipes & Cisterns: Two Inlets and One Drain

Concept: Net rate = sum of filling rates – draining rate.

Step 1 — Individual rates (fraction of tank per minute):

$$\text{Rate of A} = \frac{1}{12}, \quad \text{Rate of B} = \frac{1}{18}, \quad \text{Rate of C (drain)} = \frac{1}{36}$$



Step 2 — Net rate with all three open.

$$\frac{1}{12} + \frac{1}{18} - \frac{1}{36} = \frac{3}{36} + \frac{2}{36} - \frac{1}{36} = \frac{4}{36} = \frac{1}{9}$$

Step 3 — Time to fill.

$$t = \frac{1}{1/9} = 9 \text{ minutes}$$

Why other options are wrong:

- (B) 10 min: would require net rate = $1/10$, not the case.
- (C) 12 min: equals A alone; ignoring B and C.
- (D) 15 min: no valid combination gives this rate.

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

Solution

Q14 — Profit & Loss: Profit Percentage

Concept: $\text{Profit}\% = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100.$

Step 1 — Compute profit.

$$\text{Profit} = 900 - 750 = \text{Rs. } 150$$

Step 2 — Compute profit%.

$$\text{Profit}\% = \frac{150}{750} \times 100 = 20\%$$

Why other options are wrong:

- (A) 15%: 15% of 750 = 112.5; SP would be Rs. 862.5, not 900.
- (C) 25%: 25% of 750 = 187.5; SP would be Rs. 937.5, not 900.
- (D) 30%: 30% of 750 = 225; SP would be Rs. 975, not 900.

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

Solution

Q15 — Compound Interest: 3 Years

Concept: $A = P\left(1 + \frac{r}{100}\right)^n$; $\text{CI} = A - P.$



Step 1 — Compute amount.

$$A = 8000 \times (1.05)^3 = 8000 \times 1.157625 = 9261$$

Step 2 — Compute CI.

$$CI = 9261 - 8000 = \text{Rs. 1261}$$

Detailed expansion: $(1.05)^2 = 1.1025$; $(1.05)^3 = 1.1025 \times 1.05 = 1.157625$.

Why other options are wrong:

- (A) Rs. 1200: corresponds to $SI = 8000 \times 5\% \times 3 = 1200$.
- (B) Rs. 1230: a common rounding error; exact answer is 1261.
- (D) Rs. 1300: overestimate with no valid basis.

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

Solution

Q16 — Arithmetic Progression: Sum Formula

Concept: $S_n = \frac{n}{2}(a + l)$, where a = first term, l = last term, n = number of terms.

Step 1 — Find n . AP: 5, 10, 15, ..., 100; common difference $d = 5$.

$$n = \frac{100 - 5}{5} + 1 = 19 + 1 = 20$$

Step 2 — Compute sum.

$$S_{20} = \frac{20}{2}(5 + 100) = 10 \times 105 = 1050$$

Why other options are wrong:

- (A) 950: arises from taking $n = 19$ (omitting the last term).
- (B) 1000: no standard calculation with this AP gives 1000.
- (C) 1025: off-by-one error in the number of terms.

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



Solution**Q17 — Geometric Progression: Sum of First n Terms**

Concept: $S_n = \frac{a(r^n - 1)}{r - 1}$ for $r \neq 1$.

Step 1 — Identify parameters. GP: 2, 6, 18, 54, ...

$$a = 2, \quad r = \frac{6}{2} = 3, \quad n = 5$$

Step 2 — Compute S_5 .

$$S_5 = \frac{2(3^5 - 1)}{3 - 1} = \frac{2(243 - 1)}{2} = \frac{2 \times 242}{2} = 242$$

Verification: $2 + 6 + 18 + 54 + 162 = 242 \checkmark$.

Why other options are wrong:

- (B) 162: that is only the 5th term ($ar^4 = 2 \times 81$), not the sum.
- (C) 486: equals S_5 for a GP starting at 4 with $r = 3$.
- (D) 364: corresponds to $a = 4, r = 3, n = 4$: $4(81 - 1)/2 = 160 \neq 364$.

Answer: (A) [Go Back to Q 17](#)

Solution**Q18 — Geometry: Pythagorean Theorem**

Concept: In a right triangle, $h^2 = a^2 + b^2$ (Pythagoras).

Step 1 — Apply the theorem.

$$h^2 = 8^2 + 15^2 = 64 + 225 = 289$$

Step 2 — Solve.

$$h = \sqrt{289} = 17 \text{ cm}$$

Note: (8, 15, 17) is a well-known Pythagorean triple.

Why other options are wrong:

- (A) 15 cm: that is one of the legs, not the hypotenuse.
- (C) 18 cm: $18^2 = 324 \neq 289$.
- (D) 20 cm: $20^2 = 400 \neq 289$.



Answer: (B) [Go Back to Q 18](#)**Solution****Q19 — Mensuration: Surface Area of a Sphere****Concept:** Total surface area of a sphere = $4\pi r^2$.**Step 1 — Substitute values.** $r = 7 \text{ cm}$, $\pi = \frac{22}{7}$.

$$\text{SA} = 4 \times \frac{22}{7} \times 7^2 = 4 \times \frac{22}{7} \times 49 = 4 \times 22 \times 7 = 616 \text{ cm}^2$$

Why other options are wrong:

- (A) 154 cm^2 : this is πr^2 (area of a circle of radius 7), not a sphere's SA.
- (B) 308 cm^2 : this is $2\pi r^2$ (one hemisphere SA without base).
- (D) 1232 cm^2 : double the correct answer; a common factor-of-2 error.

Answer: (C) [Go Back to Q 19](#)**Solution****Q20 — Geometry: Inscribed Angle Theorem****Concept:** The *Inscribed Angle Theorem* states that the central angle subtended by a chord is *twice* the inscribed angle subtended by the same chord on the major arc.**Step 1 — Apply the theorem.**

$$\text{Central angle} = 2 \times \text{Inscribed angle} = 2 \times 70^\circ = 140^\circ$$

Why other options are wrong:

- (A) 35° : half the inscribed angle; the relationship is reversed.
- (B) 70° : the inscribed angle itself; the central angle is double this.
- (C) 105° : $1.5 \times 70^\circ$; not a valid theorem relationship.

Answer: (D) [Go Back to Q 20](#)

Answer Key

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

