

Jharkhand Polytechnic Mathematics

Sample Paper – 8

Duration: 50 Minutes

Maximum Marks: 50

Instructions

- This paper contains **50** Multiple Choice Questions (Single Correct Answer), modelled on the Mathematics section of the **Jharkhand Polytechnic (PECE)** entrance examination conducted by JCECEB.
- Each correct answer carries **+1 mark**. There is a **negative marking of 0.25 mark** for every wrong answer. Unattempted questions carry **no penalty**.
- Only **one** option is correct. Choose carefully.
- This is an offline OMR based test. Darken the correct bubble fully with a blue or black ball pen.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Q1. The HCF (highest common factor) of 28 and 42 is:

- (A) 28
- (B) 7
- (C) 14
- (D) 2

Q2. The LCM (lowest common multiple) of 6 and 9 is:

- (A) 18
- (B) 54
- (C) 3
- (D) 9



Q3. The smallest natural number is:

- (A) 0
- (B) 2
- (C) 10
- (D) 1

Q4. Identify the rational number from the options below:

- (A) $\sqrt{2}$
- (B) 0.6
- (C) $\sqrt{3}$
- (D) $\sqrt{5}$

Q5. The face value of the digit 8 in the number 5832 is:

- (A) 8
- (B) 800
- (C) 80
- (D) 8000

Q6. If $2x - 3 = 11$, then the value of x is:

- (A) 4
- (B) 14
- (C) 5
- (D) 7

Q7. The value of $(a + b)^2$ when $a = 5$ and $b = 1$ is:

- (A) 26
- (B) 36
- (C) 10



(D) 16

Q8. The factors of $x^2 - 100$ are:

(A) $(x - 10)(x + 10)$

(B) $(x - 10)(x - 10)$

(C) $(x - 20)(x + 5)$

(D) $(x + 50)(x - 2)$

Q9. If $11x = 88$, then x equals:

(A) 7

(B) 9

(C) 8

(D) 99

Q10. The roots of the quadratic equation $x^2 - 12x + 35 = 0$ are:

(A) 1, 35

(B) 5, 7

(C) -5, -7

(D) 6, 6

Q11. On simplifying, $8x + 7x$ equals:

(A) $56x$

(B) x

(C) $15x^2$

(D) $15x$

Q12. If $a = 3$, the value of $3a^2 - 4$ is:

(A) 23



(B) 32

(C) 5

(D) 14

Q13. The ratio 40 : 50 in its simplest form is:

(A) 5 : 4

(B) 8 : 10

(C) 4 : 5

(D) 1 : 2

Q14. The average of 14, 28 and 42 is:

(A) 42

(B) 28

(C) 84

(D) 21

Q15. The mean proportional between 4 and 25 is:

(A) 100

(B) 29

(C) 14.5

(D) 10

Q16. If $6 : 11 = x : 33$, then the value of x is:

(A) 18

(B) 22

(C) 6

(D) 33

Q17. 90% of 200 is:



- (A) 90
- (B) 200
- (C) 180
- (D) 18

Q18. An article bought for Rs. 1000 is sold for Rs. 800. The loss per cent is:

- (A) loss 10%
- (B) loss 20%
- (C) profit 20%
- (D) loss 25%

Q19. The fraction $\frac{17}{25}$ expressed as a percentage is:

- (A) 68%
- (B) 17%
- (C) 25%
- (D) 70%

Q20. A watch marked at Rs. 2500 is sold at a discount of 20%. Its selling price is:

- (A) Rs. 3000
- (B) Rs. 500
- (C) Rs. 2300
- (D) Rs. 2000

Q21. If 30% of a number is 60, the number is:

- (A) 180
- (B) 90
- (C) 200
- (D) 300



- Q22.** The simple interest on Rs. 5000 at 6% per annum for 2 years is:
- (A) Rs. 300
 - (B) Rs. 600
 - (C) Rs. 6000
 - (D) Rs. 660
- Q23.** The compound interest on Rs. 10000 at 10% per annum for 2 years (compounded annually) is:
- (A) Rs. 2100
 - (B) Rs. 2000
 - (C) Rs. 1000
 - (D) Rs. 12100
- Q24.** At what rate per annum will Rs. 4000 earn a simple interest of Rs. 480 in 2 years?
- (A) 12%
 - (B) 4%
 - (C) 5%
 - (D) 6%
- Q25.** If A can complete a piece of work in 25 days, the part of the work A does in one day is:
- (A) 25
 - (B) $\frac{1}{25}$
 - (C) $\frac{1}{5}$
 - (D) 5
- Q26.** A can do a work in 4 days and B can do the same work in 12 days. Working together, they finish it in:



- (A) 16 days
- (B) 8 days
- (C) 6 days
- (D) 3 days

Q27. A tap can fill a tank in 15 hours. The part of the tank it fills in one hour is:

- (A) $\frac{1}{15}$
- (B) 15
- (C) $\frac{1}{30}$
- (D) $\frac{2}{15}$

Q28. A car travels 420 km in 6 hours. Its average speed is:

- (A) 2520 km/h
- (B) 426 km/h
- (C) 70 km/h
- (D) 60 km/h

Q29. A train 360 m long crosses a pole in 12 seconds. Its speed is:

- (A) 12 m/s
- (B) 30 m/s
- (C) 372 m/s
- (D) 25 m/s

Q30. The distance covered by a vehicle moving at 65 km/h in 4 hours is:

- (A) 65 km
- (B) 16.25 km
- (C) 260 km



(D) 130 km

Q31. The speed of a boat in still water is 25 km/h and the speed of the stream is 5 km/h. The upstream speed of the boat is:

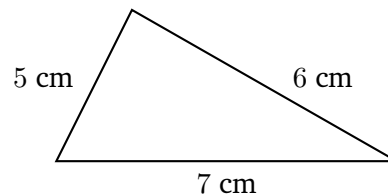
(A) 20 km/h

(B) 30 km/h

(C) 5 km/h

(D) 125 km/h

Q32. A triangle in which all three sides are of different lengths, like the one shown, is called a:



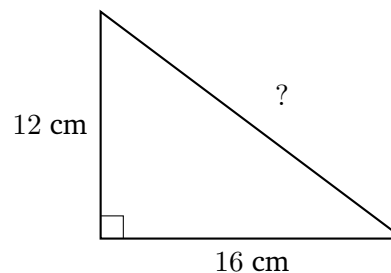
(A) equilateral triangle

(B) isosceles triangle

(C) right-angled triangle

(D) scalene triangle

Q33. In the right-angled triangle shown, the two legs measure 12 cm and 16 cm. The length of the hypotenuse is:



(A) 20 cm

(B) 28 cm



(C) 18 cm

(D) 24 cm

Q34. Two angles are complementary. If one of them is 40° , the other angle is:

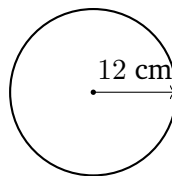
(A) 140°

(B) 60°

(C) 50°

(D) 40°

Q35. The diameter of the circle shown, whose radius is 12 cm, is:



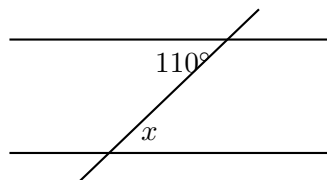
(A) 12 cm

(B) 24 cm

(C) 6 cm

(D) 144 cm

Q36. In the figure, two parallel lines are cut by a transversal. The two co-interior (allied) angles add up to 180° . If one of them is 110° , the angle x is:



(A) 110°

(B) 90°

(C) 180°

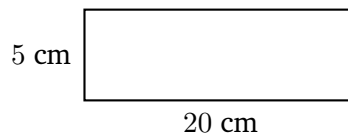
(D) 70°



Q37. The sum of the interior angles of an octagon (a polygon with 8 sides) is:

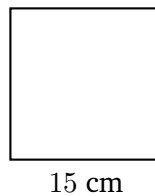
- (A) 720°
- (B) 1080°
- (C) 900°
- (D) 1440°

Q38. The perimeter of the rectangle shown, of length 20 cm and breadth 5 cm, is:



- (A) 100 cm
- (B) 25 cm
- (C) 40 cm
- (D) 50 cm

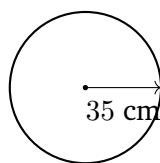
Q39. The area of the square shown, of side 15 cm, is:



- (A) 225 cm^2
- (B) 60 cm^2
- (C) 30 cm^2
- (D) 45 cm^2

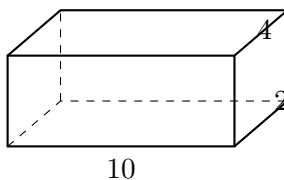
Q40. The circumference of a circle of radius 35 cm $\left(\text{take } \pi = \frac{22}{7}\right)$ is:





- (A) 110 cm
- (B) 3850 cm
- (C) 220 cm
- (D) 70 cm

Q41. The volume of the cuboid shown, of length 10 cm, breadth 4 cm and height 2 cm, is:

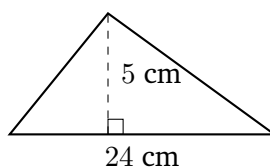


- (A) 16 cm^3
- (B) 80 cm^3
- (C) 800 cm^3
- (D) 40 cm^3

Q42. The volume of a cube of side 7 cm is:

- (A) 49 cm^3
- (B) 21 cm^3
- (C) 343 cm^3
- (D) 294 cm^3

Q43. The area of the triangle shown, with base 24 cm and height 5 cm, is:



- (A) 60 cm^2
- (B) 120 cm^2
- (C) 29 cm^2
- (D) 30 cm^2

Q44. The value of $\operatorname{cosec} 30^\circ$ is:

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

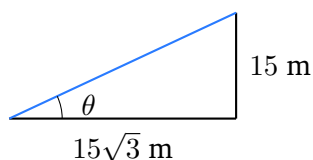
Q45. The value of $\sec 45^\circ$ is:

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

Q46. The value of $2 \sin 30^\circ$ is:

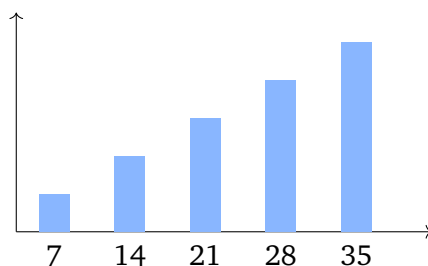
- (A) 2
- (B) $\frac{1}{2}$
- (C) 1
- (D) $\sqrt{3}$

Q47. A vertical tower of height 15 m casts a shadow of length $15\sqrt{3}$ m on the ground, as shown. The angle of elevation of the sun is:



- (A) 30°
- (B) 45°
- (C) 60°
- (D) 90°

Q48. The data values 7, 14, 21, 28, 35 are shown as bars below. The mean (average) of this data is:



- (A) 35
- (B) 21
- (C) 105
- (D) 28

Q49. The mode of the data 8, 9, 9, 9, 10 is:

- (A) 8
- (B) 10
- (C) 45
- (D) 9

Q50. When a fair coin is tossed once, the probability of getting a head OR a tail (that is, a certain event) is:

- (A) 0
- (B) $\frac{1}{2}$
- (C) 1
- (D) 2



Detailed Solutions**Q1.****Solution**

Concept — HCF: The HCF of two numbers is the largest number that divides both of them exactly.

Step 1 — Write the prime factors: $28 = 2 \times 2 \times 7$ and $42 = 2 \times 3 \times 7$.

Step 2 — Take the common factors: The factors common to both are 2 and 7.

Step 3 — Multiply them: $\text{HCF} = 2 \times 7 = 14$.

Why other options are wrong:

- 28 is one of the numbers, not the HCF.
- 7 and 2 are common factors but not the highest.

Final Answer: $\text{HCF} = 14 \Rightarrow \boxed{\text{C}}$

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

Q2.**Solution**

Concept — LCM: The LCM of two numbers is the smallest number that is a multiple of both.

Step 1 — List multiples: Multiples of 6: 6, 12, 18, 24, ...; multiples of 9: 9, 18, 27, ...

Step 2 — Find the smallest common one: The smallest common multiple is 18.

Why other options are wrong:

- 54 is a common multiple but not the smallest.
- 3 is the HCF, and 9 is not a multiple of 6.

Final Answer: $\text{LCM} = 18 \Rightarrow \boxed{\text{A}}$

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



Q3.

Solution

Concept — Natural numbers: The natural numbers are the counting numbers 1, 2, 3, 4, ..., and they start from 1.

Step 1 — Recall the starting value: Counting begins at 1.

Step 2 — Identify the smallest: The smallest natural number is 1.

Why other options are wrong:

- 0 is a whole number, not a natural number.
- 2 and 10 are natural numbers but larger than 1.

Final Answer: The smallest natural number is 1 $\Rightarrow$ D

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

Q4.

Solution

Concept — Rational and irrational numbers: A rational number can be written as a fraction of integers; its decimal either ends or repeats.

Step 1 — Test each option: $\sqrt{2} = 1.414\dots$, $\sqrt{3} = 1.732\dots$ and $\sqrt{5} = 2.236\dots$ never end or repeat, so they are irrational.

Step 2 — Identify the rational one: $0.6 = \frac{6}{10} = \frac{3}{5}$, a fraction of integers, so it is rational.

Why other options are wrong:

- $\sqrt{2}$, $\sqrt{3}$ and $\sqrt{5}$ are all irrational numbers.

Final Answer: 0.6 is rational $\Rightarrow$ B

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



Q5.

Solution

Concept — Face value: The face value of a digit is simply the digit itself, no matter which place it occupies.

Step 1 — Locate the digit: The digit is 8 in the number 5832.

Step 2 — State its face value: The face value of 8 is 8.

Why other options are wrong:

- 800 is the place value of 8 (hundreds place), not its face value.
- 80 and 8000 use wrong places.

Final Answer: Face value = 8 $\Rightarrow$

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

Q6.

Solution

Concept — Linear equation: Move the constant term to the other side, then divide by the coefficient of x .

Step 1 — Add 3 to both sides: $2x = 11 + 3 = 14$.

Step 2 — Divide by 2: $x = \frac{14}{2}$.

Step 3 — Compute: $x = 7$.

Why other options are wrong:

- 4 uses $11 - 3$ then divides wrongly.
- 14 forgets to divide by 2.
- 5 subtracts instead of adding.

Final Answer: $x = 7 \Rightarrow$

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



Q7.

Solution

Concept — Algebraic identity: $(a + b)^2 = a^2 + 2ab + b^2$, or simply square the sum.

Step 1 — Add first: $a + b = 5 + 1 = 6$.

Step 2 — Square the sum: $(6)^2 = 36$.

Why other options are wrong:

- $26 = a^2 + b^2$ forgets the $2ab$ term.
- 10 is $2ab$ only.
- 16 comes from a wrong calculation.

Final Answer: $(a + b)^2 = 36 \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q7](#)

Q8.

Solution

Concept — Difference of squares: $a^2 - b^2 = (a - b)(a + b)$.

Step 1 — Write 100 as a square: $x^2 - 100 = x^2 - 10^2$.

Step 2 — Apply the identity: $x^2 - 10^2 = (x - 10)(x + 10)$.

Why other options are wrong:

- $(x - 10)(x - 10) = x^2 - 20x + 100$, which is wrong.
- The other pairs do not multiply back to $x^2 - 100$.

Final Answer: $x^2 - 100 = (x - 10)(x + 10) \Rightarrow \boxed{\text{A}}$

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



Q9.

Solution**Concept — Simple equation:** Divide both sides by the coefficient of x .**Step 1 — Divide by 11:** $x = \frac{88}{11}$.**Step 2 — Compute:** $x = 8$.**Why other options are wrong:**

- 7 and 9 do not satisfy $11x = 88$.
- 99 adds instead of dividing.

Final Answer: $x = 8 \Rightarrow$ CAnswer: (C) [Go Back to Q9](#)

Q10.

Solution**Concept — Quadratic roots:** Factorise so that the two factors multiply to $+35$ and add to -12 .**Step 1 — Split the middle term:** $x^2 - 12x + 35 = (x - 5)(x - 7)$.**Step 2 — Set each factor to zero:** $x - 5 = 0$ or $x - 7 = 0$, giving $x = 5$ or $x = 7$.**Why other options are wrong:**

- 1, 35 and 6, 6 do not satisfy the equation.
- $-5, -7$ would need the equation $x^2 + 12x + 35$.

Final Answer: Roots are 5 and 7 $\Rightarrow$ BAnswer: (B) [Go Back to Q10](#)

Q11.

Solution

Concept — Like terms: Terms with the same variable can be added by adding their coefficients.

Step 1 — Add the coefficients: $8 + 7 = 15$.

Step 2 — Attach the variable: $8x + 7x = 15x$.

Why other options are wrong:

- $56x$ multiplies the coefficients.
- x subtracts them.
- $15x^2$ wrongly multiplies the variables too.

Final Answer: $8x + 7x = 15x \Rightarrow$ D

Answer: (D) [Go Back to Q11](#)

Q12.

Solution

Concept — Substitution: Replace the variable with its value and follow the order of operations.

Step 1 — Square first: $a^2 = 3^2 = 9$.

Step 2 — Multiply by 3: $3 \times 9 = 27$.

Step 3 — Subtract 4: $27 - 4 = 23$.

Why other options are wrong:

- 32 uses $(3a)^2 - 4$ wrongly... it forgets to subtract correctly.
- 5 uses $3a - 4$ directly.
- 14 uses a wrong square.

Final Answer: $3a^2 - 4 = 23 \Rightarrow$ A

Answer: (A) [Go Back to Q12](#)



Q13.

Solution**Concept — Simplifying ratios:** Divide both terms of the ratio by their HCF.**Step 1 — Find the HCF:** HCF of 40 and 50 is 10.**Step 2 — Divide both terms:** $\frac{40}{10} : \frac{50}{10} = 4 : 5$.**Why other options are wrong:**

- 5 : 4 reverses the ratio.
- 8 : 10 is not in simplest form.
- 1 : 2 is incorrect.

Final Answer: $40 : 50 = 4 : 5 \Rightarrow$ CAnswer: (C) [Go Back to Q13](#)

Q14.

Solution**Concept — Average:** $\text{Average} = \frac{\text{sum of values}}{\text{number of values}}$.**Step 1 — Add the values:** $14 + 28 + 42 = 84$.**Step 2 — Divide by the count:** $\frac{84}{3} = 28$.**Why other options are wrong:**

- 84 is the sum, not the average.
- 42 is the largest value.
- 21 uses a wrong divisor.

Final Answer: $\text{Average} = 28 \Rightarrow$ BAnswer: (B) [Go Back to Q14](#)

Q15.

Solution

Concept — Mean proportional: The mean proportional between two numbers a and b is $\sqrt{a \times b}$.

Step 1 — Multiply the numbers: $4 \times 25 = 100$.

Step 2 — Take the square root: $\sqrt{100} = 10$.

Why other options are wrong:

- 100 is the product, not its square root.
- 29 adds the numbers and 14.5 halves that sum.

Final Answer: Mean proportional = 10 $\Rightarrow$ D

Answer: (D) [Go Back to Q15](#)

Q16.

Solution

Concept — Equal ratios: If $a : b = c : x$, then cross multiplication gives $a \times x = b \times c$.

Step 1 — Write the proportion: $6 : 11 = x : 33$.

Step 2 — Cross multiply: $6 \times 33 = 11 \times x$, so $198 = 11x$.

Step 3 — Solve: $x = \frac{198}{11} = 18$.

Why other options are wrong:

- 22, 6 and 33 do not satisfy the proportion.

Final Answer: $x = 18 \Rightarrow$ A

Answer: (A) [Go Back to Q16](#)



Q17.

Solution

Concept — Percentage: $x\%$ of a number $= \frac{x}{100} \times \text{number}$.

Step 1 — Write the fraction: $90\% = \frac{90}{100}$.

Step 2 — Multiply: $\frac{90}{100} \times 200 = 90 \times 2 = 180$.

Why other options are wrong:

- 90 is the percentage value, not the result.
- 200 is the original number.
- 18 uses a wrong fraction.

Final Answer: 90% of 200 = 180 $\Rightarrow$ **C**

Answer: (C) [Go Back to Q17](#)

Q18.

Solution

Concept — Loss per cent: $\text{Loss}\% = \frac{\text{Loss}}{\text{Cost price}} \times 100$.

Step 1 — Find the loss: $\text{Loss} = 1000 - 800 = 200$.

Step 2 — Apply the formula: $\text{Loss}\% = \frac{200}{1000} \times 100 = 20\%$.

Why other options are wrong:

- Loss 10% uses a wrong loss amount.
- There is a loss, not a profit, so profit 20% is wrong.
- Loss 25% would need a loss of 250.

Final Answer: Loss = 20% $\Rightarrow$ **B**

Answer: (B) [Go Back to Q18](#)



Q19.

Solution

Concept — Fraction to percentage: Multiply the fraction by 100 and add the % sign.

Step 1 — Multiply by 100: $\frac{17}{25} \times 100 = 17 \times 4 = 68$.

Step 2 — Add the sign: $\frac{17}{25} = 68\%$.

Why other options are wrong:

- 17% and 25% just read off the numerator or denominator.
- 70% is a wrong rounding.

Final Answer: $\frac{17}{25} = 68\% \Rightarrow \boxed{A}$

Answer: (A) [Go Back to Q19](#)

Q20.

Solution

Concept — Discount: Selling price = marked price – discount, where discount = discount% of marked price.

Step 1 — Find the discount: 20% of 2500 = $\frac{20}{100} \times 2500 = 500$.

Step 2 — Subtract: Selling price = 2500 – 500 = 2000.

Why other options are wrong:

- Rs. 3000 adds the discount.
- Rs. 500 is the discount itself.
- Rs. 2300 uses a wrong discount.

Final Answer: Selling price = Rs. 2000 $\Rightarrow \boxed{D}$

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



Q21.

Solution

Concept — Reverse percentage: If 30% of a number is 60, then $\frac{30}{100}$ of the number equals 60.

Step 1 — Write the equation: $\frac{30}{100} \times x = 60$.

Step 2 — Solve for x : $x = \frac{60 \times 100}{30}$.

Step 3 — Compute: $x = \frac{6000}{30} = 200$.

Why other options are wrong:

- 180, 90 and 300 do not give 60 as their 30%.

Final Answer: The number is 200 $\Rightarrow$ **C**

Answer: (C) [Go Back to Q21](#)

Q22.

Solution

Concept — Simple interest: $SI = \frac{P \times R \times T}{100}$.

Step 1 — List the data: $P = 5000$, $R = 6$, $T = 2$.

Step 2 — Substitute: $SI = \frac{5000 \times 6 \times 2}{100}$.

Step 3 — Compute: $SI = \frac{60000}{100} = 600$.

Why other options are wrong:

- Rs. 300 uses $T = 1$.
- Rs. 6000 omits the 100.
- Rs. 660 would be the compound interest.

Final Answer: $SI = \text{Rs. } 600 \Rightarrow$ **B**

Answer: (B) [Go Back to Q22](#)



Q23.

Solution

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

Step 1 — Find the amount: $A = 10000 \left(1 + \frac{10}{100}\right)^2 = 10000 \times (1.1)^2$.

Step 2 — Compute the power: $(1.1)^2 = 1.21$, so $A = 10000 \times 1.21 = 12100$.

Step 3 — Subtract the principal: $\text{CI} = 12100 - 10000 = 2100$.

Why other options are wrong:

- Rs. 2000 is the simple interest.
- Rs. 12100 is the total amount, not the interest.
- Rs. 1000 uses $T = 1$.

Final Answer: $\text{CI} = \text{Rs. } 2100 \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q23](#)

Q24.

Solution

Concept — Finding the rate: From $\text{SI} = \frac{PRT}{100}$, we get $R = \frac{\text{SI} \times 100}{P \times T}$.

Step 1 — List the data: $\text{SI} = 480$, $P = 4000$, $T = 2$.

Step 2 — Substitute: $R = \frac{480 \times 100}{4000 \times 2}$.

Step 3 — Compute: $R = \frac{48000}{8000} = 6\%$.

Why other options are wrong:

- 12%, 4% and 5% do not give Rs. 480 interest.

Final Answer: $\text{Rate} = 6\% \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q24](#)



Q25.

Solution

Concept — One day's work: If a person finishes a job in n days, the part done in one day is $\frac{1}{n}$.

Step 1 — Apply with $n = 25$: One day's work = $\frac{1}{25}$.

Step 2 — Confirm: In 25 days, $25 \times \frac{1}{25} = 1$ whole work.

Why other options are wrong:

- 25 and 5 are not fractions of work.
- $\frac{1}{5}$ would mean finishing in 5 days.

Final Answer: One day's work = $\frac{1}{25} \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q25](#)

Q26.

Solution

Concept — Combined work: Add the one-day works and take the reciprocal for the total time.

Step 1 — One day's work each: A does $\frac{1}{4}$, B does $\frac{1}{12}$.

Step 2 — Add them: $\frac{1}{4} + \frac{1}{12} = \frac{3}{12} + \frac{1}{12} = \frac{4}{12} = \frac{1}{3}$.

Step 3 — Take the reciprocal: Time together = 3 days.

Why other options are wrong:

- 16 and 8 days come from wrong addition.
- 6 days is too slow.

Final Answer: They finish in 3 days $\Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q26](#)



Q27.

Solution

Concept — Filling rate: A tap that fills a tank in n hours fills $\frac{1}{n}$ of it in one hour.

Step 1 — Apply with $n = 15$: One hour's filling = $\frac{1}{15}$.

Step 2 — Confirm: In 15 hours, $15 \times \frac{1}{15} = 1$ full tank.

Why other options are wrong:

- 15 is the number of hours, not the part.
- $\frac{1}{30}$ and $\frac{2}{15}$ are wrong fractions.

Final Answer: One hour's work = $\frac{1}{15} \Rightarrow \boxed{\text{A}}$

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

Q28.

Solution

Concept — Speed: $\text{Speed} = \frac{\text{distance}}{\text{time}}$.

Step 1 — List the data: distance = 420 km, time = 6 h.

Step 2 — Divide: $\text{Speed} = \frac{420}{6} = 70 \text{ km/h}$.

Why other options are wrong:

- 2520 multiplies instead of dividing.
- 426 adds the values.
- 60 uses a wrong divisor.

Final Answer: Speed = 70 km/h $\Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q28](#)



Q29.

Solution

Concept — Train crossing a pole: The train covers a distance equal to its own length, so $\text{speed} = \frac{\text{length}}{\text{time}}$.

Step 1 — List the data: length = 360 m, time = 12 s.

Step 2 — Divide: $\text{Speed} = \frac{360}{12} = 30 \text{ m/s}$.

Why other options are wrong:

- 372 adds the values.
- 12 and 25 use wrong operations.

Final Answer: Speed = 30 m/s $\Rightarrow$ **B**

Answer: (B) [Go Back to Q29](#)

Q30.

Solution

Concept — Distance: Distance = speed $\times$ time.

Step 1 — List the data: speed = 65 km/h, time = 4 h.

Step 2 — Multiply: Distance = $65 \times 4 = 260 \text{ km}$.

Why other options are wrong:

- 65 ignores the time.
- 16.25 divides instead of multiplying.
- 130 uses a wrong time.

Final Answer: Distance = 260 km $\Rightarrow$ **C**

Answer: (C) [Go Back to Q30](#)



Q31.

Solution

Concept — Upstream speed: Going upstream, the stream opposes the boat, so upstream speed = boat speed – stream speed.

Step 1 — Subtract the speeds: $25 - 5 = 20$ km/h.

Step 2 — State the result: Upstream speed = 20 km/h.

Why other options are wrong:

- 30 km/h is the downstream speed ($25 + 5$).
- 5 is the stream speed and 125 multiplies the values.

Final Answer: Upstream speed = 20 km/h $\Rightarrow$ A

Answer: (A) [Go Back to Q31](#)

Q32.

Solution

Concept — Types of triangle by sides: A triangle is scalene if all three sides are of different lengths, isosceles if exactly two sides are equal, and equilateral if all three are equal.

Step 1 — Read the figure: The sides are 5 cm, 6 cm and 7 cm, all different.

Step 2 — Match the definition: A triangle with all sides different is scalene.

Why other options are wrong:

- An equilateral triangle has all sides equal.
- An isosceles triangle has two equal sides.
- Right-angled refers to an angle, not the sides.

Final Answer: It is a scalene triangle $\Rightarrow$ D

Answer: (D) [Go Back to Q32](#)



Q33.

Solution

Concept — Pythagoras theorem: In a right-angled triangle, $(\text{hypotenuse})^2 = (\text{leg}_1)^2 + (\text{leg}_2)^2$.

Step 1 — Square the legs: $12^2 = 144$ and $16^2 = 256$.

Step 2 — Add them: $144 + 256 = 400$.

Step 3 — Take the square root: Hypotenuse = $\sqrt{400} = 20$ cm.

Why other options are wrong:

- 28 adds the two legs.
- 18 and 24 do not satisfy the theorem.

Final Answer: Hypotenuse = 20 cm $\Rightarrow$ **A**

Answer: (A) [Go Back to Q33](#)

Q34.

Solution

Concept — Complementary angles: Two angles are complementary if their measures add up to 90° .

Step 1 — Write the relation: $40^\circ + (\text{other angle}) = 90^\circ$.

Step 2 — Solve: Other angle = $90^\circ - 40^\circ = 50^\circ$.

Why other options are wrong:

- 140° would make the sum 180° (supplementary).
- 60° and 40° do not give a sum of 90° .

Final Answer: The other angle is $50^\circ \Rightarrow$ **C**

Answer: (C) [Go Back to Q34](#)



Q35.

Solution

Concept — Diameter and radius: The diameter of a circle is twice its radius, that is, $\text{diameter} = 2 \times \text{radius}$.

Step 1 — List the radius: $\text{radius} = 12 \text{ cm}$.

Step 2 — Double it: $\text{Diameter} = 2 \times 12 = 24 \text{ cm}$.

Why other options are wrong:

- 12 is the radius itself.
- 6 halves the radius.
- 144 squares the radius.

Final Answer: $\text{Diameter} = 24 \text{ cm} \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q35](#)

Q36.

Solution

Concept — Co-interior angles: When a transversal cuts two parallel lines, each pair of co-interior (allied) angles adds up to 180° .

Step 1 — Write the relation: $110^\circ + x = 180^\circ$.

Step 2 — Solve for x : $x = 180^\circ - 110^\circ = 70^\circ$.

Why other options are wrong:

- 110° would make co-interior angles equal, which is wrong.
- 90° and 180° do not satisfy the sum.

Final Answer: $x = 70^\circ \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q36](#)



Q37.

Solution

Concept — Angle sum of a polygon: The sum of the interior angles of a polygon with n sides is $(n - 2) \times 180^\circ$.

Step 1 — Put $n = 8$: Sum = $(8 - 2) \times 180^\circ$.

Step 2 — Compute: Sum = $6 \times 180^\circ = 1080^\circ$.

Why other options are wrong:

- 720° is for a hexagon ($n = 6$).
- 900° is for a heptagon ($n = 7$).
- 1440° is for a decagon ($n = 10$).

Final Answer: Sum = $1080^\circ \Rightarrow$ **B**

Answer: (B) [Go Back to Q37](#)

Q38.

Solution

Concept — Perimeter of a rectangle: Perimeter = $2 \times (\text{length} + \text{breadth})$.

Step 1 — Add length and breadth: $20 + 5 = 25$.

Step 2 — Multiply by 2: Perimeter = $2 \times 25 = 50$ cm.

Why other options are wrong:

- 100 is the area (20×5).
- 25 is the half-perimeter.
- 40 uses only the length twice.

Final Answer: Perimeter = 50 cm $\Rightarrow$ **D**

Answer: (D) [Go Back to Q38](#)



Q39.

Solution**Concept — Area of a square:** $\text{Area} = \text{side} \times \text{side} = \text{side}^2$.**Step 1 — List the side:** $\text{side} = 15 \text{ cm}$.**Step 2 — Square it:** $\text{Area} = 15 \times 15 = 225 \text{ cm}^2$.**Why other options are wrong:**

- 60 is the perimeter (4×15).
- 30 doubles the side.
- 45 multiplies the side by 3.

Final Answer: $\text{Area} = 225 \text{ cm}^2 \Rightarrow \boxed{\text{A}}$ **Answer: (A)** [Go Back to Q39](#)

Q40.

Solution**Concept — Circumference of a circle:** $\text{Circumference} = 2\pi r$.**Step 1 — Substitute the values:** $2 \times \frac{22}{7} \times 35$.**Step 2 — Simplify $\frac{35}{7}$:** $\frac{35}{7} = 5$, so the expression becomes $2 \times 22 \times 5$.**Step 3 — Compute:** $2 \times 22 \times 5 = 220 \text{ cm}$.**Why other options are wrong:**

- 110 forgets the factor 2.
- 3850 is the area (πr^2).
- 70 is just $2r$.

Final Answer: $\text{Circumference} = 220 \text{ cm} \Rightarrow \boxed{\text{C}}$ **Answer: (C)** [Go Back to Q40](#)

Q41.

Solution

Concept — Volume of a cuboid: $\text{Volume} = \text{length} \times \text{breadth} \times \text{height}$.

Step 1 — List the data: length = 10, breadth = 4, height = 2.

Step 2 — Multiply the first two: $10 \times 4 = 40$.

Step 3 — Multiply by the height: $40 \times 2 = 80 \text{ cm}^3$.

Why other options are wrong:

- 16 and 40 leave out one dimension.
- 800 multiplies by an extra 10.

Final Answer: Volume = $80 \text{ cm}^3 \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q41](#)

Q42.

Solution

Concept — Volume of a cube: $\text{Volume} = \text{side}^3$.

Step 1 — List the side: side = 7 cm.

Step 2 — Cube it: Volume = $7 \times 7 \times 7 = 343 \text{ cm}^3$.

Why other options are wrong:

- 49 is side^2 (the area of a face).
- 21 is 3×7 .
- 294 is the total surface area (6×49).

Final Answer: Volume = $343 \text{ cm}^3 \Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q42](#)



Q43.

Solution

Concept — Area of a triangle: $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$.

Step 1 — List the data: base = 24 cm, height = 5 cm.

Step 2 — Multiply base and height: $24 \times 5 = 120$.

Step 3 — Take half: $\text{Area} = \frac{1}{2} \times 120 = 60 \text{ cm}^2$.

Why other options are wrong:

- 120 forgets the factor $\frac{1}{2}$.
- 29 adds base and height.
- 30 halves a wrong product.

Final Answer: Area = $60 \text{ cm}^2 \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q43](#)

Q44.

Solution

Concept — Reciprocal ratios: $\operatorname{cosec} \theta = \frac{1}{\sin \theta}$.

Step 1 — Recall $\sin 30^\circ$: $\sin 30^\circ = \frac{1}{2}$.

Step 2 — Take the reciprocal: $\operatorname{cosec} 30^\circ = \frac{1}{1/2} = 2$.

Why other options are wrong:

- $\frac{1}{2}$ is $\sin 30^\circ$, not its reciprocal.
- 1 and $\frac{\sqrt{3}}{2}$ are other standard values.

Final Answer: $\operatorname{cosec} 30^\circ = 2 \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q44](#)



Q45.

Solution

Concept — Reciprocal ratios: $\sec \theta = \frac{1}{\cos \theta}$.

Step 1 — Recall $\cos 45^\circ$: $\cos 45^\circ = \frac{1}{\sqrt{2}}$.

Step 2 — Take the reciprocal: $\sec 45^\circ = \frac{1}{1/\sqrt{2}} = \sqrt{2}$.

Why other options are wrong:

- $\frac{1}{\sqrt{2}}$ is $\cos 45^\circ$, not its reciprocal.
- 1 is $\sec 0^\circ$ and 2 is $\sec 60^\circ$.

Final Answer: $\sec 45^\circ = \sqrt{2} \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q45](#)

Q46.

Solution

Concept — Standard value with a multiplier: First find the trigonometric value, then multiply.

Step 1 — Recall $\sin 30^\circ$: $\sin 30^\circ = \frac{1}{2}$.

Step 2 — Multiply by 2: $2 \sin 30^\circ = 2 \times \frac{1}{2} = 1$.

Why other options are wrong:

- 2 forgets to multiply by $\frac{1}{2}$.
- $\frac{1}{2}$ is $\sin 30^\circ$ alone.
- $\sqrt{3}$ is unrelated here.

Final Answer: $2 \sin 30^\circ = 1 \Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q46](#)



Q47.

Solution

Concept — Height and distance: The angle of elevation θ satisfies $\tan \theta = \frac{\text{height}}{\text{shadow length}}$.

Step 1 — Write the ratio: $\tan \theta = \frac{15}{15\sqrt{3}}$.

Step 2 — Simplify: $\tan \theta = \frac{1}{\sqrt{3}}$.

Step 3 — Identify the angle: Since $\tan 30^\circ = \frac{1}{\sqrt{3}}$, we get $\theta = 30^\circ$.

Why other options are wrong:

- $\tan 45^\circ = 1$ and $\tan 60^\circ = \sqrt{3}$, which do not match.
- 90° would mean no shadow.

Final Answer: Angle of elevation = $30^\circ \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q47](#)

Q48.

Solution

Concept — Mean: $\text{Mean} = \frac{\text{sum of observations}}{\text{number of observations}}$.

Step 1 — Add the numbers: $7 + 14 + 21 + 28 + 35 = 105$.

Step 2 — Divide by the count: $\frac{105}{5} = 21$.

Why other options are wrong:

- 35 is the largest value.
- 105 is the sum, not the mean.
- 28 is not in the middle of the calculation.

Final Answer: Mean = 21 $\Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q48](#)



Q49.

Solution

Concept — Mode: The mode is the value that appears most often in the data.

Step 1 — Count the occurrences: 8 appears once, 9 appears three times, 10 appears once.

Step 2 — Pick the most frequent: 9 occurs the most, so the mode is 9.

Why other options are wrong:

- 8 and 10 each appear only once.
- 45 is the sum of all the values.

Final Answer: Mode = 9 $\Rightarrow$ D

Answer: (D) [Go Back to Q49](#)

Q50.

Solution

Concept — Certain event: An event that is sure to happen has probability 1.

Step 1 — List the outcomes: A coin gives either a head or a tail, so "head OR tail" covers both outcomes.

Step 2 — Form the ratio: Favourable outcomes = 2, total outcomes = 2, so probability = $\frac{2}{2} = 1$.

Why other options are wrong:

- 0 would mean the event is impossible.
- $\frac{1}{2}$ is the probability of just a head.
- 2 is impossible, as probability never exceeds 1.

Final Answer: Probability of a certain event = 1 $\Rightarrow$ C

Answer: (C) [Go Back to Q50](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	A	3	D	4	B	5	A
6	D	7	B	8	A	9	C	10	B
11	D	12	A	13	C	14	B	15	D
16	A	17	C	18	B	19	A	20	D
21	C	22	B	23	A	24	D	25	B
26	D	27	A	28	C	29	B	30	C
31	A	32	D	33	A	34	C	35	B
36	D	37	B	38	D	39	A	40	C
41	B	42	C	43	A	44	B	45	D
46	C	47	A	48	B	49	D	50	C

