



UNIFIED COUNCIL

An ISO 9001:2008 Certified Organisation



UNIFIED CYBER OLYMPIAD - UC 326

Solutions for class : 8

Mental Ability

1. (B) Let the breadth of the rectangle be x cm

Then length = $3x$ cm

New breadth = $(x + 5)$ cm

New length = $(3x - 3)$ cm

Then, $(x + 5)(3x - 3) - 3x \times x = 57$

$$\Rightarrow 3x^2 + 12x - 15 - 3x^2 = 57$$

$$\Rightarrow 12x = 57 + 15 = 72$$

$$\Rightarrow x = 6$$

\therefore Breadth = 6cm, length = 18 cm

perimeter = $2(6+18) = 2 \times 24 = 48$ cm

2. (B) One cart load = $\frac{42}{7} = 6$ tonnes

5 cart load = $6 \times 5 = 30$ tonnes

3. (A) $21952 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 7 \times 7$
 $= 2^3 \times 2^3 \times 7^3$

$$\therefore \sqrt[3]{21952} = \sqrt[3]{2^3 \times 2^3 \times 7^3} = 2 \times 2 \times 7 = 28$$

\therefore The digit in the units place of cube root of 21952 is 8.

4. (B) Let the principal = ₹ x

Amount = ₹ $3x$

Time = 20 years

$$\therefore \text{SI} = ₹ 3x - x = ₹ 2x$$

$$\text{Rate} = \left(\frac{2x \times 100}{x \times 20} \right) \% \text{ p.a.} = 10\% \text{ p.a.}$$

Now, principal = ₹ x ; Amount = ₹ $2x$,

Rate = 10% p.a.

$$\text{S.I.} = ₹ 2x - ₹ x = ₹ x$$

$$\therefore \text{Time} = \frac{x \times 100}{x \times 10} = 10 \text{ years}$$

5. (A) $3^{2^2} = 3^{2^4} = 3^{16}$;

$$\left[(3^2)^2 \right]^2 = 3^8 = 6561;$$

$$3^2 \times 3^2 \times 3^2 = 3^{2+2+2} = 3^6 = 729$$

$$\therefore 3^{16} > 3^8 > 3222 > 3^6$$

6. (A) The correct average weight of 10 apples is $52 \text{ g} + 10 \text{ g} = 62 \text{ g}$

7. (D) Let the four consecutive numbers be $(x - 2)$, $(x - 1)$, x and $(x + 1)$

$$\Rightarrow (x - 2)(x - 1)x(x + 1) + p$$

$$\Rightarrow (x^2 - 3x + 2)(x^2 + x) + p$$

$$\Rightarrow x^4 + x^3 - 3x^3 - 3x^2 + 2x^2 + 2x + p$$

$$\Rightarrow x^4 - 2x^3 - x^2 + 2x + p$$

The expression on the right hand side will be perfect square if and only if $p = 1$.

Perfect square number

$$= [(x^2 + 3x)^2 + 2(x^2 + 3x) + 1] = (x^2 + 3x + 1)^2$$

8. (D) Let the C.P. of the goods = ₹ 100

Then, Marked price of the goods = ₹ 140

Discount = 20%

$$\therefore \text{S.P. of the goods} = 80\% \text{ of } ₹ 140 = ₹ 112$$

$$\therefore \text{Profit } \% = \frac{(112 - 100)}{100} \times 100 = 12\%$$

9. (D) $3x + 5x + 2x = 180$

$$10x = 180$$

$$x = 18^\circ$$

$$\angle QP5 = \angle QRS = 5x$$

$$= 5(18)$$

$$= 90$$

10. (B) Let the share of A = ₹ x.
Then, share of B = ₹ (84100 - x)
- $$\therefore x \left(1 + \frac{5}{100}\right)^3 = (84100 - x) \left(1 + \frac{5}{100}\right)^5$$
- \Rightarrow Ratio of shares of A and B
- $$= \frac{x}{84100 - x} = \left(1 + \frac{5}{100}\right)^2 = \left(\frac{21}{20}\right)^2 = \frac{441}{400}$$

11. (B) $1 - 3 + 5 - 7 + 9 - 11 + 13 - \dots - 97 + 99 + 101$
- $$\Rightarrow 1 + \underbrace{2 + 2 + 2 + \dots + 2}_{25 \text{ times}}$$
- $$= 1 + (25 \times 2) = 51$$

12. (C) M.P. = ₹ 500, 1st discount = 20%
Net price after 1st discount = 80% of ₹ 500
- $$= \frac{80}{100} \times ₹ 500 = ₹ 400$$
- 2nd discount = 10%
- \therefore Final S.P. after 2nd discount
- $$= \frac{90}{100} \times ₹ 400 = ₹ 360$$

13. (D) $\left(2^{\frac{1}{4}} - 1\right) \left(2^{\frac{3}{4}} + 2^{\frac{1}{2}} + 2^{\frac{1}{4}} + 1\right)$
- Let $2^{\frac{1}{4}} = a$. Then,
Given exp. = $(a - 1)(a^3 + a^2 + a + 1)$
= $(a - 1)(a^2(a + 1) + 1(a + 1))$
= $(a - 1)(a + 1)(a^2 + 1) = (a^2 - 1)(a^2 + 1)$
= $a^4 - 1$
- \therefore Required value $\left(2^{\frac{1}{4}}\right)^4 - 1 = 2 - 1 = 1$

14. (B) $2^a \times 3^b = 576$
 $\Rightarrow 2^6 \times 3^2 = 576$
- $\therefore a = 6, b = 2 \Rightarrow \frac{a}{b} = \frac{6}{2} = 3$
15. (A) The statement given in option A is a true statement.

Reasoning

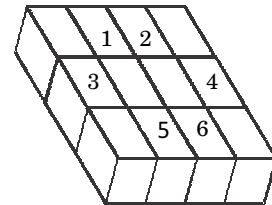
16. (C) The shapes follow a pattern in which they move from out side to inside
17. (A) $24 \xrightarrow{-4} 20 \xrightarrow{-2} 18 \xrightarrow{-4} 14 \xrightarrow{-2} 12 \xrightarrow{-4} 8$
- \therefore The missing number is 8.

18. (B) Total number of note books = 20
Position of sumitra's book = 8th from bottom
Number of books corrected from top = 10
Number of books in the pile = 10
Position of sumitra's notebook from top
= $10 - 8 + 1 = 3$
19. (B) The cube which lies exactly at the center, is surrounded by other cubes on all sides.

\therefore There is only one cube which is surrounded by cubes.

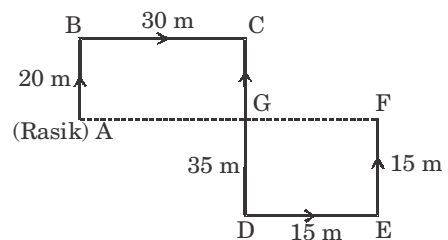
20. (A) From the 2nd and 4th views of the cube, it is clear that the face opposite to $\begin{array}{|c|} \hline \bullet \\ \hline \end{array}$ is $\begin{array}{|c|} \hline \bullet \bullet \\ \hline \end{array}$
21. (D) The first letters in odd numbered terms from the series J, I, H and in even numbered terms from the series K, L, M.

22. (A)

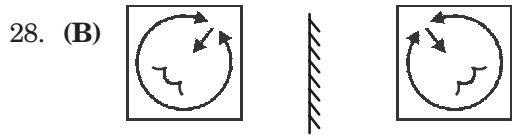


The blocks at the corner columns have three painted faces. Hence, there are 6 faces which have two painted faces

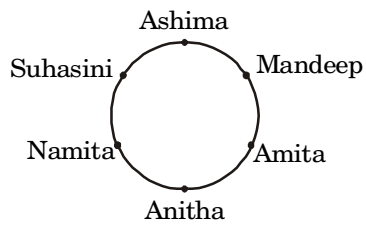
23. (B) The shape rotates 90° clock wise after each successive step in the given sequence.
24. (D) Except option (D), all other shapes are divided into an odd number of parts.
25. (A) Each row is a combination of three outside elements of \square , \bigcirc and \triangle . Each element appears only one time in each row. Inside each radius moves either CW or ACW in row.
26. (C) The small circles are decreasing consecutively and the black dots are increasing.
27. (D) The movements of Rasik from A to F are as shown in figure.



Since $CD = AB + EF$, so F lies in line with A.
Rasik's distance from original position A = AF.
= $(AG + GF) = (BC + DE) = (30 + 15) \text{ m} = 45 \text{ m}$.
Also, F lies to the east of A.



29. (A) According to the given question seating arrangement is shown as



∴ The pair sitting adjacent to each other is Anitha and Amita.

30. (B) $30 \text{ K } 2 \text{ Q } 3 \text{ J } 6 \text{ T } 5$
 $\Rightarrow 30 \div 2 + 3 \times 6 - 5$
 $\Rightarrow 15 + 18 - 5 = 28$

Computers

- | | | | |
|---------|---------|---------|---------|
| 31. (C) | 32. (D) | 33. (D) | 34. (C) |
| 35. (B) | 36. (B) | 37. (B) | 38. (D) |
| 39. (D) | 40. (A) | 41. (B) | 42. (B) |
| 43. (B) | 44. (C) | 45. (C) | |

English

- | | | | |
|---------|---------|---------|---------|
| 46. (A) | 47. (A) | 48. (C) | 49. (C) |
| 50. (A) | | | |