



UNIFIED COUNCIL

An ISO 9001:2008 Certified Organisation



UNIFIED CYBER OLYMPIAD - UC 329

Solutions for class : 8

Mental Ability

1. (A) Clearly, area of unshaded region
= Area of circle – Area of square RSTV
But, diameter of circle
= diagonal of square = $2r$

$$\text{Area of square RSTV} = \left(\frac{\text{diagonal}}{\sqrt{2}} \right)^2$$

$$= \left(\frac{2r}{\sqrt{2}} \right)^2 = \frac{4r^2}{2}$$

$$= 2r^2$$

2. (D) The outcomes of an event with the same probability of occurrence are called equally likely outcomes.

3. (B) Let the C.P of 25 mangoes = ₹ x
given, by selling 20 mangoes, the person recovers the price of 25 mangoes.

∴ Profit = The price of 5 mangoes

$$= \frac{x}{25} \times 5 = \frac{x}{5}$$

$$\therefore \text{Profit} = ₹ \frac{x}{5}$$

$$\text{Profit percent} = \frac{\text{Profit}}{\text{C.P}} \times 100$$

$$= \frac{\frac{x}{5}}{x} \times 100$$

$$= \frac{x}{5} \times \frac{1}{x} \times 100^{20}$$

$$= 20$$

Hence answer is (A).

4. (D) $P = ₹ 8000$

$T = 1$ year (payable half yearly, so $n = 2$)

$R = 5\%$

$$\therefore \text{C.I} = P \left(1 + \frac{R}{100} \right)^n - P$$

$$= 8000 \left(1 + \frac{5}{100} \right)^2 - 8000$$

$$= 8000 \times \frac{105^{21}}{100^5} \times \frac{105}{100} - 8000$$

$$= 4 \times 21 \times 105 - 8000$$

$$= 8820 - 8000$$

$$= ₹ 820$$

Hence answer is (D)

5. (C)

Tens	Ones
p	q

∴ Number $x = 10p + 2$

digits reversed

Tens	Ones
q	p

∴ number $y = 10q + p$

$$X - Y = (10p + q) - (10q + p)$$

$$X - Y = 10p - p + q - 10q$$

$$X - Y = 9(p - q)$$

Clearly, $x - y$ is divisible by 9.

6. (C) Shaded portion

7. (C) PL is perpendicular to KL, LM is the construction of an angle bisector.

8. (C) $\frac{1 + \sqrt{0.01}}{1 - \sqrt{0.25}} = \frac{1 + 0.1}{1 - 0.5} = \frac{1.1}{0.5} = \frac{11}{5} = 2.2$.

Hence answer is (D).

9. (C) Given, $AD \parallel BC$,
 $AB \parallel CD$

and $\angle A = \angle C, \angle B = \angle D$

Also, given $\angle C = 78^\circ \Rightarrow \angle A = 78^\circ$

In $\triangle ADX$,

$$AD = XD$$

$$\Rightarrow \angle DAX = \angle DXA$$

[angles opposite to equal sides are also equal]

$$\therefore \angle DAX = 78^\circ$$

Also, $\angle ADX + \angle DAX + \angle DXA = 180^\circ$

[sum of three angles of a triangle is 180°]

$$\Rightarrow n + 78^\circ + 78^\circ = 180^\circ$$

$$\therefore n = 24^\circ$$

Also, $AB \parallel CD$ and let BC be the transversal

$$\therefore \angle ABC + \angle BCD = 180^\circ$$

$$\therefore m + 68^\circ + 78^\circ = 180^\circ$$

[interior angles on the same side of transversal are supplementary]

$$\Rightarrow m = 34^\circ$$

10. (B) Volume of the liquid in the jar
 $= 200 \text{ cm}^3$.

Side of the immersed cube = 7 cm

$$\Rightarrow \text{Its volume} = 7^3 \text{ cm}^3 = 343 \text{ cm}^3$$

Therefore, the reading on the measuring jar
 $\text{is } 200 + 343 \text{ cm}^3 = 543 \text{ cm}^3$

11. (C) Let the principal be P in case of SI.

$$r = r\%, T = 2 \text{ yr, amount} = 2P$$

$$SI = 2P - P = P$$

$$P = \frac{P \times r \times 2}{100} \quad \left[\square SI = \frac{PRT}{100} \right]$$

$$\Rightarrow R = 50\%$$

In case of compound interest,

$$r = R\%, t = 2, Yr, A = 2P$$

$$\text{Using formula, } A = P \left[1 + \frac{r}{100} \right]^t$$

$$\therefore 2P = P \left[1 + \frac{R}{100} \right]^2$$

$$\Rightarrow 2 = \left(1 + \frac{R}{100} \right)^2$$

$$\Rightarrow 1 + \frac{R}{100} = \sqrt{2} = 1.41$$

$$\Rightarrow R = 0.41 \times 100 = 41\%$$

i.e. $r > R$

12. (A) Consider, $\frac{(2m^{-1}pq^0) - 4 \times 2m^{-1}p^3}{2pq^2}$

$$= \frac{(2^{-4})(m^{-1})^{-4}(p^{-4})(q^0)^{-4} \times 2m^{-1}p^3}{2pq^2}$$

$$[(a^m)^n = a^{m \times n}]$$

$$= \frac{2^{-4} m^4 p^{-4} \times 1 \times 2m^{-1} p^3}{2pq^2}$$

$$[a^0 = 1]$$

$$= \frac{m^3}{2^4 p^2 q^2}$$

$$\square a^{-m} = \frac{1}{a^m}, \frac{a^m}{a^n} = a^{m-n}, a^m \times a^n = a^{m+n}$$

$$= \frac{m^3}{16 p^2 q^2}$$

13. (C) As per the properties of L.C.M and H.C.F.

14. (C) On quadrilateral ABCD,

Given $AB = BC$

and also $AD = \frac{1}{4} AB$

$$\therefore AD = \frac{1}{4} BC \quad (\square AB = BC)$$

$$AD = \frac{1}{4} \times 12 \quad (\square \text{ Given } BC = 12 \text{ cm})$$

$$AD = 3 \text{ cm}$$

Hence, answer is (D).

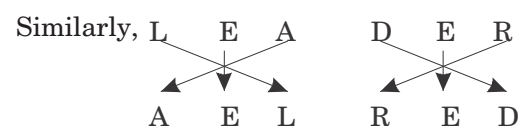
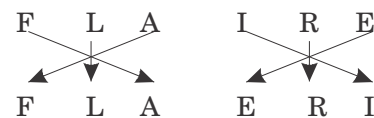
15. (D) Observe the perfect squares 1, 4, 9, 25, 36, 49, 64, 81, 100, 121, 144, 169....

Hence, 7 cannot be the last digit (unit's place) for perfect number.

Reasoning

16. (B) Except for 81, sum of digits in all other options is 10.

17. (B) As,



Hence, option (B) is correct.

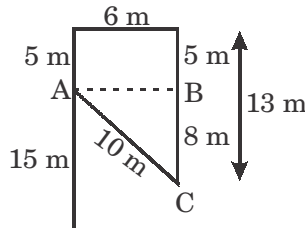
18. (A) The letter which is fourth to the right of 'M' in english alphabetical order is Q.

19. (A) Here, the design of column (1) is superimposed on the design of column (2) to get the design of column (3).



So, option figure (A) will complete the grid.
Hence, option (A) is correct.

20. (A)

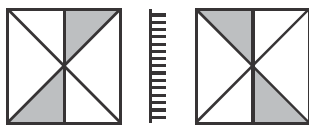


Let his original position be A.
Distance from the original position = AC
 $= \sqrt{AB^2 + BC^2}$
 $= \sqrt{6^2 + 8^2} = \sqrt{100} = 10 \text{ m}$
 \therefore He is 10 m away in North west direction.

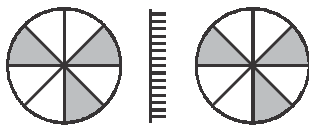
21. (A) Except option (A) all other figures can be obtained by rotation

22. (B) $5 \times 8 = 40, 4 \times 3 = 12 \Rightarrow 40 - 12 = 28$
 $12 \times 7 = 84, 9 \times 8 = 72 \Rightarrow 84 - 72 = 12$
 $3 \times 5 = 15, 6 \times -1 = -6 \Rightarrow 15 - (-6) = 21$

23. (A) Here, the first figure of the first pair is laterally inverted to obtain the second figure, as shown



Following the above pattern, we see that figure (A) will complete the second pair as

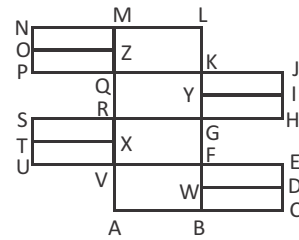


Hence, option (A) is correct.

24. (B) One who eats too much : GLUTTON
Option (B) (NOTTULG) is the correct answer.

25. (D) In the given series, after each successive step the square rotates by 90° in clockwise direction and the \odot and \blacksquare gets interchanges.

26. (A) On labelling the given figure, we get



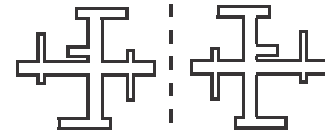
Rectangles made up of 1 unit = \square NMZO, \square PQZO, \square MQKL, \square JKYI, \square YIHG, \square QKGR, \square STXR, \square RGFV, \square TXVU, \square AVFB, \square EFWD and \square BCDW = 12

Rectangles formed from 2 rectangles = \square MNPQ, \square SRVU, \square GHJK, \square BCEF, \square MLGR, \square QKfV, and \square ABGR = 7

Rectangles formed from 3 rectangles = \square NLKP, \square JHRQ, \square SGFU, \square ACEV, \square MLFV and \square QKBA = 6
Rectangle formed from 4 rectangles = \square ABLM = 1

\therefore Total number of rectangles formed = $12 + 7 + 6 + 1 = 26$ rectangles

Hence, option (A) is correct.

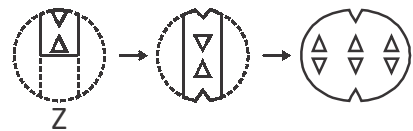


27. (B)

28. (D) The face with 3 dots appears in each of the three positions. Clearly, the faces having 1, 2, 4 and 5 dots are adjacent to the face having 3 dots. The only face left is the one having 6 dots which lies opposite to the face having 3 dots.

Hence, option (D) is correct.

29. (D) Upon unfolding the folded paper, represented by figure (Z), we get



Hence, option (D) is correct.

30. (A) Here, the circles are moving in clockwise direction and the shaded portion in both circles is also moving in clockwise direction. On following this pattern, we see that option figure (a) will complete the series.

Hence, option (A) is correct.

Computers

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

English

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