UNIFIED COUNCIL
An ISO 9001:2008 Certified Organisation
UCO Unified Cyber Olympiad

# UNIFIED CYBER OLYMPIAD - UC 326

## Solutions for class : 10

### Mental Ability

1. **(C)** The required number of out comes
$= 6 \times 8 \times 10 = 480$

2. **(D)** Let the number of swans be x.

$\Rightarrow \frac{7}{2}\sqrt{x} = x - 2$

$\Rightarrow 7\sqrt{x} = 2(x - 2)$

on SOBS, we get $49x = 4(x - 2)^2$

$\Rightarrow 4x^2 - 65x + 16 = 0$

i.e., $(x - 16)(4x - 1) = 0$

$x = 16, \frac{1}{4}$

3. **(C)** $(AA)^2 = DCBA$

since, the units place digit remains the same, so the value of A can be 0, 1, 5, 6.

$11^2 = 121$ which is not a 4 digit number.

$55^2 = 3025$. The ten's place digit is even

$66^2 = 4356$. The ten's place digit is odd

$\therefore$ $66^2 = 4356$ is the correct number

4. **(Del)**

5. **(A)** $p > q$ and $r < 0$

$pr < qr$ (T)

$p + r > q + r$ (T)

Hence option (A) is true

6. **(A)** $x^2 + px + q \Rightarrow a^2 + pa + q$

$x^2 + lx + m \Rightarrow a^2 + la + m$

$a^2 + pa + q = a^2 + la + m$

$pa - la = m - q$

$a(p - l) = m - q$

$a = \frac{m - q}{p - l}$

7. **(D)** $3x + 4y = 12$

$3(0) + 4y = 12$

$\Rightarrow y = 3$

$4(0) + 3x = 12$

$\Rightarrow x = 4$

Area of $\Delta OAB = \frac{1}{2}(A)(B)$

$= \frac{1}{2} \times 3 \times 4 = 3 \times 2 = 6$

$\therefore$ The required area is 6 sq. units.

8. **(C)** The two lines $2x + 32y + 3 = 0$

and $3x + 48y + k = 0$ are coincident lines,

Hence, $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

$\Rightarrow \frac{2}{3} = \frac{32}{48} = \frac{3}{k}$

$\Rightarrow \frac{2}{3} = \frac{3}{k}$ or $k = \frac{9}{2}$

9. **(A, D)** $(\sec^2\theta - 1)(1 - \operatorname{cosec}^2\theta) = -1 \neq 1$

$\cos^2\theta - \sin^2\theta = \cos 2\theta \neq \cos\theta$

Hence option (A, D) are the incorrect statements.

10. **(A)** Given that $x^2 + y^2 = 10$ and $xy = 4$

$(y + x)^2 = x^2 + y^2 + 2xy = 10 + 8 = 18$

$\Rightarrow (y + x) = 3\sqrt{2}$ - ①

$(y - x)^2 = x^2 + y^2 - 2xy = 10 - 8 = 2$

$\Rightarrow (y - x) = \sqrt{2}$ - ②

solving 1 and 2, $x = \sqrt{2}$, $y = 2\sqrt{2}$,

$$\frac{x}{y} = \frac{1}{2}$$

11. **(A)** $\Delta = \frac{1}{2}\lambda[2\lambda - 6 + 2\lambda] + (1-\lambda)[6 - 2\lambda - 2 + 2\lambda]$
$-(4+\lambda)[2 - 2\lambda - 2\lambda]$
$\Rightarrow \frac{1}{2}\left|8\lambda^2 + 4\lambda - 4\right| = 70$
or $2\lambda^2 + \lambda - 36 = 0$
$\Rightarrow \lambda = 4, -\frac{9}{2}$

So, $\lambda$ has only 1 integral value i.e., 4.

12. **(A)** Let the roots be $\alpha$ and $(m\alpha)$,

then $\alpha(1 + m) = \frac{-b}{a}$ ---- (1)

and $m\alpha^2 = \frac{c}{a}$ -- - - --(2)

from (1) and (2), $m\left[\frac{-b}{a(1+m)}\right]^2 = \frac{c}{a}$

$$\Rightarrow \frac{mb^2}{a^2(1+m)^2} = \frac{c}{a}$$
$$\Rightarrow mb^2 = ac(1+m)^2$$

13. **(B)** AB = 4cm, BC = 6 cm, CA = 7cm

Let AP = x, BP = y and CQ = Z

$\Rightarrow$ x + y = 4 cm -- (1)

y + z = 6 cm -- (2)

and z + x = 7 cm -- (3)

Adding all these equations,

2(x + y + z) = 17

x + y + z = 8.5 --- (4)

subtracting (1), (2),
(3) from (4) one by one,
we get

z = 8.5 − 4 = 4.5 cm,

x = 8.5 − 6 = 2.5 cm,

y = 8.5 − 7 = 1.5 cm.

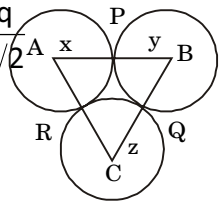
14. **(C)** $a + b = \frac{5}{p}$ and $ab = \frac{q}{p}$

It is given that a + b = ab - 10

$\Rightarrow 10 = \frac{5}{p}$ and $10 = \frac{q}{1/2}$

$\Rightarrow p = \frac{1}{2}$ and $q = 5$

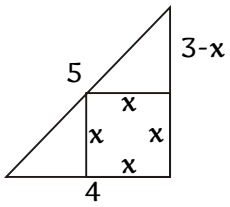
$\therefore p = \frac{1}{2}$ and $q = 5$.




15. **(B)** By Similar triangles,

$\frac{3-x}{x} = \frac{3}{4}$

$\Rightarrow x = 1\frac{5}{7}$ m



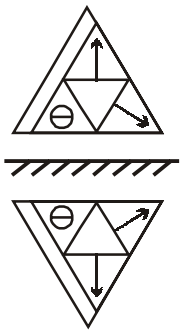

## Reasoning

16. **(D)** The Square and circle alternate positions.

The Shape on the outside is rotated $90^0$ clockwise each time.

The triangle is always inside the circle.

17. **(A)**



18. **(A)** Son's sister $\rightarrow$ Daughter

Daughter of daughter $\rightarrow$ Grand daughter

Hence, Rama is pointing to her grand daughter and Rama is grand mother to that girl.

19. **(C)** In each row there are two shapes, the least figure has first shape with shade but smaller in size and an empty second shape. Hence, the missing figure in the grid is option (C).

20. **(D)** P < Q > R $\Lambda$ S

According to the given instructions P is a father of Q, R and Q is brother of R and R is daughter of S. Hence, Q, R are children of P and S, where 'S' is the mother.

21. **(C)** Multiply the numbers diagonally across the square and add the products together to get the number in the centre.

4 × 4 = 16 2 × 3 = 6 16 + 6 = 22

22. **(D)** $5 + 3 + 4 = 12$ , $8 + 7 + 2 = 17$, $9 + 6 + 4 = 19$

$12 - 11 = 1$, $17 - 14 = 3$, $19 - 12 = 7$

23. **(B)**

24. **(A)** The bigger ball's diameter is moving at 90° and smaller balls diameter is moving at 45°, simultaneously the slope of the bigger figure get reversed.

25. **(C)** Dot moves clockwise and the arrow moves in and out in opposite direction alternately (in a group of two figures). The circle and square inter

26. **(C)** By interchanging figure 2 and 3 movement of the two arrows become sequential. Arrow with a dot moves anticlockwise through 90° and other arrow moves anticlockwise through 45°.

27. **(C)** The given series consists of two series.

(i) 7, 26, 63, 124 .....

(ii) 5, 17, 37, 65 .....

In the first series,

$7 = 2^3 - 1$, $26 = 3^3 - 1$, $6^3 = 4^3 - 1$,

$124 = 5^3 - 1$, $\therefore 6^3 - 1 = 215$

and in the second series.

$5 = 2^2 + 1$, $17 = 4^2 + 1$,

$37 = 6^2 + 1$, $65 = 8^2 + 1$,

$\therefore 10^2 + 1 = 101$

28. **(Del)**

29. **(C, D)** $3 \times 4 > 2 - 9 + 3 < 3$

$\Rightarrow 3 + 4 \times 2 = 9 \div 3 - 3$

$\Rightarrow 3 + 8 = 0$ (False)

$7 \times 3 < 7 \div 8 + 4 \times 10$

$\Rightarrow 7 + 3 - 7 > 8 \div 4 + 10$

$3 > 14$ (False)

$6 > 2 + 2 = 10 < 4 \times 5$

$6 \times 2 \div 2 < 10 - 4 + 5$

$12 \div 2 < 6 + 5$

$6 < 11$ (True)

In option D, $8 > 2.666....$ (True).

30. **(A)** The cubes A and C are formed from the given net

## Computers

31. **(A)** 32. **(B)** 33. **(C)** 34. **(D)**

35. **(Del)** 36. **(D)** 37. **(D)** 38. **(A)**

39. **(C)** 40. **(B)** 41. **(C)** 42. **(B)**

43. **(D)** 44. **(C)** 45. **(D)**

## English

46. **(A)** 47. **(A)** 48. **(C)** 49. **(D)**

50. **(A)**