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

UNIFIED CYBER OLYMPIAD - UC 326

Solutions for class : 9

Mental Ability

1. **(C)** Mode = 3 median − 2 mean

$\therefore$ mode : median = 7 : 4

$\therefore$ Let, mode = 7x and median = 4x

$\therefore 7x = 3 \times 4x - 2$ mean

$\Rightarrow$ 7x = 12x − 2 mean

$\Rightarrow$ 2 mean = 5x

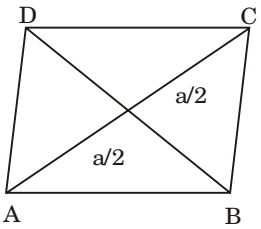
$$\Rightarrow \text{mean} = \frac{5}{2}\ x$$

$$\therefore \text{mean : mode} = \frac{5}{2}\ x : 7x$$

= 5x : 14x = 5 : 14

2. **(A)** Let side AB = diagonal AC =a units

Then, the other diagonal



$$= 2 \times \sqrt{a^2 - \left(\frac{a}{2}\right)^2}$$

$$= 2\sqrt{a^2 - \frac{a^2}{4}} = 2\sqrt{\frac{3a^2}{4}} = \sqrt{3}a$$

$$\therefore \text{Required ratio} = \frac{\sqrt{3}a}{a} = \sqrt{3} : 1$$

3. **(C)** **In** Δ's AOC and BOD

OA = OB (given)

OC = OD (given)

$\angle AOB - \angle COB = \angle COD - \angle COB$,

i.e., $\angle AOC = \angle BOD$

$\therefore \Delta AOC \cong \Delta BOD$ (SAS)

$\Rightarrow$ AC = BD (cpct)

4. **(D)** A + B + C = 1250

$$A + \frac{9}{2}A + \frac{3}{4}A = 1250$$

$\Rightarrow$ A = 200

$$B = \frac{9}{2} \times 200 = 100 \times 9 = 900$$

$$C = \frac{3}{4} \times 200 = 3 \times 50 = 150$$

5. **(B)** As n is divided by 4 and say remainder is 3.

If quotient is 'q' then n = 4q + 3

$\Rightarrow$ 2n = 8q + 6

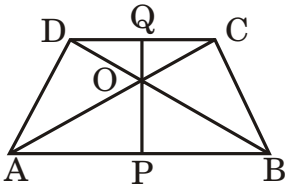
If 2n = (8q + 4) + 2 = 4 (2q + 1) + 2

So, if 2n is divided by 4, the quotient is 2q + 1 and remainder is 2.

6. **(C)** Let PQ be the perpendicular distance between the parallel sides AB and CD

$$\text{So, } \frac{ar(AOB)}{ar(COD)} = \frac{\frac{1}{2} \times AB \times OP}{\frac{1}{2} \times CD \times OQ} \quad [\because OP = 2OQ]$$

$$= \frac{2\ CD \times 2\ OQ}{CD \times OQ} = \frac{4}{1}$$



7. **(B)** By substituting the options, we can find that option (B) satisfies the equations.

8. **(D)** $2^x = (2^2)^y = (2^3)^z \Rightarrow x = 2y = 3z$

Given, $xyz = 288$

$\Rightarrow x \times \frac{x}{2} \times \frac{x}{3} = 288$

$\Rightarrow x^3 = 6 \times 288 \Rightarrow x = 12$

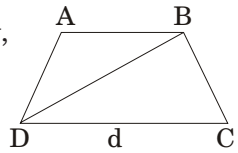
$\therefore y = \frac{12}{2} = 6$ and $z = \frac{12}{3} = 4$

$\therefore \frac{1}{2x} + \frac{1}{4y} + \frac{1}{8z} = \frac{1}{24} + \frac{1}{24} + \frac{1}{32}$

$= \frac{4+4+3}{96} = \frac{11}{96}$

9. **(D)** Let ABCD represent the quadrilateral and DC = d cm.

By the triangle inequality,



$d = DC < BC + BD$

$< BC + AB + AD$

$= 2014 + 2015 + 2016 = 6045$

Thus $d < 6044$

10. **(A)** $\angle PSR = \angle PQR = 68^\circ$

(opp. $\angle$s of a $\|^{gm}$ are equal)

$\angle PTS = 180^\circ - 139^\circ = 41^\circ$

(PTQ is a straightline)

$\therefore \angle RST = \angle PTS = 41^\circ$

(SR $\|$ PQ alt. $\angle$s are equal)

$\therefore y = \angle PSR - \angle RST$

$= 68^\circ - 41^\circ = 27^\circ$

11. **(B)** $a^2 - b^2 - c^2 + 2bc + a + b - c$

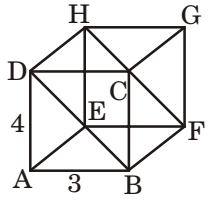
$= \left[a^2 - (b^2 + c^2 - 2bc)\right] + (a + b - c)$

$= \left[a^2 - (b - c)^2\right] + (a + b - c)$

$= \left[(a + b - c)\ (a - b + c)\right] + (a + b - c)$

$= (a + b - c)\left[a - b + c + 1\right]$

12. **(D)** Area of sliced section DBFH = DB $\times$ FB



$DB^2 = AD^2 + AB^2$

$= 4^2 + 3^2 = 25$

$\Rightarrow DB = 5$

$\therefore$ Required area = $(5 \times 5)\ cm^2 = 25\ cm^2$

13. **(A)** $M \propto \frac{1}{N} \Rightarrow M = \frac{K}{N}$

or $MN = K$ or $M_1 N_1 = M_2 N_2 = M_3 N_3$

$\Rightarrow 15 \times (-4) = (-6) \times A = 2B = C \times 60$

$\Rightarrow A = 10, B = -30, C = -1$

14. **(C)** Interior angle of a regular polygon of 'n' sides

$= \frac{(n-2) \times 180^0}{n}$

Exterior angle of a regular polygon of 'n' sides

$= \frac{360^0}{n}$

Given, $\frac{(n-2) \times 180^0}{n} = 8\left(\frac{360^0}{n}\right)$

$\Rightarrow (n-2) = 8 \times \frac{360^0}{180^0} = 16$

$\Rightarrow n = 18$

15. **(C)** Units place in $7^4 = 1$,

Units place in 7^{68} is 1

$\therefore$ Unit place in $7^{68} \times 7^3 = 3$

Similarly unit place in 6^{59} is 6 and unit place in 3^4 is 1 also in 3^{64} is 1.

Unit place in $7^{71} \times 6^{59} \times 3^{65}$ is the unit place of $3 \times 6 \times 3 = 4$

Reasoning

16. **(A)** The shapes move from the outside to the inside.

17. **(A)** The numbers in the brackets is half of the difference between the two numbers beside.

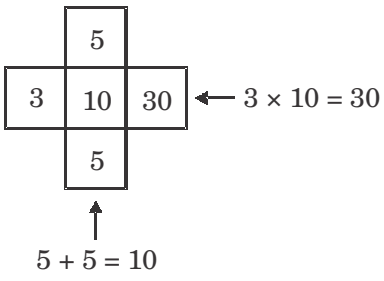
$402\ (92)\ 218 \Rightarrow 402 - 218 = 184, 184 \div 2 = 92$

$634\ (?)\ 512 \Rightarrow 634 - 512 = 122, 122 \div 2 = 61$

$\therefore$ The number is 61.

18. **(B)** Given C, D, are sisters. A, B are husbands of C and D respectively. Hence, Mr. A is brother-in-law of Mr. B.

19. **(A)**



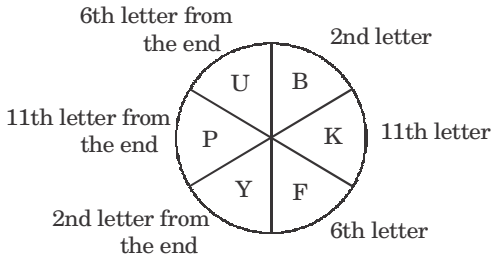
20. **(C)** Except the shape given option (C), all other shapes have two curves and a circular shape.

21. **(C)** Slanting shading indicates letter 'A' vertical shade is coded as 'P' and empty (No shading) is coded as Q. Hnece the code of figure is AAP.

22. **(A)** P # Q ✳ R means that P is the brother of Q and Q is the husband of R. Hence, P is the borther-in-law of R.

23. **(B)** In the given grid, the figures in the third column are represent the shape of the shaded part in the second column. Hence, the missing figure in the gird is option (B).

24. **(A)**



25. **(B)** Brother's son is a nephew. Hence, Q is nephew of S.

26. **(C)** All made up of 'S' except **(C)**, which is made up of inverted 'S'.

27. **(A)** From A to B left bottom side dot disappeared similarly B to C opposite side of dot get disappeared, from figure C to D line segment get disappeared. Following same pattern **(A)** would be the correct choice.

28. **(A)** The given series when written in the reverse order becomes.

13, 11, 5, 0, 1, 2, 6, 4, 8, 3, 0, 7, 9, 3, 7

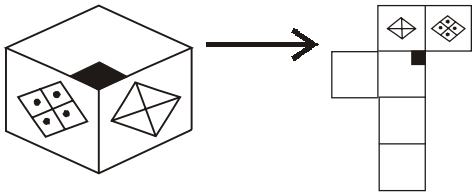
The 7th number from the left is 6. The 4th number to the right of 6 is 0.

29. **(D)**

A	C	E	B	D	F	×
A	C	E	B	F	D	×
F	D	A	C	E	B	ɜ
			A	C	E	×
F	A	C	E	B	D	×
1st	2nd	3rd	4th	5th	6th	

There are four persons to the right of D.

30. **(A)**



Computers

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

English

46. **(A)** 47. **(C)** 48. **(B)** 49. **(B)**
50. **(C)**