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UNIFIED COUNCIL
OLYMPIADS

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UNIFIED CYBER OLYMPIAD (UPDATED)

CLASS - 9
Question Paper Code : 3O109

KEY

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

SOLUTIONS

MENTAL ABILITY

01. (B) LHS $= \left(-\sqrt{2x}\right)^2 + y^2 + \left(2\sqrt{2}z\right)^2$

$+\left(-2\sqrt{2}xy\right) + 4\sqrt{2}yz - 8xz$

$= \left(-\sqrt{2}x + y + 2\sqrt{2}z\right)^2$

02. (A) If $x = 2 + 2^{\frac{1}{3}} + 2^{\frac{2}{3}}$

$x - 2 = 2^{\frac{1}{3}} + 2^{\frac{2}{3}}$

Cubing on both sides, we get

$(x-2)^3 = \left(2^{\frac{1}{3}} + 2^{\frac{2}{3}}\right)^3$

$x^3 - 6x\,(x-2) - 8 = 2 + 6\,(x-2) + 4$

$x^3 - 6x^2 + 12x - 8 = 6 + 6(x-2)$

$x^3 - 6x^2 + 6x = -6 + 8$

$x^3 - 6x^2 + 6x = 2$

03. (D) Given that the radii of three solid glass balls are 'r' cm, 6 cm and 8 cm, sum of the volumes of the three glass balls

$= \frac{4}{3}\pi r^3 + \frac{4}{3}\pi(6)^3 + \frac{4}{3}\pi(8)^3$

$= \frac{4}{3}\pi\,(r^3 + 6^3 + 8^3)$ cm³

The volume of the solid sphere of radius 9 cm

$= \frac{4}{3}\pi(9^3) = 243 \times 4\pi$

$\therefore$ $243 \times 4\pi = \dfrac{4}{3}\pi \,(r^3 + 728)$

$\Rightarrow 729 = r^3 + 728$

$\Rightarrow r^3 = 729 - 728 = 1$

$\Rightarrow r = 1$

Hence, r = 1 cm

04. (D) Sum of the digits = 5 + 6 + 7 + 8 + 9 + 1 + 0 + 1 + 1 + 1 + 2 + 1 + 3 + 1 + 4 = 50

If sum of digits is 45 then the given number is divisible by 9

$\therefore$ Remainder = 50 − 45 = 5

05. (A) Given point (2p, p − 3) lies on the equation $3x + 2y + 12 = 0$

$\Rightarrow$ 3(2p) + 2 (p − 3) + 12 = 0

$\Rightarrow$ 6p + 2p − 6 + 12 = 0

$\Rightarrow$ $8p = -6 \Rightarrow p = \dfrac{-3}{4}$

06. (A) Let $p(x) = x^4 - a^2 + 3x - a$.

Since $x + a$, i.e. $x - (-a)$ is a factor of p(x), we must have p(−a) = 0

$\Rightarrow$ $(-a)^4 - a^2\,(-a)^2 + 3(-a) - a = 0$

$\Rightarrow$ $a^4 - a^4 - 3a - a = 0$

$\Rightarrow$ $-4a = 0$

$\Rightarrow$ $a = 0$

07. (A) Let the required speed be 'x' km/h.

Speed is inversely proportional to the time taken.

$\therefore$ $24 : 18 :: x : 15$

$x = \dfrac{24 \times 15}{18} = 20$

$\therefore$ Satish must go at a speed of 20 km/h to reach his school in 18 minutes.

08. (A) Let the two consecutive even numbers be 'n' and (n + 2).

Then, according to the problem,

$n^2 + (n + 2)^2 = 340$

$\Rightarrow n^2 + n^2 + 4n + 4 = 340$

$\Rightarrow 2n^2 + 4n + 4 = 340$

$\Rightarrow 2n^2 + 4n - 336 = 0$

$\Rightarrow n^2 + 2n - 168 = 0$

$\Rightarrow n^2 + 14n - 12n - 168 = 0$

$\Rightarrow n(n + 14) - 12(n + 14) = 0$

$\Rightarrow (n + 14)\,(n - 12) = 0$

$\Rightarrow n = -14 \text{ or } 12$

$\therefore$ The required numbers are 12 and 14

Their sum = 12 + 14 = 26.

09. (A) C.S.A. $= 2 \times \dfrac{22}{7} \times h \times \dfrac{5h}{3} = \dfrac{220\,h^2}{21}$

$\therefore \dfrac{9240}{2} = \dfrac{220\,h^2}{21}$

$\therefore$ h = 21 cm $\Rightarrow$ r = 35 cm

$\therefore$ V $= \pi r^2 h = \dfrac{22}{7} \times 35 \times 35 \times 21$

= 80850 cm³

10. (C) Given numbers are 13a & 11a.

1 cm of 13a and 11a is 13 × 11 × a.

$\therefore$ 13 × 11 × a = 2002

$a = \dfrac{2002}{13 \times 11} = 14$

$\therefore$ The required numbers are 13 × 14 & 11 × 14

ie 182, 154.

11. (B) $\Rightarrow a = \dfrac{1}{a}$

Number = its reciprocal

$\Rightarrow 1, -1$

$1 + \dfrac{1}{1} = 2$

$-1 + \dfrac{1}{-1} = -2$

12. (C) $\dfrac{\sqrt{a} + \dfrac{1}{\sqrt{a}}}{1 - a} + \dfrac{1 - \dfrac{1}{\sqrt{a}}}{1 + \sqrt{a}}$

$= \dfrac{a + 1}{\sqrt{a}\,(1 - a)} + \dfrac{\sqrt{a} - 1}{\sqrt{a}\,(1 + \sqrt{a})}$

$$= \frac{a + 1 + a\sqrt{a} + \sqrt{a} + \sqrt{a} - 1 - a\sqrt{a} + a}{\sqrt{a}(1-a)(1+\sqrt{a})}$$

$$= \frac{2a + 2\sqrt{a}}{\sqrt{a}(1-a)(1+\sqrt{a})}$$

$$= \frac{2\sqrt{a}(\sqrt{a}+1)}{\sqrt{a}(1-a)(1+\sqrt{a})} = \frac{2}{1-a}$$

13. (B) $2^{\frac{1}{4}}.4^{\frac{1}{8}}.16^{\frac{1}{16}}.256^{\frac{1}{32}}$

$$= 2^{\frac{1}{4}}.2^{\frac{1}{4}}.2^{\frac{1}{4}}.2^{\frac{1}{4}}. = 2^{\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}} = 2^1 = 2$$

14. (A) Area of rectangle

= lb = (3p + 5q) (5p − 7q)

= 15p^2 − 21pq + 25pq − 35q^2

= 15p^2 + 4pq − 35q^2

15. (B) Let the required number of days be x. Then, less men

⇒ more days. It is in inverse proportion.

∴ $x_1 y_1 = x_2 y_2$

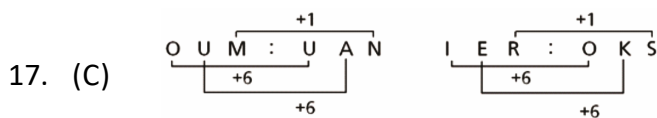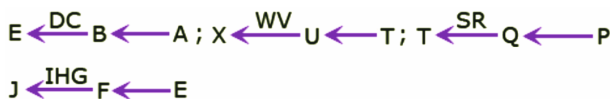$27 \times 24 = 36 \times x$

$$x = \frac{\overset{3}{\cancel{27}} \times \overset{6}{\cancel{24}}}{\underset{1}{\cancel{36}} \, \underset{1}{\cancel{4}}} \Rightarrow x = 24$$
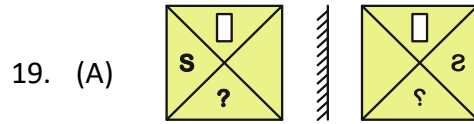
= 18

REASONING

16. (D) In other groups, the last two letters are consecutive in reverse order and for the first letter there is a gap of 2 letters. i.e.,
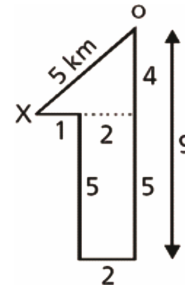
$E \xleftarrow{DC} B \longleftarrow A$; $X \xleftarrow{WV} U \longleftarrow T$; $T \xleftarrow{SR} Q \longleftarrow P$

$J \xleftarrow{IHG} F \longleftarrow E$

17. (C)
O U M : U A N   I E R : O K S
with +1, +6 mappings

18. (C)
1st number: $2 \xrightarrow{+5} 7 \xrightarrow{+7} 14 \xrightarrow{+9} 23 \xrightarrow{+11} 34 \xrightarrow{+13} \boxed{47}$
Middle letter: $Z \xrightarrow{-1} Y \xrightarrow{-1} X \xrightarrow{-1} W \xrightarrow{-1} V \xrightarrow{-1} \boxed{U}$
3rd number: $5 \xrightarrow{+2} 7 \xrightarrow{+2} 9 \xrightarrow{+2} 11 \xrightarrow{+2} 13 \xrightarrow{+2} \boxed{15}$
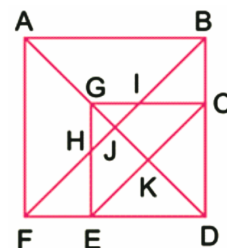
19. (A)

20. (D) $OX = \sqrt{4^2 + 3^2}$

$= \sqrt{25} = 5$ km

21. (D) A's son is brother of C and D.

B is the uncle to C.

22. (A) (10 − 8) × (15 − 8) = 14

(8 − 6) × (9 − 5) = 8

So missing number = (6 − 4) × (11 − 8)

= (2 × 3) = 6

23. (A) Number of cubes having more than one faces pained.

Cubes painted from 2 faces = (n − 2) × 12 = (4 − 2) × 12 = 24 and cubes painted from 3 faces = 8 i.e., 24 + 8 = 32.

24. (D) The figure may be labelled as shown.

The simplest triangles are EFH, BIC, GHJ, GIJ, EKD and CKD i.e., 6 in number.

The triangles composed of two components each are ABJ, AFJ, GCK, GEK, CED and GHI i.e., 6 in number.
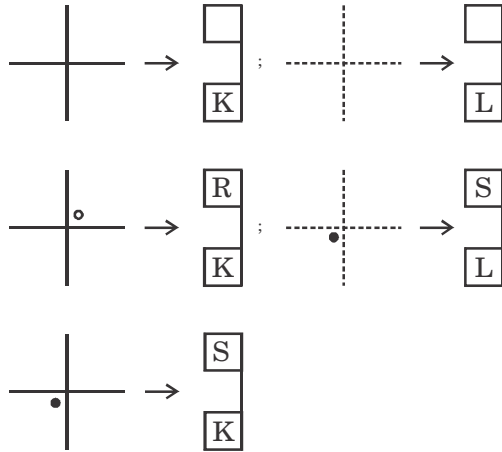
The triangles composed of three components each are GCD, GED, DJB and DJF i.e., 4 in number.

The triangles composed of four components each are ABF and GCE i.e., 2 in number.

The triangles composed of five components each are ABD and AFD i.e., 2 in number. There is only one triangle i.e., FBD composed of six components.

Total number of triangles in the figure = 6 + 6 + 4 + 2 + 2 + 1 = 21.

25. (B)

26. (C) The circles in 1ˢᵗ and 2ⁿᵈ columns are overlapped and the overlapped part of lines in the interior of the circle disappears forming the figures in the 3ʳᵈ column.
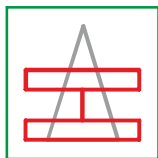
27. (D) According to the given instructions, the seating arrangement can be made as shown,

S U P Q T R (or)

S U Q P T R

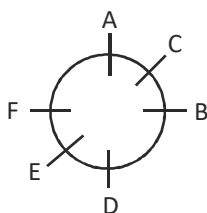In either case, U is sitting to the right of S.

28. (C) The given pattern can defined as HBBB.

29. (B)

30. (C) 'D' is the left of B.

Option (C) is correct.

COMPUTERS

31. (C) Shape tweening in Adobe Flash is used to morph shapes between keyframes, allowing for smooth transitions and transformations of shapes. In this scenario, to animate the transformation of a circle into a square, you would place the circle shape on the starting keyframe and the square shape on the ending keyframe. Then, by applying a Shape Tween between these keyframes, Flash automatically generates the intermediate frames to create the morphing effect from a circle to a square.

32. (C) The characteristic of computers that refers to their ability to perform a wide range of tasks is their versatility.

33. (B) The Title Slide layout typically includes placeholders for the presentation title, subtitle, and presenter's name, providing essential information at the beginning of the presentation.

34. (C) Closed Source Software, Non-free Software or Commercial Software is its other name. Examples are macOS, Adobe Suite, Microsoft Windows Professional Edition.

35. (A) After pseudocode has been written, the next step is usually to implement the algorithm in a programming language, translating the high-level logic into executable code.

36. (B) The term "artificial intelligence" was coined by John McCarthy in 1955.

37. (B) Standard Toolbar

38. (C) <slider>

39. (C) A cable modem is a type of modem used to connect a computer to a broadband Internet service via cable television lines, while a DSL modem is used for connecting to DSL services over telephone lines.

40. (A) The ReadOnly property of a TextBox control in Visual Basic determines whether the user can edit its contents. When set to True, the TextBox becomes read-only, meaning the user can view its contents but cannot modify them.

41. (C) South Korea

42. (C) A hub is a networking device that broadcasts data packets to all devices connected to it. It operates at the physical layer of the OSI model and does not have the intelligence to selectively forward packets like a switch.

43. (A) USB stands for universal serial bus.

44. (B) Multiple inline style properties are separated within the style attribute using semicolons.

45. (D) A smartwatch acts as both an input device (for tracking fitness activities through sensors) and an output device (for displaying notifications and information to the user), making it a hybrid input-output device.

ENGLISH

46. (C)

47. (B)

48. (C)

49. (D)

50. (A)

━━━━━ *The End* ━━━━━