



UNIFIED CYBER OLYMPIAD (UPDATED)

CLASS - 10
Question Paper Code : 30119

KEY

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

SOLUTIONS

MENTAL ABILITY

01. (A) Given $\frac{x}{1} = \frac{\sqrt{a+3b} + \sqrt{a-3b}}{\sqrt{a+3b} - \sqrt{a-3b}}$

$$\therefore \frac{x+1}{x-1} = \frac{(\sqrt{a+3b} + \sqrt{a-3b}) + (\sqrt{a+3b} - \sqrt{a-3b})}{(\sqrt{a+3b} + \sqrt{a-3b}) - (\sqrt{a+3b} - \sqrt{a-3b})}$$

$$\frac{x+1}{x-1} = \frac{2\sqrt{a+3b}}{2\sqrt{a-3b}}$$

Squaring on both sides.

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

$$ax^2 + 2ax + a - 3bx^2 - 6bx - 3b = ax^2 - 2ax + a + 3bx^2 - 6bx + 3b$$

$$0 = 6bx^2 - 4ax + 6b$$

$$\therefore 3bx^2 - 2ax + 3b = 0$$

02. (C) $\frac{1}{p} + \frac{1}{q} + \frac{1}{r} = \frac{pq + qr + rp}{pqr}$

$$= \frac{\left(\frac{c}{a}\right)}{\left(\frac{-d}{a}\right)}$$

$$= \frac{-c}{d}$$

03. (A) $\text{Mass} = V \times D = \pi(R+r)(R-r)h \times D$

$$= \frac{22}{7} \left(\frac{4.5}{2} + 2 \right) \left(\frac{4.5}{2} - 2 \right) 77 \times 8 \text{ gm/cc}$$

$$= 2.057 \text{ kg}$$

04. (A) $(x-1)$ is a factor means sum of coefficient are zero.

05. (A) If two numbers written in a prime factorisation, then their LCM is the product of primes with highest powers

\therefore LCM of $2^5 \times 3^6 \times 7^4 \times 11$ and

$$2^6 \times 3^4 \times 5^6 \times 7^2 = 2^6 \times 3^6 \times 5^6 \times 7^4 \times 11$$

06. (C) $s = \frac{a+b+c}{2} = \frac{9\text{cm}+40\text{cm}+41\text{cm}}{2} = \frac{90\text{cm}}{2} = 45\text{cm}$

$$\text{Area of } \triangle ABC = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{45\text{cm} \times 36\text{cm} \times 5\text{cm} \times 4\text{cm}}$$

$$= \sqrt{9 \times 5 \times 9 \times 4 \times 5 \times 4 \text{ cm}^4}$$

$$= 9 \times 5 \times 4 \text{ cm}^2 = 180 \text{ cm}^2$$

$$\therefore \frac{1}{2} \times 9\text{cm} \times h = 180\text{cm}^2$$

[\therefore Shortest side altitude is longest]

$$h = 180 \text{ cm}^2 \times \frac{2}{9\text{cm}} = 40\text{cm}$$

07. (A) Let the present ages of the father and the son be ' x ' years and ' y ' years respectively

Five years ago, their ages were $(x-5)$ years and $(y-5)$ years

According to the problem

$$(x-5) = 7(y-5)$$

$$\Rightarrow x-5+35-7y=0$$

$$\Rightarrow x-7y+30=0$$

$$\Rightarrow x=7y-30 \quad \dots\dots (1)$$

Five years later, their ages will be $(x+5)$ years and $(y+5)$ years

According to the problem

$$(x+5) = 3(y+5)$$

$$\Rightarrow x+5=3y+15$$

$$\Rightarrow x=3y+15-5$$

$$\Rightarrow x=3y+10 \quad \dots\dots (2)$$

From (1) and (2), we have

$$7y-30=3y+10$$

$$\Rightarrow 4y=40$$

$$\Rightarrow y=10$$

$$\Rightarrow x=7y-30$$

$$=7(10)-30$$

$$=40$$

\therefore The present ages of the father and the son are 40 years and 10 years respectively

08. (B) Given $\sqrt{7}, 3\sqrt{7}, 5\sqrt{7}$ are in AP

$$\therefore a = \sqrt{7} \quad d = 3\sqrt{7} - \sqrt{7} = 2\sqrt{7}$$

$$s_n = \frac{n}{2} [2a + (n-1)d]$$

$$= \frac{n}{2} [2\sqrt{7} + (n-1)2\sqrt{7}]$$

$$= \frac{n}{2} [2\cancel{\sqrt{7}} + 2\sqrt{7}n - 2\cancel{\sqrt{7}}]$$

$$= \frac{n}{2} \times n \times 2\sqrt{7}$$

$$s_n = n^2 \sqrt{7}$$

09. (A) For option A

$$\Delta = (-15)^2 - 4 \times 56.25 \times 1 = 225 - 225 = 0$$

$\Delta = 0 \Rightarrow$ the roots are real.

for option B $\Delta = (-22)^2 - 4 \times 1 \times 125 = 484 - 500$

$$\Delta = -16$$

$\Delta < 0 \Rightarrow$ Roots are not real

for option 'C' $\Delta = 25 - 28 = -3$

for option 'D' $\Delta = 64 - 68 = -4$

10. (C) Side of square = HCF of length and breadth of the room.

$$1763 \text{ cm} \text{ \& } 1927 \text{ cm}$$

$$\text{HCF} = 41 \text{ cm}$$

$$\begin{array}{r}
 1783 \overline{) 1927} \quad (1 \\
 \underline{1763} \\
 164 \overline{) 1763} \quad (10 \\
 \underline{1640} \\
 123 \overline{) 164} \quad (1 \\
 \underline{123} \\
 41 \overline{) 123} \quad (3 \\
 \underline{123} \\
 \underline{0}
 \end{array}$$

∴ Least number of square tiles =

$$\begin{array}{r}
 \cancel{1763}^{43} \text{ cm} \times \cancel{1927}^{47} \text{ cm} \\
 \hline
 \cancel{41}_1 \text{ cm} \times \cancel{41}_1 \text{ cm}
 \end{array}$$

$$= 2021$$

11. (D) Given $a = 23$

$$d = a_2 - a_1 = 22\frac{1}{4} - 23 = \frac{-3}{4}$$

Given $a_n < 0$

$$a + (n-1)d < 0$$

$$23 + (n-1)\left(\frac{-3}{4}\right) < 0$$

$$23 - (n-1)\frac{3}{4} < 0$$

$$23 < (n-1)\frac{3}{4}$$

$$23 \times \frac{4}{3} < n-1$$

$$\frac{92}{3} < n-1$$

$$30.6 + 1 < n$$

$$n > 31.6$$

∴ Next integer of 31.6 is '32'

∴ $N = 32$

∴ a_{32} is the first negative term

$$\therefore a_{32} = 23 + 31 \times \left(\frac{-3}{4}\right) = \frac{92-93}{4} = \frac{-1}{4}$$

$$a_{31} = a + 30d = 23 + 30\left(\frac{-3}{4}\right)$$

$$= \frac{92-90}{4} = \frac{2}{4} = \frac{1}{2}$$

12. (C) Given $p(x) = x^3 - 9x^2 - 69x + 5$

$$\text{Given } \alpha\beta\gamma = \frac{-d}{a} = -5$$

$$p(-5) = (-5)^3 - 9(-5)^2 - 69(-5) + 5$$

$$= -125 - 225 + 345 + 5$$

$$= -350 + 350$$

$$p(-5) = 0$$

∴ -5 is the zero of $p(x)$

$$\begin{array}{r}
 x^2 - 14x + 1 \\
 x+5 \overline{) \begin{array}{l} x^3 - 9x^2 - 69x + 5 \\ \underline{x^2 + 5x^2} \\ 14x^2 - 69x + 5 \\ \underline{-14x^2 - 70x} \\ x + 5 \\ \underline{x + 5} \\ 0 \end{array} }
 \end{array}$$

$$x^2 - 14x + 1 = 0$$

$$a = 1, b = -14, c = 1$$

$$\therefore x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-14) \pm \sqrt{(-14)^2 - 4 \times 1 \times 1}}{2}$$

$$= \frac{14 \pm \sqrt{196 - 4}}{2}$$

$$= \frac{14 \pm \sqrt{64 \times 3}}{2}$$

$$= \frac{14 \pm 8\sqrt{3}}{2}$$

$$= 7 \pm 4\sqrt{3}$$

∴ -5, $7 + 4\sqrt{3}$ & $7 - 4\sqrt{3}$ are the zeros of $p(x)$

$$\begin{array}{r}
 13. \text{ (D)} \quad 3748x + 5467y = 10085 \\
 1731x + 7484y = 4034 \\
 \hline
 (-) \quad (-) \quad (-) \\
 \hline
 2017x - 2017y = 6051
 \end{array}$$

$$2017(x - y) = 6051$$

$$x - y = \frac{6051}{2017} = 3$$

14. (D) Let speed of the sailer in still water be x kmph and speed of the stream be y kmph

$$\frac{8h}{x + y} = 40 \text{ min} = \frac{2}{3} \text{ hour}$$

$$\therefore x + y = \frac{24}{2} = 12 \longrightarrow \textcircled{1}$$

$$\text{Given } \frac{8h}{x - y} = 1 \text{ hour}$$

$$\therefore x - y = 8 \longrightarrow \textcircled{2}$$

$$\text{Eq. } \textcircled{1} + \textcircled{2} \Rightarrow x + \cancel{y} + x - \cancel{y} = 12 + 8$$

$$2x = 20$$

$$x = 10 \text{ kmph}$$

15. (D) Let the number of red balls be 'x'

$$\therefore \text{Total balls} = x + 16$$

Probability of getting a red ball $P(R)$

$$= \frac{x}{x + 16}$$

Probability of getting a blue ball $P(B)$

$$= \frac{16}{x + 16}$$

$$\text{Given } P(B) = 2 \times P(R)$$

$$\frac{16}{(x + 16)} = \frac{2x}{(x + 16)}$$

$$x = \frac{16^8}{2 \cdot 1}$$

$$\text{Number of Red balls} = 8$$

REASONING

$$\begin{array}{ll}
 \text{As } Q \xrightarrow{-4} M & \text{Similarly, } Y \xrightarrow{-4} U \\
 I \xrightarrow{+4} M & A \xrightarrow{+4} E \\
 O \xrightarrow{-4} K & W \xrightarrow{-4} S \\
 K \xrightarrow{+4} O & C \xrightarrow{+4} G
 \end{array}$$

16. (A)

17. (C) The bottom left figure rotates 90° anti-clockwise and gets enlarged, the upper larger figure rotates 90° anti-clockwise and becomes smaller, the third figure is replaced by a new one and all the figures, then moves one side clockwise.

18. (D) FKUDVT

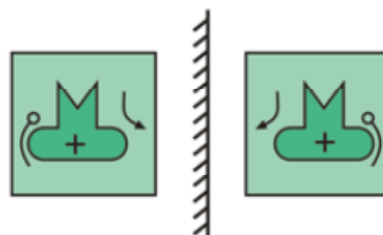
$$3 \% 8 5 \# 6 .$$

First and last elements are divisible by 3. so 6 is coded as T and 3 is coded as F.

$\% 8 5 \#$ is coded as KUDV

Therefore $3 \% 8 5 \# 6$ is coded as FKUDVT

19. (D) Z X V T R P (N) L J H F D B



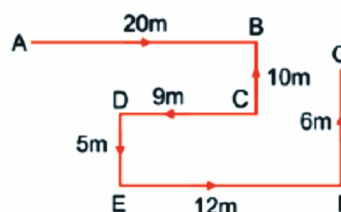
20. (D)

21. (A) $P + N$ i.e., P is the mother of N, hence, the sex of P is determined as female.

$Q \div P$ i.e., Q is the father of P. hence, $Q \div P + N$ clearly means that P is the daughter of Q.

22. (C) In all other groups of letters there is no gap between first and second letters, gap of one letter between second and third letters, gap of two letters between third and fourth letters.

23. (C) The movements of the rat from A to G are as shown in figure.



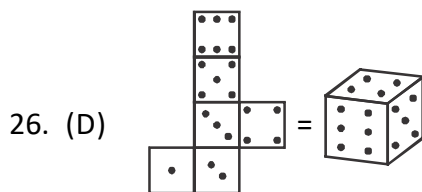
Clearly, it is finally walking in the direction FG i.e., North.

24. (B) disc above is the correct answer because scab is hidden between disc and above. Disgusting they may be, but scabs help us to heal by forming a barrier against infection.

25. (A) In the first figure, $5 = (5 \times 1)$, $8 = (4 \times 2)$, $4 = (2 \times 2)$.

In the second figure, $6 = (3 \times 2)$, $9 = (3 \times 3)$, $4 = (2 \times 2)$.

So, the digits of the missing figure are (6×1) , (7×1) , (4×2) i.e., 6, 7, 8.



27. (D) As per conditions given, following is the position of 5 persons in a line



From left, editor is at the 4th place in the line

28. (D)

H	O	R	T	I	C	U	L	T	U	R	E
1	2	3	4	5	6	7	8	9	10	11	12

Option (A) : R O E T C H L U I U T I

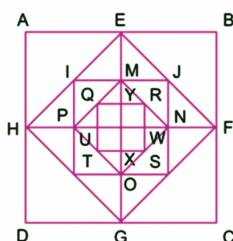
Option (B) : H O R T E C U L T U R I

Option (C) : T H I O L R U I U E C T

Option (D) : H O R T I C U L T U R E

29. (A) ENE – The complete word is FRIGHTENED.

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



The simplest squares are QVYU, VRWY, YWSX and UYXT i.e. 4 in number.

The squares composed of four components each are IMYP, MJNY, YNKO, PYOL and QRST i.e. 5 in number.

The squares composed of seven components each are AEYH, EBFY, YFCG and HYGD i.e. 4 in number.

The only square composed of twelve components is MNOP.

There is only one square i.e. IJKL composed of sixteen components.

There is only one square i.e. EFGH composed of twenty-four components.

There is only one square i.e. ABCD which is composed of twenty-eight components.

Thus, there are $4 + 5 + 4 + 1 + 1 + 1 + 1 = 17$ squares in the given figure.

COMPUTERS

31. (C) Slide Show → Used to view the slides in presentation mode.

- Slide Transition → Adds effects when moving from one slide to another.
- Custom Animation → Adds effects to individual objects (like text flying in, spinning, fading).
- Text Animation → This is not a specific option in PowerPoint; text effects are applied via Custom Animation.

32. (D) We enter 3 types of data in cells : labels, numbers and formulae.

33. (B) Privacy is about protecting personal information from unauthorized access.

- Plagiarism → Copying someone else's work.
- Intellectual Rights → Protects inventions, trademarks, or creations.

34. (B) In MS-Access to open an existing database we should press ctrl + O

35. (A) HTML is case sensitive, not correct statement.

36. (A) The active cell (the one currently selected) is highlighted with a thick, dark border so you know where you are typing.

A dotted border appears inside the cell only when copying or during certain operations, not for normal selection.

ENGLISH

37. (C) Lookup Wizard lets you create a field where users can choose values from another table or a list.
It is not specifically for selecting Excel values, though you can import them separately.
38. (C) Object Browser shows all objects, their properties, methods and events.
Form Layout Window → For designing forms.
Code Editor Window → For writing code, not for browsing all objects.
39. (B) Custom Slide Show → Allows you to create a new slide show using existing slides, arranged in any order you want.
Rehearsal → Used to practice timing of slides.
Slide Show Setup → Sets options like looping, monitor selection, and slide range, but doesn't reorder slides.
Slide Show View → Simply runs the presentation in full-screen mode.
40. (D) Barchart. Used to show comparisons between different items of data and which run horizontally on the page.
41. (D) In MS-Access (or similar database/report design tools), you can select multiple controls (like text boxes, labels, buttons) using any of these methods:
1. Shift key → Click each object while holding Shift to select multiple objects.
 2. Ruler selection → If controls are aligned, clicking the horizontal or vertical ruler selects them along that line.
 3. Ctrl key → Click each object while holding Ctrl to select multiple objects individually.
42. (B) $\text{=sum}(D_1 : D_5)$ is used to add all numbers in a range of cells whereas in option (A, C) the function add only two numbers.
43. (D) An Ms-powerpoint slide can be combination of text, graphics, audio, video, animation and text.
44. (A) MS-Access is a DBMS software.
45. (B) 'OL' is used in HTML to order a list.
46. (B) Obsolete means no longer in use or out of date.
Modern/current → Opposite meaning.
Useful → Not the same meaning.
47. (B) Fastidious → Very attentive to detail, meticulous.
- Lethargic → Lazy or slow.
 - Obstinate → Stubborn.
 - Voracious → Very eager or hungry.
48. (C) next to → Preposition (shows relationship with "her").
next → Adverb (modifies "said" in "what next?").
49. (D) Correct sentence: "The army sent the colonel to patrol from the plane."
- Other options have wrong words like "carnal/karnal/petrol" which don't make sense.
50. (D) Original sentence → Future perfect tense (active)
Change to passive voice → Subject becomes object, verb adjusts: will have been sown.