



UNIFIED CYBER OLYMPIAD (UPDATED)

CLASS - 9
Question Paper Code : 30119

KEY

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

SOLUTIONS

MENTAL ABILITY

01. (B) Simplify each term

$$\sqrt{175} = 5\sqrt{7}$$

$$-3\sqrt{252} = -18\sqrt{7}$$

$$5\sqrt{343} = 35\sqrt{7}$$

Combine terms

$$5\sqrt{7} - 18\sqrt{7} + 35\sqrt{7} = 22\sqrt{7}$$

Rewrite as a single square root

$$22\sqrt{7} = \sqrt{3388}$$

02. (D) Square the given equation:

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

$$x^2 + 2 + \frac{1}{x^2} = 9$$

$$x^2 + \frac{1}{x^2} = 7$$

cubing on both sides.

$$\left(x^2 + \frac{1}{x^2}\right)^3 = 7^3$$

$$\left(x^2 + \frac{1}{x^2}\right) = 7^3$$

$$x^6 + 3x^2 \cdot \frac{1}{x^2} \left(x^2 + \frac{1}{x^2}\right) + \frac{1}{x^6} = 343$$

$$x^6 + 3(7) + \frac{1}{x^6} = 343$$

$$x^6 + \frac{1}{x^6} = 343 - 21 = 322$$

03. (B) Convert to cm

$$8.25 \text{ m} = 825 \text{ cm}$$

$$6.75 \text{ m} = 675 \text{ cm}$$

$$4.5 \text{ m} = 450 \text{ cm}$$

Find HCF of 825, 675, 450 = 75 cm

04. (A) It is in inverse proportion.

$$\therefore x_1 y_1 = x_2 y_2$$

$$720 \times (35 - 5) = (720 - 120) y_2$$

$$\frac{720 \times 30}{600} = y_2$$

The remaining food will last for 36 days.

05. (A) Using $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$$567^3 - 433^3 = (567 - 433)(567^2 + 433 \times 567 + 433^2)$$

First factor :

$$567 - 433 = 134$$

$$\begin{aligned} 06. (D) \quad \frac{1}{\sqrt{11}-3} &= \frac{1}{\sqrt{11}-3} \times \frac{\sqrt{11}+3}{\sqrt{11}+3} \\ &= \frac{\sqrt{11}+3}{(\sqrt{11})^2 - 3^2} = \frac{\sqrt{11}+3}{11-9} = \frac{\sqrt{11}+3}{2} \end{aligned}$$

Similarly,

$$\frac{1}{3-\sqrt{7}} = \frac{3+\sqrt{7}}{2}$$

$$\frac{1}{\sqrt{7}-\sqrt{5}} = \frac{\sqrt{7}+\sqrt{5}}{2}$$

$$\frac{1}{\sqrt{5}-\sqrt{3}} = \frac{\sqrt{5}+\sqrt{3}}{2}$$

$$\therefore \frac{\sqrt{5}+\sqrt{3}}{2} < \frac{\sqrt{7}+\sqrt{5}}{2} < \frac{3+\sqrt{7}}{2} < \frac{\sqrt{11}+3}{2}$$

$$\text{i.e., } \frac{1}{\sqrt{5}-\sqrt{3}} < \frac{1}{\sqrt{7}-\sqrt{5}} < \frac{1}{3-\sqrt{7}} < \frac{1}{\sqrt{11}-3}$$

$$\Rightarrow \sqrt{5}-\sqrt{3} > \sqrt{7}-\sqrt{5} > 3-\sqrt{7} > \sqrt{11}-3$$

07. (C) Given $p(x) = \frac{2x+1}{x-2}$

$$\therefore p\left(\frac{2x+1}{x-2}\right) = \frac{2\left(\frac{2x+1}{x-2}\right)+1}{\left(\frac{2x+1}{x-2}\right)-2}$$

$$= \frac{\left[\frac{4x+2+(x-2)}{x-2}\right]}{\left[\frac{2x+1-2(x-2)}{x-2}\right]}$$

$$= \frac{(4x+\cancel{2}+x-\cancel{2})}{(\cancel{x-2})} \times \frac{(\cancel{x-2})}{(2\cancel{x}+1-\cancel{2x}+4)}$$

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

08. (C) Divisor = $2x - 3$

$$x = \frac{3}{2}$$

Substitute into the polynomial

$$f(x) = 2x^3 - 9x^2 + x + 15$$

$$f\left(\frac{3}{2}\right) = 2\left(\frac{27}{8}\right) - 9\left(\frac{9}{4}\right) + \frac{3}{2} + 15$$

$$= \frac{54}{8} - \frac{81}{4} + \frac{3}{2} + 15$$

Convert all to denominator 8

$$\begin{aligned} &\frac{54}{8} - \frac{162}{8} + \frac{12}{8} + \frac{120}{8} \\ &= \frac{54 - 162 + 12 + 120}{8} = \frac{24}{8} = 3 \end{aligned}$$

$$09. (B) \quad \text{LHS} = \frac{4(x+1)+5(x-1)+6}{x^2-1}$$

$$= \frac{4x+4+5x-5+6}{x^2-1}$$

$$= \left(\frac{9x+5}{x^2-1} \right)$$

$$10. (C) \quad \pi r^2 h = 23,100 \text{ cm}^3$$

$$\frac{22}{7} \times \frac{35}{2} \times \frac{35}{2} \times h \text{ cm}^3 = 23,100 \text{ cm}^3$$

$$h = 23,100 \text{ cm}^3 \times \frac{7}{22} \times \frac{2}{35} \times \frac{2}{35}$$

$$= 24 \text{ cm}$$

$$11. (D) \quad \frac{15}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}}$$

$$= \frac{15}{\sqrt{10} + 2\sqrt{5} + 2\sqrt{10} - \sqrt{5} - 4\sqrt{5}}$$

$$= \frac{15}{3\sqrt{10} - 3\sqrt{5}} = \frac{5}{\cancel{3}(\sqrt{10} - \sqrt{5})}$$

$$= \frac{5}{\sqrt{10} - \sqrt{5}} \times \frac{\sqrt{10} + \sqrt{5}}{\sqrt{10} + \sqrt{5}} = \frac{\cancel{5}(\sqrt{10} + \sqrt{5})}{\cancel{3}}$$

$$12. (B) \quad \text{Volume of cube} = (7\text{cm})^3 = 343\text{cm}^3$$

$$\text{Diameter of cone} = \text{side of cube} = 7\text{cm}$$

$$\therefore r = \frac{7\text{cm}}{2} \text{ \& } h = 7\text{cm}$$

$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

$$= \frac{1}{3} \times \frac{\cancel{22}^{11}}{\cancel{7}} \times \frac{\cancel{7}}{\cancel{2}} \times \frac{7}{2} \times 7\text{cm}^3$$

$$= 89.83 \text{ cm}^3$$

$$\text{wastage of wood}$$

$$= 343 \text{ cm}^3 - 89.83\text{cm}^3 = 253.17\text{cm}^3$$

$$\text{waste wood percentage}$$

$$= \frac{253.17\text{cm}^3}{343\text{cm}^3} \times 100$$

$$= 73.81\%$$

$$\begin{aligned} 13. (C) \quad & x^2 + x(c-b) + (c-a)(a-b) = x^2 + x(c-a) \\ & + a-b + (c-a)(a-b) \\ & = x^2 + x[(c-a) + (a-b)] + (c-a)(c-b) \\ & = x^2 + x(c-a) + x(a-b) + (c-a)(a-b) \\ & = x(x+c-a) + (a-b)(x+c-a) \\ & = (x+c-a)(x+a-b) \end{aligned}$$

$$14. (B) \quad \text{Given } 6x + 6y = 5xy \quad \dots (1)$$

$$6x - 6y = xy \quad \dots (2)$$

$$\text{Eq (1)} + (2) \Rightarrow 12x = 6xy$$

$$y = 2$$

$$6x - 12 = 2x \quad \dots (2)$$

$$4x = 12$$

$$x = 3$$

$$\therefore 3x - 2y = 9 - 4 = 5$$

$$15. (C) \quad \text{Let speed of the boat in still water be 'x' and speed of the stream be 'y'}$$

$$\text{Given } \frac{100}{x+y} + \frac{30}{x-y} = 6 \text{ hours}$$

$$\text{Let } \frac{1}{x+y} = a \text{ and } \frac{1}{x-y} = b$$

$$100a + 30b = 6 \quad \dots (1)$$

$$\text{Given } \frac{75}{x+y} + \frac{75}{x-y} = 8$$

$$75a + 75b = 8 \quad \dots (2)$$

$$\text{Eq (1)} \times 3 \Rightarrow \cancel{300}a + 90b = 18$$

$$\begin{array}{r} \text{Eq (2)} \times 4 \Rightarrow \cancel{300}a + \cancel{300}b = 32 \\ \quad \quad \quad (-) \quad (-) \quad (-) \\ \hline \quad \quad \quad +210b = +14 \end{array}$$

$$b = \frac{\cancel{14}^1}{\cancel{210}_{30}^{15}}$$

$$100a + \cancel{30}^2 \times \frac{1}{\cancel{15}} = 6$$

$$100a = 4$$

$$a = \frac{4}{100} = \frac{1}{25}$$

$$\therefore a = x + y = 25 \quad \dots (3)$$

$$\therefore b = x - y = 15 \quad \dots (4)$$

$$\text{eq (3)} + (4) \quad 2x = 40$$

$$x = 20 \text{ kmph}$$

REASONING

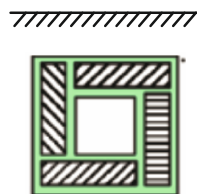
16. (D) LKJ : pon :: ? : hgf
- Look at the pattern: Letters are in reverse order in the alphabet:
 - L → p (forward 4)
 - K → o (forward 4)
 - J → n (forward 4)
 - Apply the same pattern backward for the second pair to get hgf :
 - ? → h (4 letters before l = h)
 - ? → g (4 letters before k = g)
 - ? → f (4 letters before j = f)
17. (A) Number sequence: 10, 12, 28, 90, 368, ?, 11112
- Pattern : Multiply the previous number by its position in the sequence and add 2:
 - $10 \times 1 + 2 = 12$
 - $12 \times 2 + 4 = 28$
 - $28 \times 3 + 6 = 90$
 - $90 \times 4 + 8 = 368$
 - $368 \times 5 + 10 = 1850$
18. (B) Code: TOGETHER → RQEGRJCT
- Look at the letter positions:
 - T → R (−2), O → Q (+2), G → E (−2), E → G (+2), T → R (−2), H → J (+2), E → C (−2), R → T (+2)
 - Pattern : alternate subtract 2, add 2.
 - Apply same pattern to PAROLE
 - P → N (−2)
 - A → C (+2)
 - R → P (−2)
 - O → Q (+2)
 - L → J (−2)
 - E → G (+2)
19. (D) Odd-position letters → A, C, E, G, I, K, M, O, Q, S, U, W, Y
Even-position letters in reverse → Z, X, V, T, R, P, N, L, J, H, F, D, B

Combined sequence → A, C, E, G, I, K, M, O, Q, S, U, W, Y, Z, X, V, T, R, P, N, L, J, H, F, D, B
17th letter = T

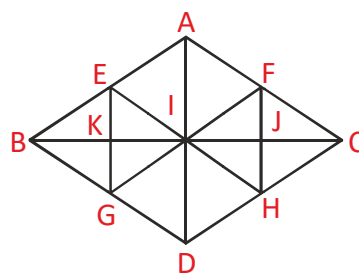
6th to the left of T → 11th letter = U



20. (D)



21. (D) A and B are brothers.
- A's son is D's brother → A is D's (and C's) father.
 - B = A's brother → B is C's uncle.
22. (C) Group 1 (rounded/curved) : 2, 5, 9
Group 2 (triangular/angled) : 3, 4, 8
Group 3 (other shapes) : 1, 6, 7
23. (D) All others decrease by 3 then 1, but JFE decreases by 4 then 1.
24. (C) AEI, AIF, JFC, FIJ, IEK, EKB, BKG, IKG, IGD, IDH, IJH, JCH, FIC, IEB, IGB, CHI, FCH, FIH, IEG, EBG, AIB, AIC, BID, ICD, ABC, BDC, ABD, ACD = 28 triangles.



25. (D) Distance from house :
 $\sqrt{(-12)^2 + 5^2} = \sqrt{144 + 25} = \sqrt{169} = 13 \text{ km}$
26. (C) $90 - 32 = 58$
27. (A) Cube divided into $4 \times 4 \times 4 = 64 \times 4 \times 4 = 64 \times 4 \times 4 = 64$ smaller cubes.
- Corner cubes (3 red faces): 8
 - Edge cubes (2 red faces): 24
 - Cubes with >1 red face = $8 + 24 = 32$

28. (C) Sentence: "You only need to ask in this school, and you will get help."
- Look for two words next to each other that hide a 4-letter word.
 - "this school" ? "isch"? Not meaningful.
 - "ask in" ? "skin" Hidden word is skin
 - "you will" ? "ouwi"
 - "get help" ? "thelp"

29. (D)

1. $Q + R @ P @ N \rightarrow$ Q is mother of R, R's sister is P ? P is child of R, not Q
2. $Q + R \$ P @ N \rightarrow$ Q is mother of R, R's brother is P ? P is child of R
3. $Q \times R \$ P @ N \rightarrow$ Q is father of R, R's brother is P ? P is child of R
4. $Q \times R \$ P \$ N \rightarrow$ Q is father of R, R's brother is P ? P is son of Q

30. (A) $Q = 4$ (middle)

- T between Q and U, U between T and S $\rightarrow$ positions 4 – 7 : Q, T, U, S
 - V between P and Q $\rightarrow$ positions 2 – 3 : P, V
 - P lower than R $\rightarrow R = 1$
- Final ladder (top $\rightarrow$ bottom)
- 1: R, 2: P, 3: V, 4: Q, 5: T, 6: U, 7: S

COMPUTERS

31. (A)

- Wi Fi $\rightarrow$ enables hi speed wireless data transfer $\rightarrow$ (iv).
- Optical fibre $\rightarrow$ a physical medium for data transmission $\rightarrow$ (i).
- Internet $\rightarrow$ the largest WAN in the world $\rightarrow$ (iii).
- Interspace $\rightarrow$ refers to the new Internet technology being developed $\rightarrow$ (ii).

32. (A) OpenOffice Writer uses .odt (Open Document Text) format, not .doc (MS Word) or .txt

33. (A) Do While...Loop continues as long as the condition is true. Do Until...Loop runs until the condition is true (opposite).

34. (C) Fibre optic cables use light for high-speed data transmission; coaxial and Ethernet cables use electrical signals.

35. (B) These are Business-to-Consumer (B2C) platforms selling products directly to customers.

36. (D) OCR (Optical Character Recognition) and MICR (Magnetic Ink Character Recognition) are both used to recognize characters; scanning alone only captures an image.

37. (D) Linux is an operating system, not an application software like Word Processor, Spreadsheet, or Database.

38. (A) The Left function extracts the first 3 characters from the string "Hello World".

39. (C) WAN (Wide Area Network) connects computers over large geographical areas, unlike LAN which is within a building or city.

40. (D) Security services handle usernames, passwords, certificates, and encryption for secure communication.

41. (B) Spell check identifies and corrects spelling mistakes; Thesaurus suggests synonyms, Find and Replace searches text.

42. (A) 16 bits

43. (B) Memory hierarchy: Bit < Byte < Kilobyte < Megabyte < Gigabyte < Terabyte.

44. (C) Utility software helps maintain the computer, e.g., antivirus, disk defragmenter. Database and Presentation are application software; OS is system software.

45. (D) When a computer boots, the OS loads first to manage hardware and run applications.

ENGLISH

46. (B) "Transient" means short-lived or temporary. Opposite options like permanent, steady, constant indicate lasting.
47. (C) "Bravery" is a noun. Wisely, gently, rarely are all adverbs describing how an action is done.
48. (A) "final" → adjective (describes "report")
"late" → adverb (describes "submitted")
49. (D) Passive voice : Meal will have been eaten by Ramu, by now.
50. (D) Correct words : donates, send, sum, drought.