



## Unified International Cyber Olympiad

### UNIFIED INTERNATIONAL CYBER OLYMPIAD

**CLASS - 10**

**Question Paper Code : 3P124**

#### KEY

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

#### SOLUTIONS

##### MENTAL ABILITY

01. (A) Volume =  $\frac{4}{3}\pi r^3 = 38808$

$$\frac{4}{3} \times \frac{22}{7} \times r^3 = 38,808 \text{ cm}^3$$

$$r^3 = 38808 \times \frac{3 \times 7}{4 \times 22}$$

$$r = \sqrt[3]{21^2 \times 21}$$

$$r = 21 \text{ cm}$$

Surface area of a sphere

$$= 4\pi r^2 = 4 \times \frac{22}{7} \times 21 \times 21$$

$$= 5544 \text{ cm}^2$$

02. (A) Given LCM + HCF = 1,94,292 \_\_\_\_\_ (1)

$$\text{LCM} - \text{HCF} = 1,93,788 \text{ _____ (2)}$$

$$\underline{\quad (-) \quad (-) \quad}$$

$$2 \text{ LCM} = 388080$$

$$\text{LCM} = \frac{388080}{2} = 1,94,040$$

$$1,94,040 + \text{HCF} = 1,94,292$$

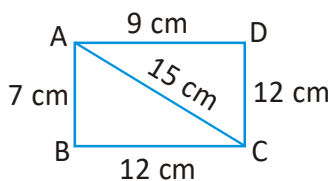
$$\text{HCF} = 1,94,292 - 1,94,040 = 252$$

But product of two numbers = LCM  $\times$  HCF

$$2520 \times x = 194040 \times 252$$

$$x = \frac{194040 \times 252}{2520} = 19404$$

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



$$\text{where } s = \frac{a+b+c}{2} = \frac{7\text{cm} + 12\text{cm} + 15\text{cm}}{2}$$

$$= \frac{34\text{cm}}{2} = 17\text{ cm}$$

$$\text{Area } (\triangle ABC) = \sqrt{17 \times 10 \times 5 \times 2} \text{ cm}^2$$

$$= 10\sqrt{17} \text{ cm}^2$$

$$\text{In } \triangle ACD, 15^2 = 12^2 + 9^2 \Rightarrow \angle D = 90^\circ$$

$$\therefore \text{Area of } \triangle ACD = \frac{1}{2} \times AD \times DC$$

$$= \frac{1}{2} \times 9 \times 12 \text{ cm}^2 = 54 \text{ cm}^2$$

$$\therefore \text{Area of the quadrilateral ABCD}$$

$$(10\sqrt{17} + 54) \text{ cm}^2$$

04. (B) LHS =  $(1 + 2 + 3 - 4) + (5 + 6 + 7 - 8) + (9 + 10 + 11 - 12) + \dots + (197 + 198 + 199 - 200)$

$$= 2 + 10 + 18 + 26 + \dots + 394$$

$$[\because \text{They are in AP } l_n = \frac{n}{2} (a + l)]$$

$$= \frac{50}{2} [2 + 394] = 396 \times \frac{100}{4} = 9900$$

05. (D) Area of the sector = CSA of a cone

$$\frac{1}{2} \cancel{\pi} (2\sqrt{3} \text{ cm})^2 = \cancel{\pi} r \times (2\sqrt{3})$$

$$\frac{1}{2} \frac{(2\sqrt{3})^2}{(2\sqrt{3})} = r$$

$$r = \sqrt{3}$$

$$h = \sqrt{l^2 - r^2} = \sqrt{(2\sqrt{3})^2 - (\sqrt{3})^2}$$

$$= \sqrt{12 - 3} = \sqrt{9} = 3$$

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

$$= \frac{1}{3} \pi \times (\sqrt{3})^2 \times 3 = 3\pi \text{ cm}^3$$

06. (A)  $7 \times 15 + 1, 7 \times 16 + 1, 7 \times 17 + 1, \dots$  are in AP.

$$106, 113, 120, \dots, 995 \text{ are in AP}$$

$$a = 106, d = a_2 - a_1 = 113 - 106 = 7$$

$$a_n = 995$$

$$a + (n - 1)d = 995$$

$$106 + (n - 1) \times 7 = 995$$

$$(n - 1) \times 7 = 995 - 106$$

$$(n - 1) = \frac{889}{7} = 127$$

$$n = 127 + 1$$

$$n = 128$$

$$S_n = \frac{n}{2} (a + l)$$

$$S_{128} = \frac{128}{2} (106 + 995)$$

$$= 64 \times 1101$$

$$= 70,464$$

07. (D) Let the speed of the man in still water be  $x$  KMPH and speed of stream be  $y$  KMPH respectively

$$\text{Given } \frac{\frac{3}{4} \text{ km}}{x - y} = \frac{11\frac{1}{4} \text{ hours}}{60}$$

$$x - y = \frac{3}{4} \times \frac{60}{45} \times 4$$

$$x - y = 4 \rightarrow (1)$$

$$\text{Given } \frac{\frac{3}{4} \text{ km}}{x + y} = \frac{7\frac{1}{2} \text{ hours}}{60}$$

$$x + y = \frac{3}{4} \times \frac{60}{15} \times 2$$

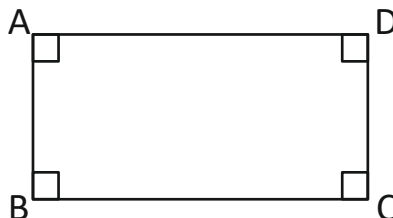
$$x + y = 6 \rightarrow (2)$$

$$\text{equ (1) + (2)} \Rightarrow 2x = 10$$

$$x = 5 \text{ KMPH}$$

08. (D) Given  $2(AB + BC) = 82 \text{ cm}$

$$AB + BC = \frac{82}{2} \text{ cm}$$



$$AB + BC = 41$$

squaring on both sides

$$(AB + BC)^2 = 41^2$$

$$AB^2 + BC^2 + 2AB \times BC = 1681$$

$$AC^2 + 2AB \times BC = 1681$$

$$[\because AB^2 + BC^2 = AC^2]$$

$$29^2 + 2AB \times BC = 1681$$

$$841 + 2AB \times BC = 1681$$

$$2AB \times BC = 1681 - 841$$

$$AB \times BC = \frac{840}{2}^{420} \text{ cm}$$

$$\therefore \text{Area of the rectangle} = AB \times BC = 420 \text{ cm}^2$$

09. (D) Given  $\frac{x+b+x+a}{x^2+xa+xb+ab} = \frac{1}{c}$

$$(2x + a + b)c = x^2 + xa + xb + ab$$

$$\therefore x^2 + x(a + b - 2c) + (ab - bc - ca) = 0$$

$$\text{Given } \alpha + \beta = 0$$

$$\frac{-(a+b-2c)}{1} = 0$$

$$a + b = 2c \Rightarrow c = \left( \frac{a+b}{2} \right)$$

$$\alpha\beta = ab - bc - ca = ab - (a + b)c$$

$$= ab - (a + b) \left( \frac{a+b}{2} \right)$$

$$= \frac{2ab - a^2 - b^2 - 2ab}{2} = \frac{-(a^2 + b^2)}{2}$$

10. (B)  $\angle A = (2x + 4)^\circ$  and  $\angle C = (2y + 10)^\circ$ ;

$$\text{But } \angle A + \angle C = 180^\circ$$

(Cyclic quadrilateral)

$$\Rightarrow (2x + 4)^\circ + (2y + 10)^\circ = 180^\circ$$

$$\Rightarrow 2x + 2y = 166^\circ$$

$$\text{Also } \angle B = (y + 3)^\circ, \angle D = (4x - 5)^\circ$$

$$\text{But } \angle B + \angle D = 180^\circ$$

$$\Rightarrow (y + 3)^\circ + (4x - 5)^\circ = 180^\circ$$

$$\Rightarrow 4x + y = 182^\circ$$

On solving (1) and (2), we get  $x = 33^\circ$ ,  $y = 50^\circ$

$$\angle B = (y + 3)^\circ = (50 + 3)^\circ = 53^\circ$$

$$\angle C = (2y + 10)^\circ = (100 + 10)^\circ = 110^\circ,$$

$$\therefore \angle B + \angle C = 53^\circ + 110^\circ = 163^\circ$$

11. (A)  $210 = 5 \times 7 \times 2 \times 3$

$$65 = 5 \times 13$$

$$\therefore \text{HCF of } 210 \text{ \& } 65 = 5$$

$$\text{Given } 199 \times 5 + 55y = 5$$

$$199 \times 5 - 5 = -55y$$

$$\frac{199 \times 5 - 5}{-55} = y$$

$$y = -18$$

$$\therefore y^2 = (-18)^2 = 324$$

12. (A) The given equations are

$$\frac{1}{2(2x+3y)} + \frac{12}{7(3x-2y)} = \frac{1}{2} \dots\dots\dots(i)$$

$$\frac{7}{(2x+3y)} + \frac{4}{(3x-2y)} = 2 \dots\dots\dots(ii)$$

Putting  $\frac{1}{(2x+3y)} = u$  and  $\frac{1}{(3x-2y)} = v$ ,  
the given equations become

$$\frac{u}{2} + \frac{12v}{7} = \frac{1}{2} \Rightarrow 7u + 24v = 7 \dots\dots\dots(iii)$$

$$\text{and, } 7u + 4v = 2 \dots\dots\dots(iv)$$

On subtracting (iv) from (iii), we get

$$20v = 5 \Rightarrow v = \frac{5}{20} = \frac{1}{4}$$

$$\Rightarrow \frac{1}{(3x-2y)} = \frac{1}{4} \left[ \because v = \frac{1}{(3x-2y)} \right]$$

.....(v)

Putting  $v = \frac{1}{4}$  in (iii), we get

$$7u + 24 \times \frac{1}{4} = 7$$

$$\Rightarrow 7u = (7 - 6) = 1 \Rightarrow u = \frac{1}{7}$$

$$\Rightarrow \frac{1}{(2x+3y)} = \frac{1}{7} \quad \left[ \because u = \frac{1}{(2x+3y)} \right]$$

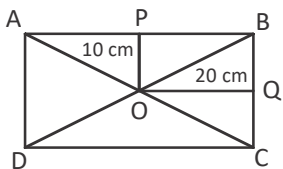
$$\Rightarrow 2x + 3y = 7 \quad \dots\dots\dots(\text{vi})$$

Multiplying (v) by 3, (vi) by 2 and adding the results, we get  $13x = 26 \Rightarrow x = 2$

13. (D)  $BC = AD = 2PO = 20 \text{ cm}$

$$AB = DC = 2 \times OQ = 40 \text{ cm}$$

$$\begin{aligned}\text{Perimeter of rectangle} &= 2(AB + BC) \\ &= 120 \text{ cm}\end{aligned}$$



14. (D)  $AB \parallel DF \Rightarrow \angle D = \angle B = 65^\circ$

[ $\therefore$  Alternative angles]

$$BD \parallel FG \Rightarrow \angle F = \angle D = 65^\circ$$

[ $\therefore$  Alternative angles]

But  $x + \angle F = 125^\circ$

[ $\therefore$  Exterior angle of a triangle]

$$\therefore x + 65^\circ = 125^\circ$$

$$x = 60^\circ$$

$$y + 125^\circ = 180^\circ (\because \text{Linear pair})$$

$$y = 55^\circ$$

$$x - y = 5^\circ$$

15. (A) Sum of 31 items =  $60 \times 31 = 1860$

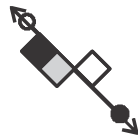
Sum of the first 16 items =  $16 \times 58 = 928$

Sum of the last 16 items =  $16 \times 62 = 992$

$$16\text{th result} = 928 + 992 - 1860 = 60$$

## REASONING

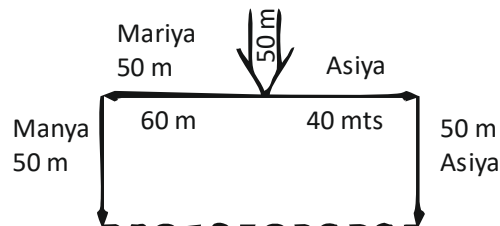
16. (B) Replacing each letter by the letter three positions ahead gives PDWKHPDWLFV. The 9th letter is L.



17. (C)

18. (C) 100 m

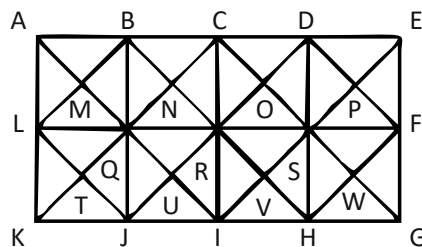
The track of both the friends is



Two friends are  $60 + 40 = 100$  mts apart.

19. (C) 24

We shall label the given figure as shown.



The squares composed of two components each are BNQM, CORN, DPSO, MQTL, NRUQ, OSVR, PFWS, QUIJT, RVIU and SWHV i.e. 10 in number.

The squares composed of four components each are ABQL, BCRQ, CDSR, DEFS, LQJK, QRIJ, RSHI and SFGH i.e. 8 in number.

The squares composed of eight components each are BRJL, CSIQ and DFHR i.e. 3 in number.

The squares composed of sixteen components each are ACIK, BDHJ and CEGL i.e. 3 in number.

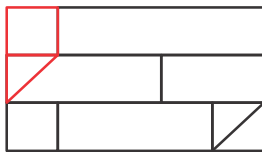
Thus, there are  $10 + 8 + 3 + 3 = 24$  squares in the figure.

20. (C) 11

Ref : A B C D E F G H I J K L M N O P Q R S  
T U V W X Y Z

The first and fourth vowels are A and O respectively. There are 13 letters between A and O, out of which 'E' and 'I' are vowels. Thus, there are 11 consonants between A and O.

21. (C) Since the rotation of the figure is not allowed, let's check which option figure can exactly fit itself in the given question figure.



22. (B) My daughter's father = Ravi.

So, the father of my daughter's father = Ravi's father.

The person's only brother is Ravi's father, so the person is Ravi's father's brother, i.e., Ravi's uncle.



23. (A)

24. (B) After interchanging + with – and  $\times$  with  $\div$ , Option (B) becomes  $20 + 8 \div 4 - 2 = 20$ , which simplifies to  $20 + 2 - 2 = 20$  using BODMAS

25. (A) Z - V; C - B; X - N shows pairs opposite faces.



26. (D)

27. (A) Rearranging the letters in NIFTIYIN forms the word INFINITY, which means forever or endlessness. None of the other options can be rearranged to form a word matching the given clue.

28. (A) The fifth letter to the left of T is L. Counting 12 letters to the right from L gives E.

29. (D) The first letter is determined by the type of heart shape (plain heart  $\rightarrow$  L), and the second letter is determined by the number of raindrop shapes (1 raindrop  $\rightarrow$  N). Hence, the correct code is LN.

30. (C) In all the other letter pairs, the first and second letters are equidistant from the beginning and the end of the English alphabet, respectively. However, in FR, they are not.

### COMPUTERS

31. (A) View

View is the Ribbon tab that follows Review in Microsoft PowerPoint. The remaining options are command groups found within Ribbon tabs.

32. (C) A FOR...NEXT loop executes only when its initial value can progress toward the final value according to the STEP value. For example:

FOR I = 1 TO 5 STEP -1

This loop executes zero times because the initial value (1) cannot reach 5 using a negative step.

33. (A) Registers  $\rightarrow$  Cache  $\rightarrow$  RAM  $\rightarrow$  SSD

Memory components are arranged in a hierarchy based on their access speed:

1. Registers – Located inside the CPU, they provide the fastest access and temporarily hold data and instructions currently being processed.
2. Cache Memory – A small, high-speed memory located on or near the CPU that stores frequently used data and instructions for quick access.
3. RAM (Random Access Memory) – The computer's main memory, which is slower than cache but much faster than secondary storage.
4. SSD (Solid-State Drive) – A non-volatile secondary storage device. Although SSDs are much faster than traditional hard disks, they are slower than RAM in terms of access time.

- Therefore, the correct order from fastest to slowest is :  
Registers → Cache → RAM → SSD
34. (A) Dim BooksIssued As Integer  
In Visual Basic, variables are declared using the syntax:  
Dim VariableName As DataType  
Therefore, Dim BooksIssued As Integer correctly declares an integer variable named BooksIssued.
35. (B) A valid identifier in C++ must begin with a letter or an underscore (\_). It may contain letters, digits, and underscores, but it cannot begin with a digit, contain special characters such as a hyphen (-), or be a reserved keyword. Therefore, total\_marks is the only valid identifier.
36. (A)
- .xlsx is the default workbook format in Excel 2010, based on the Office Open XML standard.
  - .xls is the workbook format used in Excel 97–2003.
  - .csv stores data as Comma-Separated Values, making it suitable for exchanging tabular data between applications.
  - .pdf stands for Portable Document Format, which preserves the document's layout for viewing and printing.
37. (C) Three  
The variables a, b, and temp are declared.
38. (A) Router  
A router connects different networks and forwards data packets between them using IP addresses.
39. (A) Replace colour with color.  
In CSS, the correct property name is color, not colour.
40. (A) Query  
A Query filters and retrieves records based on specified conditions. It does not alter the original table. Reports present data, forms facilitate data entry, and tables store the actual records.
41. (B) Device management monitors communication with hardware devices, detects changes in device availability and reports hardware-related errors.
42. (A) Yandex  
Yandex is a Russian multinational technology company best known for its search engine and a wide range of Internet-based services, including email, maps, cloud storage, and translation.  
The other options are not primarily known as Russian search engines:
- Lycos – An American web portal and search engine.
  - SlideShare – A platform for sharing presentations, documents, and other professional content.
  - Dotdash – A digital publishing company (formerly About.com) that operates informational websites rather than a search engine.
43. (B) Privacy  
Reading another person's personal emails without authorization is a breach of privacy because confidential information is accessed without consent.
44. (A) Software collaboration  
The analogy compares each platform with its primary purpose.
- LinkedIn is primarily used for career development, including professional networking, job searching, and showcasing skills and experience.
  - GitHub is primarily used for software collaboration, enabling developers to host, manage, share, and collaboratively develop software projects using version control.
- Therefore, the correct analogy is:  
LinkedIn : Career Development :: GitHub : Software Collaboration  
Hence, Option A is the correct answer.
45. (D) Google Search is a search engine, not a web browser

**ENGLISH**

46. (B)

47. (B)

48. (D)

49. (A)

50. (C)

==== *The End* =====