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UNIFIED COUNCIL OLYMPIADS

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UNIFIED CYBER OLYMPIAD (UPDATED)

CLASS - 09
Question Paper Code : 3B107

KEY

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

SOLUTIONS

MENTAL ABILITY

01. (B)

$$\left(7\sqrt{2}x^2 + 10x - 4\sqrt{2}\right) = 7\sqrt{2}x^2 + 14x - 4x - 4\sqrt{2}$$

$$= 7\sqrt{2}x^2 + 7 \times \sqrt{2} \times \sqrt{2}x - 4\left(x + \sqrt{2}\right)$$

$$= 7\sqrt{2}x\left(x + \sqrt{2}\right) - 4\left(x + \sqrt{2}\right)$$

$$= \left(x + \sqrt{2}\right)\left(7\sqrt{2}x - 4\right)$$

02. (D) $$\frac{1}{x} = \frac{1}{9 - 4\sqrt{5}} = \frac{1}{9 - 4\sqrt{5}} \times \frac{9 + 4\sqrt{5}}{9 + 4\sqrt{5}}$$

$$= \frac{9 + 4\sqrt{5}}{9^2 - \left(4\sqrt{5}\right)^2} = \frac{9 + 4\sqrt{5}}{81 - 80}$$

$$\frac{1}{x} = \frac{9 + 4\sqrt{5}}{1} = 9 + 4\sqrt{5}$$

$$x + \frac{1}{x} = 9 - 4\sqrt{5} + 9 + 4\sqrt{5} = 18$$

Squaring on both sides

$$\left(x + \frac{1}{x}\right)^2 = 18^2$$

$$x^2 + 2x \times \frac{1}{x} + \left(\frac{1}{x}\right)^2 = 324$$

$$x^2 + 2 + \frac{1}{x^2} = 324$$

$$x^2 + \frac{1}{x^2} = 324 - 2$$

$$x^2 + \frac{1}{x^2} = 322$$

03. (C) $$\frac{\sqrt[4]{81\,x^8\,y^4\,z^{16}}}{\sqrt[3]{27\,x^3\,y^6\,z^9}} = \frac{\left(81\,x^8\,y^4\,z^{16}\right)^{\frac{1}{4}}}{\left(27\,x^3\,y^6\,z^9\right)^{\frac{1}{3}}}$$

$$= \frac{(81)^{\frac{1}{4}}\left(x^8\right)^{\frac{1}{4}}\left(y^4\right)^{\frac{1}{4}}\left(z^{16}\right)^{\frac{1}{4}}}{(27)^{\frac{1}{3}}\left(x^3\right)^{\frac{1}{3}}\left(y^6\right)^{\frac{1}{3}}\left(z^9\right)^{\frac{1}{3}}} = \frac{3\,x^2\,y\,z^4}{3\,x\,y^2\,z^3}$$

$$= \frac{x^{2-1}\,z^{4-3}}{y^{2-1}} = \frac{xz}{y}$$

04. (B) Let 'x' to be subtracted from

$$P(x) = \left(8x^3 + 2x^2 - 25x + 10\right)$$

So that it is exactly divisible by $(2x + 3)$

$\therefore$ $P(x) = 8x^3 + 2x^2 - 25x + 10 - k$ is exactly divisible by $(2x + 3)$

$$\therefore P\left(\frac{-3}{2}\right) = 0$$

$$\therefore P\left(\frac{-3}{2}\right) = 8\left(\frac{-3}{2}\right)^3 + 2\left(\frac{-3}{2}\right)^2 - 25\left(\frac{-3}{2}\right) + 10 - k$$

$$\cancel{8} \times \frac{-27}{\cancel{8}} + 2 \times \frac{9}{\cancel{4}_2} + \frac{75}{2} + 10 - k = 0$$

$$-27 + \frac{9}{2} + \frac{75}{2} + 10 - k = 0$$

$$-27 + 10 + \frac{9 + 75}{2} = k$$

$$-17 + \frac{\overset{42}{\cancel{84}}}{\cancel{2}_1} = k$$

25 = k

$\therefore$ 25 to be subtracted from P(x) So that it is exactly divisible by $(2x + 3)$

05. (A)

```
   8) 509 (63
       48
       ─────
       29
       24
       ─────
        5
```

$\therefore$ 99480707504 is divisible by 8.

$\therefore$ 99813707509 is divided by 8, then the remainder is 5.

06. (A) Distance travelled in one minute =

$$\frac{50\,\text{km}}{60} = \left(\frac{5}{6}\right)\text{km}$$

$\therefore$ Distance travelled in 1 hour 18 minutes i.e., (60 + 18) minutes

$$= \frac{5}{6}\,\text{km} \times 78 = 65\,\text{km}$$

07. (D) It is in inverse variation.

Given x_1 = 900 men,

y_1 = 39 days,

x_2 = (900 + 400) men = 1300 men

y_2 = ?

But $x_1 y_1 = x_2 y_2$

$$y_2 = \frac{x_1 y_1}{x_2} = \frac{900 \times 39}{1300} = 27$$

08. (C) We have, h = 21 cm and I = 28 cm

$\therefore$ $l^2 = r^2 + h^2$

$$r^2 = l^2 - h^2 = \left(28^2 - 21^2\right)\text{cm}^2$$

$$r^2 = (28 + 21) \times (28 - 21)\,\text{cm}^2$$

$$r^2 = 49 \times 7\,\text{cm}^2$$

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

$$= \left(\frac{1}{3} \times \frac{22}{7} \times (49 \times 7) \times 21\right)\text{cm}^3$$

$$= (22 \times 343)\text{cm}^3 = 7546\,\text{cm}^3$$

09. (B) $3\pi r^2 = 5659.5 \text{ cm}^2$

$3 \times \dfrac{22}{7} \times r^2 = 5659.5 \text{ cm}^2$

$r^2 = 5659.5 \text{ cm}^2 \times \dfrac{7}{22} \times \dfrac{1}{3}$

$r^2 = 600.25 \text{ cm}^2$

$r = \sqrt{600.25 \text{ cm}^2}$

$r = 24.5 \text{ cm}$

Volume $= \dfrac{2}{3}\pi r^3$

$= \dfrac{2}{3} \times \dfrac{22}{7} \times 24.5 \times 24.5 \times 24.5 \text{ cm}^3$

$= \dfrac{2}{3} \times 22 \times \dfrac{35}{10} \times \dfrac{24.5}{10} \times \dfrac{24.5}{10} \text{ cm}^3$

$= \dfrac{184877}{6} \text{ cm}^3$

$= 30812\dfrac{5}{6} \text{ cm}^3$

10. (A) Given $\dfrac{x}{a} + \dfrac{y}{b} = 2$

$\dfrac{bx + ay}{ab} = 2$

$bx + ay = 2ab$ .... (1)

Given $ax - by = a^2 - b^2$ .... (2)

Eq (1) × a $\Rightarrow abx + a^2y = 2a^2b$
Eq (2) × b $\Rightarrow abx - b^2y = a^2b - b^3$
$\qquad\qquad\quad$ (−) (+) $\qquad$ (−) (+)
$\overline{\qquad\qquad\qquad\qquad\qquad\qquad\qquad}$
$\qquad a^2y + b^2y = 2a^2b - a^2b + b^3$

$\qquad y(a^2 + b^2) = a^2b + b^3$

$\qquad\qquad y = b\dfrac{(a^2+b^2)}{(a^2+b^2)}$

$\qquad\qquad y = b$

Given $\dfrac{x}{a} + \dfrac{y}{b} = 2$

$\dfrac{x}{a} + \dfrac{y}{b} = 2 \qquad [\because y = b]$

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

$\dfrac{x}{a} = 2 - 1$

$x = a$

$bx - ay = ba - ab$

$= ab - ab$

$= 0$

11. (D) Given $2x + 3y = 2$ .... (1)

$\qquad\qquad x - 2y = 8$ .... (2)

$\qquad\qquad 2x + 3y = 2$ .... (1)

Eq (2) × 2 $\Rightarrow 2x - 4y = 16$
$\qquad\qquad$ (−) (+) $\quad$ (−)
$\overline{\qquad\qquad\qquad\qquad\qquad\qquad}$
$\qquad\qquad\qquad 7y = -14$

$\qquad\qquad\qquad y = \dfrac{-14}{7} = -2$

$x - 2(-2) = 8$

$x + 4 = 8$

$x = 8 - 4 = 4$

$x - y = 4 - (-2) = 4 + 2 = 6$

12. (D) $\dfrac{13}{80} = \dfrac{13}{2^4 \times 5}$ is terminating decimal.

Option A $= \dfrac{7}{24} = \dfrac{7}{3 \times 2^3}$ is non terminating.

Option B $= \dfrac{5}{12} = \dfrac{5}{2^2 \times 3}$ is non terminating decimal.

Option C $= \dfrac{31}{375} = \dfrac{31}{3 \times 5 \times 5 \times 5}$ It is non terminating decimal.

Option (D) $= \dfrac{13}{24 \times 5}$ which is terminating decimal.

13. (B) x^2 is not there in the given polynomial

∴ Coefficient of x^2 = zero.

**14.** (C) $\dfrac{5-\sqrt{7+x}}{(x-18)} = \dfrac{5-\sqrt{7+x}}{(x-18)} \times \dfrac{5+\sqrt{7+x}}{5+\sqrt{7+x}}$

$= \dfrac{5^2 - \left(\sqrt{7+x}\right)^2}{(x-18)\left(5+\sqrt{7+x}\right)} = \dfrac{25-(7+x)}{(x-18)\left(5+\sqrt{x+7}\right)}$

$= \dfrac{25-7-x}{(x-18)\left(\sqrt{x+7}+5\right)} = \dfrac{18-x}{(x-18)\left(\sqrt{x+7}+5\right)}$

$= \dfrac{-x+18}{(x-18)\left(\sqrt{x+7}+5\right)} = \dfrac{-1}{\left(\sqrt{x+7}+5\right)}$

15. (A) $x^2 + 3x + 2 = x^2 + 2x + x + 2$

$= x(x + 2) + 1(x + 2)$

$= (x + 2)(x + 1)$

If $P(x) = x^3 + 4x^2 + x - 6$ is divided by $(x + 2)$

then the reminder is $P(-2)$

$P(-2) = (-2)^3 + 4(-2)^2 + (-2) - 6$

$= -8 + 16 - 2 - 6$

$= 16 - 16$

$P(-2) = 0$

⇒ $(x + 2)$ is a factor of $(x + 2)$

$P(-1) = (-1)^3 + 4(-1)^2 + (-1) - 6$

$= -1 + 4 - 1 - 6$

$P(-1) = -4$

$P(-1) \neq 0$

⇒ $(x + 1)$ is not a factor of $P(x)$

∴ $(x + 2)$ is the HCF

REASONING

16. (B) If you observe the question in two statements, the is repeated, and in both the two statements, the only repeated letter is 4.
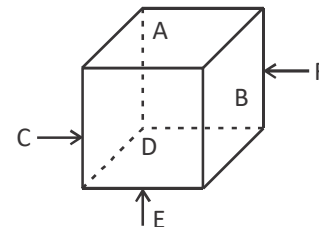
So, as per mixed number coding, the exact code for "the" is "4".

17. (B)
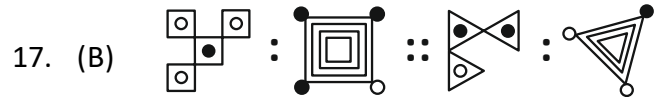
18. (C) On the basis of question figure pattern, we can see that

Six faces of the dice are A, B, C, D, E and F. A is adjacent to B. E is adjacent to D and F.
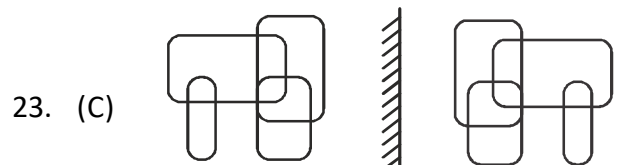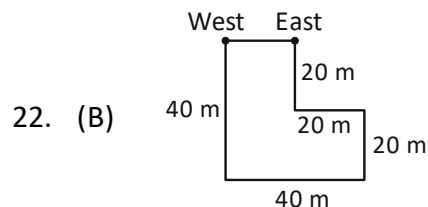
Hence, E is the side opposite to A.

is opposite to A.

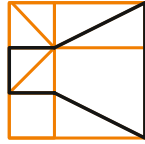**19.** (B) A is the brother of C (since A is B's brother and B is C's sister). C is D's father, so A is D's uncle.

20. (D) $(15 \times 2) + 1 = 31;$

$(31 \times 2) + 1 = 63;$

$(63 \times 2) + 1 = 127$

Similarly, $(127 \times 2) + 1 = 255$

21. (A) T R A N S F O R M = A F M <u>N</u> O R R S T

22. (B)

23. (C)

24. (D) The embedded figure / hidden shape is marked bold in option (D).

25. (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.,

$E \xleftarrow{DC} B \xleftarrow{} A$; $X \xleftarrow{WV} U \xleftarrow{} T$; $T \xleftarrow{SR} Q \xleftarrow{} P$

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

26. (D)

$$2 \quad 6 \quad 14 \quad 26 \quad \boxed{42} \quad 62$$
$$\;+4\;\;+8\;\;+12\;\;+16\;\;+20$$

The difference of each successive number is increased by 4. Hence, number 42 will fillup the blank space.

27. (C) Kalyans rank from the top = 19 − 9 = 10th

Hence, his rank from the bottom

= 38 − 10 + 1 = 29th

28. (C) MEN
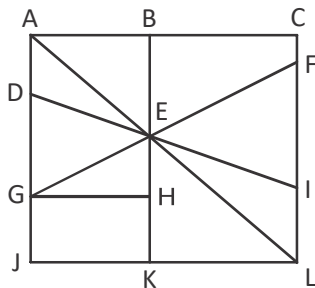
29. (A)

ABE, ACL, ADE, AEG, AJL, DEG, EFI, EFL, EGH, EIL, EKL = 11 triangles

30. (C) Joseph arrived home at 15:35.

Name	Left school at	Time Taken to walk home	Arrived home at
Harsha	15:15	10 minutes	15:25
Naveen	15:15	15 minutes	15:30
Joseph	15:15	25 minutes	15:35

COMPUTERS

31. (B) In modern graphic design software, the toolbar is a prominent part of the screen that typically contains various tools and options for selecting, drawing, editing, and manipulating elements within the document. Users can access tools like selection tools, brushes, pens, shapes, text tools, and other functions essential for creating and editing designs.

32. (A) Automation is a characteristic of computers, allowing them to perform tasks or operations automatically without the need for human intervention.

33. (C) SMTP (Simple Mail Transfer Protocol) is the standard protocol used for sending emails between email servers. It facilitates the exchange of email messages between senders and recipients across the Internet.

34. (C) An oval symbol in a flowchart is typically used to represent the start or end point of a process or algorithm. It indicates the beginning or termination of the flowchart.

35. (D) Mainframe computers, also known as mainframes, are the most commonly used type of digital computer in large industries for controlling processes as well as in offices for maintaining networks and providing access to shared resources.

36. (B) In Visual Basic, to specify the number of copies to print when using the Print() command, you would use the Print statement with the Copies argument followed by the desired number of copies. The correct syntax is shown in option B.

37. (C) ICT facilitates the growth of e-commerce and online businesses, allowing companies to reach a wider audience and participate in global markets, thus contributing to economic growth.

38. (D) Infrared (IR) is a wireless technology that uses light waves to transmit data between devices and requires direct line-of-sight communication. It is commonly used for remote controls, wireless keyboards, and data transfer between devices in close proximity.

39. (B) Shutting down a computer properly using the operating system's shutdown option ensures that all programs and processes are closed safely, preventing data loss and file corruption that may occur if the computer is abruptly powered off.

40. (A) The first programmable, electronic, general purpose digital computer was the ENIC(Electronic Numerical Integrator and computer), completed in 1945 while other computers had some similar features, ENIC was the first to have them all.

41. (A) The <style> element is used to define internal CSS rules, also known as internal styles. These styles are written directly within the HTML document and apply to the elements within that document. External rules are defined in separate CSS files and linked using the <link> element. Inline rules are applied directly to HTML elements using the style attribute. Linked rules are external stylesheets linked using the <link> element.

42. (D) Taas is not a common model of cloud computing.

43. (D) All the given options can be used to reference a cell in a formula.

44. (C) The characteristic of a computer to perform varied tasks is called versatility.

45. (C) Code View in microsoft frong page in the view that allows user to directly mainpulate and edit the HTML code of a webpage.

ENGLISH

46. (B)
47. (D)
48. (D)
49. (B)
50. (B)

The End