



Unified International
Mathematics Olympiad

UNIFIED INTERNATIONAL MATHEMATICS OLYMPIAD (UPDATED)

CLASS - 6

Question Paper Code : 4P104

KEY

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

SOLUTIONS

MATHEMATICS - 1 (MCQ)

01. (A) Given the ratio of correct & incorrect answers = 5 : 2

$$= 5x : 2x$$

$$\text{Given } 2x = 16$$

$$\therefore x = 8$$

$$\therefore \text{Total questions} = 5x + 2x = 7x = 7 \times 8 = 56$$

02. (B) Let Tina buys 'p' pencils

$$\therefore \text{Number of pencils bought by Ria} = 5p$$

$$\therefore \text{Total pencils} = 5p + p + 30 = 6p + 30$$

03. (D) LCM of 2, 9, 18, 27 is 54

$$\frac{1}{2} = \frac{27}{54}, \frac{4}{9} = \frac{4}{9} \times \frac{6}{6} = \frac{24}{54}, \frac{5}{18} = \frac{5 \times 3}{18 \times 3} = \frac{15}{54}$$

$$\frac{7}{27} = \frac{7}{27} \times \frac{2}{2} = \frac{14}{54}$$

$\therefore \frac{27}{54}, \frac{24}{54}, \frac{15}{54}, \frac{14}{54}$ is the descending order

$$\frac{1}{2}, \frac{4}{9}, \frac{5}{18}, \frac{7}{27}$$

04. (B) Given $a : b = 5 : 7 = 5x : 7x$

$a = 5x$ & $b = 7x$

$\therefore 3a + 5b : 5a - 2b$

$= 15x + 35x : 25x - 14x$

$= 50x : 11x$

$= 50 : 11$

05. (C) The pitcher $\frac{3}{4}$ is full i.e. 75% full

\therefore Each cup received juice $= \frac{75\%}{5} = 15\%$

06. (D) $(1 + 2 + 3 - 4 - 5 - 6 + 7 + 8 + 9 - 10 - 11 - 12 + \dots + 2017 + 2018 + 2019)$

$-2020 - 2021 - 2022 + 2023 + 2024 + 2025) = (1 + 2 + 3 - 4 - 5 - 6) + (7 + 8 + 9 - 10 - 11 - 12) + \dots + (2017 + 2018 + 2019 - 2020 - 2021 - 2022) + 2023 + 2024 + 2025\}$

$= [(-9) + (-9) + \dots + (-9) + 6072]$
337 times

$= -3033 + 6072$

$= 3039$

07. (C) Given $P : Q = \frac{3}{5} : \frac{5}{7} = \frac{3}{5} \times 35 : \frac{5}{7} \times 35$

$= 21 : 25$

$Q : R = \frac{3}{4} : \frac{2}{5} = \frac{3}{4} \times 20 : \frac{2}{5} \times 20 = 15 : 8$

LCM of Q's ratio 25 & 15 = 75

$\therefore P : Q = 21 : 25 = 21 \times 3 : 25 \times 3 = 63 : 75$

$Q : R = 15 : 8 = 15 \times 5 : 8 \times 5 = 75 : 40$

$\therefore P : Q : R = 63 : 75 : 40$

$\therefore P : R = 63 : 40$

08. (C) Required numbers \rightarrow 2345, 2346, 2347, 2348, 2349, 2356, 2357, 2358, 2359, 2367, 2368, 2369, 2378, 2379, 2389 are the numbers

09. (D) Required result $= (123 \times 5 \times 567 - 123 \times 7 \times 99 - 123 \times 3 \times 321 - 123 \times 2739)$

$= 123(2835 - 693 - 963 - 2739)$

$= 123 \times -1560$

$= -1,91,880$

10. (C) $A \times B = 2021 = 43 \times 47$

$\Rightarrow A + B = 43 + 47 = 90$

11. (D) $3 : 4 = \frac{3}{4}, 5 : 8 = \frac{5}{8},$

$11 : 12 = \frac{11}{12}, 15 : 16 = \frac{15}{16}$

\therefore LCM of denominators = 48

$\therefore \frac{3}{4} = \frac{3}{4} \times \frac{12}{12} = \frac{36}{48}$

$\frac{5}{8} = \frac{5}{8} \times \frac{6}{6} = \frac{30}{48}$

$\frac{11}{12} = \frac{11}{12} \times \frac{4}{4} = \frac{44}{48}$

$\frac{15}{16} = \frac{15}{16} \times \frac{3}{3} = \frac{45}{48}$

$\therefore \frac{45}{48} > \frac{44}{48} > \frac{30}{48} > \frac{36}{48}$

$\therefore \frac{45}{48}$ is greatest $\Rightarrow 15 : 16$ is greatest.

12. (D) 320 is divisible by 8

\therefore 2345678987654320 is divisible by 8

\therefore 2345678987654325

$= 2345678987654320 + 5$

\therefore Remainder = 5

13. (C) The required numbers are 18 & 8

because $18 \times 8 = 144$ & $18 + 8 = 26$

\therefore larger number = 18

14. (B) 997 is the greatest 3 digit prime number

15. (C) $998^2 - 2 \times 998 \times 1002 + 1002^2$

$= 996004 - 1999992 + 1004004$

$= 2000008 - 1999992$

$= 16$

16. (C) The given arranged numbers are 67, 61, 59, 53, 47, 43, 41. The number 53 is q.

17. (A) Given number, 458abc
To be divisible by 5, c should be either 0 or 5.

To be divisible by 4, last two digits must be divisible by 4 or should be zero.

Hence, $b = 0, c = 0$

Now, to be divisible by 3,

$$4 + 5 + 8 + a + b + c$$

$$= 4 + 5 + 8 + a + 0 + 0$$

$$= 17 + a \text{ should be divisible by 3.}$$

$$\therefore a = 1$$

Hence, $a = 1, b = 0$

and $c = 0$

18. (B) The three numbers are in the ratio 10:15 :24 given that

$$10x + 15x + 24x = 98$$

$$49x = 98$$

$$x = 2$$

Hence, the numbers are 20, 30 and 48. therefore second number is 30.

19. (B) Ratio of areas of P & Q is 4 : 9.

Area of P = 144 sq cm

Area of Q = x sq cm (Suppose)

$$\therefore 4 : 9 :: 144 : x$$

$$\Rightarrow x = 324 \text{ sq cm}$$

$$\Rightarrow \text{Side of Q} = 18 \text{ cm}$$

[Since $324 = 18 \times 18$.]

$$\therefore \text{Perimeter of Q} = 18 \times 4 \text{ cm} = 72 \text{ cm}$$

20. (A) Least prime number : Least composite number

$$= 2 : 4$$

$$= 1 : 2$$

21. (D) Nisha's weight = $0.8 \times$ Tina's weight

Rishi's weight = $0.75 \times$ Nisha's weight

Rishi's weight = $0.75 \times 0.8 \times$ Tina's weight

Rishi's weight = 0.6 Tina's weight

$$= \frac{6}{10} = \frac{3}{5} \times \text{Tina's weight}$$

$$\text{Tina's weight} = \frac{5}{3} \times \text{Rishi's weight}$$

$$\text{Rishi's weight} + 16 \text{ kg} = \frac{5}{3} \times R$$

$$16 \text{ kg} = \frac{5}{3}R - R$$

$$16 \text{ kg} = \frac{5R - 3R}{3}$$

$$\frac{2}{3}R = 16 \text{ kg}$$

$$\text{Weight of Rishi} = 16 \text{ kg} \times \frac{3}{2} = 24 \text{ kg}$$

Tina's weight = Rishi's weight + 16 kg

$$= 24 \text{ kg} + 16 \text{ kg}$$

$$= 40 \text{ kg}$$

Nisha's weight = $0.8 \times$ Tina's weight

$$= \frac{8}{10} \times 40 \text{ kg}$$

$$= 32 \text{ kg}$$

Total weight = 24 kg + 40 kg + 32 kg

$$= 96 \text{ kg}$$

$$22. (A) 36\frac{1}{3} - \left(12\frac{2}{5} + 13\frac{1}{2} + 5\frac{4}{15}\right)$$

$$= \frac{109}{3} - \left(\frac{62}{5} + \frac{27}{2} + \frac{79}{15}\right)$$

$$= \frac{109}{3} - \left(\frac{372 + 405 + 158}{30}\right)$$

$$= \frac{109}{3} - \frac{935}{30}$$

$$= \frac{218 - 187}{6} = \frac{31}{6} = 5\frac{1}{6}$$

23. (D) The increasing order of the given number is $-30, -15, -4, -2, 0, 7$.

24. (B) Area of the poster
 $= 2.5 \times 2.5 \text{ sq m}$
 $= 6.25 \text{ sq m}$
 Area of the wall
 $= 10.5 \times 8.5 \text{ sq m}$
 $= 89.25 \text{ sq m}$
 Area of the wall to be painted
 $= (89.25 - 6.25) \text{ sq m}$
 $= 83.00 \text{ sq m}$
 Cost of painting
 $= 83 \times ₹ 12 = ₹ 996$
25. (C) Given $l = 3b = 3 \times 19 \text{ mts} = 57 \text{ mts}$
 Area $= l \times b = 57 \times 19 \text{ cm}^2 = 1083 \text{ cm}^2$
26. (A) Sum of digits
 $= 5 + 7 + 4 + 3 + 2 + 5 + 1 + 7 + 9 + 2 = 45$
 \therefore Given number is divisible by '9' and '3'
 \therefore '3' to be added to that number so that the new number is divisible by '3' but not by '9'
27. (A) 'A' is largest whose value is 75321
28. (C) $\frac{169 + 312 + 144}{25}$
 $= \frac{625}{25} = 25$
29. (A) HCF of 137 - 2, 182 - 2, 422 - 2 is 15
30. (D) $p^3 + 3p^2q + 3pq^2 + q^3 = (-3)^3 + 3(-3)^2(-7) + 3(-3)(-7)^2 + (-7)^3$
 $= -27 - 189 - 441 - 343$
 $= -1000$

MATHEMATICS - 2 (MAQ)

31. (A,B,D) HCF is always a factor of LCM
 13 is a factor of 3718
 26 is a factor of 3718
 104 is not a 3718
 143 is a factor of 3718
32. (A,B,D)
 Possible combinations of (A, B) such that $AB = 64$ are (1, 64), (2, 32), (4, 16) and (8, 8)
 \therefore A + B cannot be 35

33. (B,C,D)
 Option (B)
 $\frac{1}{5} = 0.2, \frac{1}{4} = 0.25, \frac{1}{3} = 0.33, \frac{1}{2} = 0.5$
 $\therefore \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}$ are in the ascending order
 Option (D)
 $\frac{2}{5} = 0.4, \frac{31}{50} = 0.62, \frac{53}{75} = 0.706, \frac{67}{85} = 0.78$
 $\therefore \frac{2}{5}, \frac{31}{50}, \frac{53}{75}, \frac{67}{85}$ are in the ascending order.
 Option (C) If numerators are same, then biggest denominator fraction is the smallest fraction.
 $\therefore \frac{5}{17}, \frac{5}{16}, \frac{5}{12}, \frac{5}{7}$ are in the ascending order
34. (A,B,C) Sum of the digits of 297144 = $2 + 9 + 7 + 1 + 4 + 4 = 27$
 \therefore 297144 is divisible by 3 & 9.
 An even number divisible by 3 it is divisible by 6.
35. (A,C,D)
 Option (A) $1\frac{1}{2} + \frac{5}{2} = \frac{3}{2} + \frac{5}{2} = \frac{3+5}{2} = \frac{8}{2} = 4$
 $\therefore 1\frac{1}{2} + \frac{5}{2}$ is an integer
 Option (B) $\frac{12}{17} - \frac{7}{34} = \frac{24-7}{34} = \frac{17}{34} = \frac{1}{2}$
 $\therefore \frac{12}{17} - \frac{7}{34}$ is not an integer
 Option (C) $-2 - \frac{1}{2} + \frac{3}{2} = \frac{-4-1+3}{2} = \frac{-2}{2} = -1$
 $= \frac{625}{25} = 25$ is an integer
 Option (D) $10 - \left(\frac{-12}{3}\right) = 10 + \frac{12}{3} = 10 + 4 = 14$
 $\therefore 10 - \left(\frac{-12}{3}\right)$ is an integer

REASONING

36. (A) The first figure flips and joins with the given figure to form the second figure. So, the figure in option (A) matches the changes in test figures.

37. (B) Similarly,

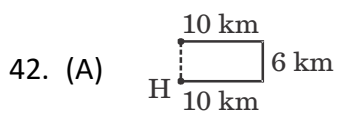
O ← NM L	T ← SR Q
P ← ONM L	U ← TSR Q
E ← DCBA Z	R ← QPON M
N ← MLKJI H	N ← MLKJI H

38. (A) The symbol □ is not used in the given figure.

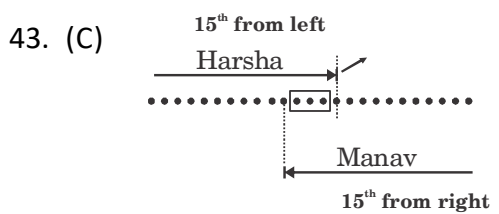
39. (A) $175 - 25 \div 5 + 20 \times 3 + 10$
 $= 175 \div 25 + 5 \times 20 - 3 \times 10$
 $= 7 + 100 - 30$
 $= 77$



41. (A) Alternate shapes are hexagons and octagons. In a hexagon the number of dotted lines joining the opposite corners increases by one and solid lines joining the opposite corners increase by one in an octagon.



Naitik is 6 km away from his house.



∴ There are 3 boys between Harsha and Manav.

44. (B) Dot does not exist in the small triangle, as it does in the other figures.

45. (C) Penalty = Fine

Fin e nhanced
 4 5

CRITICAL THINKING

46. (A) We know that only one of the three students is telling the truth. Let's evaluate each statement assuming Hannah is telling the truth and the others are lying:

- Hannah: "I didn't break the chair." → True
- James: "I didn't break the chair." → False, which means James did break the chair.
- Sophia: "James broke the chair." → False, which means James didn't break the chair.

47. (D) Penguins are exceptions to the rule. This inference logically follows from the given information.

48. (C) cannot be obtained from given figures.

49. (C) Conclusion I is not necessarily true based on the given statement. The statement does not provide enough information to determine Ayesha's performance in the interview.

Conclusion II is not true based on the given statement. The statement does not imply that all candidates who give an interview receive a job offer.

Thus, neither conclusion can be definitively drawn from the given statement.

50. (C) When you interweave the pages of two similar books and then pull them apart by holding their outer edges, the pages will not easily separate or tear apart cleanly. Instead, the pages from both books will remain interwoven with each other due to their friction and the way they are tangled together. This phenomenon occurs because the friction between the pages prevents them from sliding past each other easily, effectively binding the books together. Thus, when you attempt to pull the books apart, you will find that they resist separation and remain stuck together due to the interwoven pages.