



Unified International  
Mathematics Olympiad

**UNIFIED INTERNATIONAL MATHEMATICS OLYMPIAD**

**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	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	B	D	C	C	C

**SOLUTIONS**

**MATHEMATICS - 1 (MCQ)**

01. (A) Given the ratio of correct & incorrect answers = 5 : 2  
= 5x : 2x  
Given 2x = 16  
∴ x = 8  
∴ Total questions = 5x + 2x = 7x = 7 × 8 = 56
02. (B) Let Tina buys 'p' pencils  
∴ Number of pencils bought by Ria = 5p  
∴ Total pencils = 5p + p + 30 = 6p + 30

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

$$\frac{1}{2} = \frac{27}{54}, \frac{4}{9} = \frac{24}{54}, \frac{5}{6} = \frac{45}{54}, \frac{5}{18} = \frac{15}{54}$$

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

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

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

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

$$a = 5x \text{ \& } b = 7x$$

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

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

$$= 50x : 11x$$

$$= 50 : 11$$

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

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

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  $P : Q = \frac{3}{5} : \frac{5}{7} = \frac{3}{5} \times 35 : \frac{5}{7} \times 35$

$$= 21 : 25$$

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

$$\text{LCM of Q's ratio } 25 \text{ \& } 15 = 75$$

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

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

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

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

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)  $3 : 4 = \frac{3}{4}, 5 : 8 = \frac{5}{8},$

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

$$\therefore \text{LCM of denominators} = 48$$

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

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

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

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

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

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

12. (D) 320 is divisible by 8

$$\therefore 2345678987654320 \text{ is divisible by } 8$$

$$\therefore 2345678987654325$$

$$= 2345678987654320 + 5$$

$$\therefore \text{Remainder} = 5$$

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

$$\text{because } 18 \times 8 = 144 \text{ \& } 18 + 8 = 26$$

$$\therefore \text{larger number} = 18$$

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,  
 $4 + 5 + 8 + a + b + c$   
 $= 4 + 5 + 8 + a + 0 + 0$   
 $= 17 + a$  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)  
 $\therefore 4 : 9 :: 144 : x$   
 $\Rightarrow x = 324$  sq cm  
 $\Rightarrow$  Side of Q = 18 cm  
 [Since  $324 = 18 \times 18$ .]  
 $\therefore$  Perimeter of Q =  $18 \times 4$  cm = 72 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  
 $= \frac{6}{10} = \frac{3}{5} \times$  Tina's weight

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

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

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

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

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

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

$$\text{Tina's weight} = \text{Rishi's weight} + 16 \text{ kg}$$

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

$$= 40 \text{ kg}$$

$$\text{Nisha's weight} = 0.8 \times \text{Tina's weight}$$

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

$$= 32 \text{ kg}$$

$$\text{Total weight} = 24 \text{ kg} + 40 \text{ kg} + 32 \text{ kg}$$

$$= 96 \text{ kg}$$

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

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

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

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

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

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. (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,

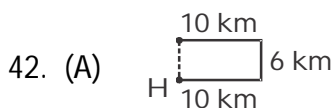
O	← NM	L		T	← SR	Q
P	← ONM	L		U	← TSR	Q
E	← DCBA	Z		R	← QPON	M
N	← MLKJI	H		N	← MLKJI	H

38. (A) The symbol  $\square$  is not used in the given figure.

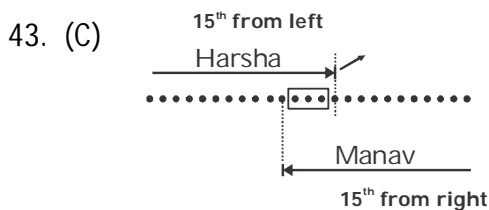
39. (A)  $175 - 25 \div 5 + 20 \times 3 + 10$   
 $= 175 \div 25 + 5 \times 20 - 3 \times 10$   
 $= 7 + 100 - 30$   
 $= 77$



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. (B) Hannah is speaking the truth (Hannah didn't break the chair):

If Hannah is telling the truth, then James and Sophia are lying.

James lying means: James did break the chair.

Sophia lying means: James did not break the chair.

This results in a contradiction because James cannot both break and not break the chair.

James is speaking the truth (James didn't break the chair):

If James is telling the truth, then Hannah and Sophia are lying.

Hannah lying means: Hannah did break the chair.

Sophia lying means: James did not break the chair.

This doesn't result in a contradiction because it fits the criteria (Hannah broke the chair).

Sophia is speaking the truth (James broke the chair):

If Sophia is telling the truth, then Hannah and James are lying.

Hannah lying means: Hannah did break the chair.

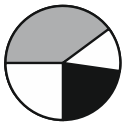
James lying means: James did break the chair.

This results in a contradiction because Hannah cannot both break and not break the chair.

Therefore, based on the logic above, if only one of them is telling the truth, then James broke 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.