



UNIFIED COUNCIL

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Unified International
Mathematics Olympiad

UNIFIED INTERNATIONAL MATHEMATICS OLYMPIAD (UPDATED)

CLASS - 7

Question Paper Code : UM9009

KEY

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

EXPLANATIONS

MATHEMATICS - 1 (MCQ)

1. (B) $3.81 \times 10^{-4} = \frac{3.81}{(10^4)} = \frac{3.81}{10000} = 0.000381$

2. (B) $\frac{x^y + z}{z} = \frac{4^2 + 2}{2} = \frac{18}{2} = 9$

3. (B) $20\% \text{ of } x + 20 = x$

$$\frac{x}{5} + 20 = x \Rightarrow 20 = x - \frac{x}{5} = \frac{4x}{5}$$

$$20 = \frac{4x}{5} \Rightarrow x = 25$$

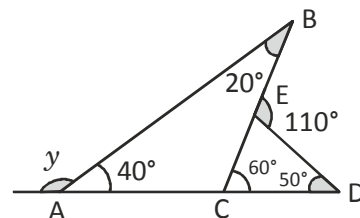
4. (D) $6 + 10 < 17 \Rightarrow (6, 10, 17)$ triplet does not form a triangle

5. (C) $(3x + 1)(4x - 1) = 3x(4x - 1) + 1(4x - 1)$
 $= 12x^2 - 3x + 4x - 1 = 12x^2 + x - 1$

6. (D) Given $2(l + b) = 10 \text{ cm}$
 $\Rightarrow l + b = 5 \text{ cm}$ & $lb = 4 \text{ cm}^2$
 $\therefore l = 4 \text{ cm}$ & $b = 1 \text{ cm}$

7. (B) Total distance travelled $= \pi d = 3.14 \times 250$
 feet
 $= 785 \text{ feet}$

8. (C) If $x = 2 \Rightarrow n(n^2 + 20) = 2(4 + 20)$
 $= 2 \times 24$ is divisible by 24
 If $n = 4 \Rightarrow n(n^2 + 20) = 4(16 + 20)$
 $= 4 \times 36$ is divisible by 24
 If $x = 6 \Rightarrow n(n^2 + 20) = 6(36 + 20)$
 $= 6 \times 56$ is divisible by 24
9. (C) $40 - 8 \div 4 \times 13 =$
 $40 - \frac{8}{4} \times 13 = 40 - 2 \times 13 = 40 - 26 = 14$
10. (B) $2^{20} = 2^{5 \times 4} = (2^5)^4 = 32^4$
 $3^{16} = 3^{4 \times 4} = (3^4)^4 = 81^4$
 $4^{12} = 4^{3 \times 4} = (4^3)^4 = 64^4$
 $5^8 = 5^{2 \times 4} = (5^2)^4 = 25^4$
11. (C) In a rhombus diagonals bisect each other perpendicularly
12. (C) $7 \times 5 \times 3 \times 1 \times 7 \times 3 \times 9$ units digit is 5
13. (D) $4 \times 3 \times 2 \times 1 = 24$ (OR)
 Star + rhombus + plus + Arrow $\rightarrow 1$
 Star + rhombus + Arrow + plus $\rightarrow 2$
 Star + plus + rhombus + Arrow $\rightarrow 3$
 Star + plus + Arrow + rhombus $\rightarrow 4$
 Star + Arrow + plus + rhombus $\rightarrow 5$
 Star + Arrow + rhombus + plus $\rightarrow 6$
 $\therefore 6 \times 4 = 24$ different ways can be arranged
14. (A) $\left(37\frac{3}{4}\right)^\circ + \left(48\frac{1}{2}\right)^\circ + x = 180^\circ$
 $x = 180^\circ - \left(37\frac{3}{4}\right)^\circ - \left(48\frac{1}{2}\right)^\circ = \left(93\frac{3}{4}\right)^\circ$
15. (B) Given $8x + 9x = 221$
 $17x = 221$
 $x = 13$
 $\therefore 9x = 9 \times 13 = 117$
16. (B) $\angle ECD = 110^\circ - 50^\circ = 60^\circ$
 $\angle BAC = \angle ECD - \angle B = 60^\circ - 20^\circ = 40^\circ$
 But $y + \angle BAC = 180^\circ$
 $\therefore y + 40^\circ = 180^\circ$
 $y = 140^\circ$



17. (D) $\frac{2^{100}}{1024} = \frac{2^{100}}{(2^{10})} = 2^{100-10} = 2^{90}$
18. (D) $\frac{4}{9} \div x = \frac{-5}{6}$
 $\therefore \frac{4}{9} \times \frac{1}{x} = \frac{-5}{6}$
 $\frac{4}{9} \times \frac{-6}{5} = x$
 $x = \frac{-8}{15}$
19. (B) Let varma's weight 3 months back be x kg
 Given $x - 5\frac{1}{2}\text{kg} + 2\frac{1}{4}\text{kg} - 3\frac{3}{4}\text{kg} = 95\text{kg}$
 $\therefore x = 95\text{kg} + 5\frac{1}{2}\text{kg} - 2\frac{1}{4}\text{kg} + 3\frac{3}{4}\text{kg}$
 $x = 102\text{ kg}$
20. (C) $2^{73} - 2^{72} - 2^{71} = 2^{71}(2^2 - 2 - 1)$
 $= 2^{71}(4 - 3) = 2^{71}$
21. (A) Area of unshaded part $= \frac{1}{2} \times b \times l$ units²
 $\therefore$ Area of shaded parts
 $= \left(lb - \frac{lb}{2}\right) \text{units}^2 = \frac{lb}{2} \text{units}^2$
22. (A) $\text{LHS} = \frac{\frac{1}{4} - \frac{3}{4} + \frac{1}{2} + \frac{19}{33} - \frac{8}{33} - \frac{1}{3}}{\frac{1}{2} + \frac{3}{4} + \frac{4}{6} - \frac{5}{6} - \frac{7}{8} - \frac{8}{9}} = \frac{0}{\frac{1}{2} + \frac{3}{4} + \frac{4}{6} - \frac{5}{6} - \frac{7}{8} - \frac{8}{9}} = 0$
23. (B) Given $\text{CP} \times \frac{(100 - 15)}{100} = ₹680$
 $\text{CP} = ₹680 \times \frac{100}{85} = ₹800$
 New SP
 $= \text{CP} \times \frac{(100 + 20)}{100} = ₹800 \times \frac{120}{100} = ₹960$

24. (B) Sum of 6 numbers = $10 \times 6 = 60$

Sum of 5 number = $60 - 25 = 35$

Mean of 5 numbers = $\frac{35}{5} = 7$

25. (A) Given $\frac{x_1 + x_2 + x_3 + x_4 + x_5}{5} = 20$

where $x_1 < x_2 < x_3 < x_4 < x_5$
and $x_3 = 18$

$\therefore x_1 + x_2 + x_3 + x_4 + x_5 = 5 \times 20 = 100$

To get the greatest integer

$\therefore x_1 = 1, x_2 = 2, x_3 = 18, x_4 = 19 \text{ \& } x_5 = 60$

26. (C) Given $\frac{P}{Q} = 7 \Rightarrow P = 7Q$

$\frac{P+Q}{P-Q} = \frac{7Q+Q}{7Q-Q} = \frac{8Q}{6Q} = \frac{4}{3}$

27. (D) Given $(4x - 7) \text{ cm} = (2x + 5) \text{ cm}$

$4x - 2x = 5 \text{ cm} + 7 \text{ cm}$

$2x = 12 \text{ cm}$

$x = 6 \text{ cm} \Rightarrow 2x + 5 = 17 \text{ cm}$

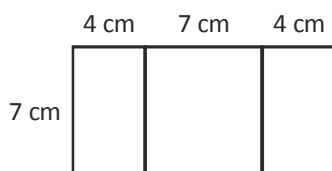
28. (C) $\left(\frac{2}{3}\right)^{-3} + \left(\frac{2}{7}\right)^{-2} + \left(\frac{2}{11}\right)^{-1} = \left(\frac{3}{2}\right)^3 + \left(\frac{7}{2}\right)^2 + \left(\frac{11}{2}\right)$

$= \frac{27}{8} + \frac{49}{4} + \frac{11}{2}$

$= \frac{27+98+44}{8} = \frac{169}{8}$

$= \left(\frac{13}{2\sqrt{2}}\right)^2 = \left(\frac{2\sqrt{2}}{13}\right)^{-2}$

29. (A) length of new object = $4 \text{ cm} + 7 \text{ cm} + 4 \text{ cm}$
 $= 15 \text{ cm}$



Breadth of new object = 7 cm

Area of new object = $15 \text{ cm} \times 7 \text{ cm}$

$= 105 \text{ cm}^3$

30. (B) $x + y + y + z + z + x = 4 + 6 + 5$

$2x + 2y + 2z = 15$

$2(x + y + z) = 15$

$x + y + z = \frac{15}{2} = 7.5$

MATHEMATICS - 2 (MAQ)

31. (A, B, C) Options A, B & C are true statements

32. (A, B, D) Options A, B & D are having 6 faces

33. (A, B, D) Options A, B & D are true statements

34. (A, C) $\frac{3x^2}{4} = 12$

$3x^2 = 12 \times 4$

$x^2 = \frac{48}{3} = 16$

$x = \pm\sqrt{16} = \pm 4$

35. (A,B,C,D) $P \times Q = -4 \times 2 = -8 \in \mathbb{Z}$

$\frac{P}{Q} = \frac{-4}{2} = -2 \in \mathbb{Z}$

$P \times Q = -4 \times 2 = -8 \in \mathbb{Z}$

$P - Q = -4 - 2 = -6 \in \mathbb{Z}$

REASONING

36. (D) Number of dots inside is one less than the number of outer image sides.

The dots are arranged cross and straight alternatively.

37. (B) reunion reuse reveal reve
1 2 3 4

Hence "reveal" is the 3rd word after arranging the given words in English dictionary.

38. (C) 857490910

39. (A) $(3 + 6) 2 + 1 = 19$

40. (C)

41. (B) pik da pa 'where are you'

da na ja 'you may come'

na ka sa 'he may go'

na $\rightarrow$ may

da $\rightarrow$ you

$\therefore$ 'ja' means come.

42. (D) Except '273' remaining numbers sum of digits is equal to '10'.

$$2 + 7 + 3 = 12.$$

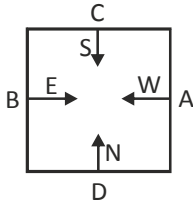
Hence 273 'd' option is correct.

43. (A)

A	B	C	D
Car	Train	Aeroplane	Bus
Kerala	Delhi	Goa	Gujarat

44. (A)

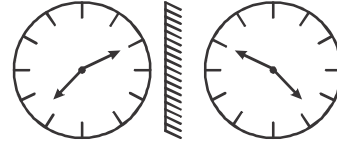
45. (B)



'C' faces towards South.

CRITICAL THINKING

46. (B) Law and order is an essential part of the word "Country".
47. (C) The exact time of getting can be obtained by finding the mirror image of the time seen, i.e.,



So, the time when the person woke was 4 : 50 am.

48. (D) Report the matter to the police.
49. (C) So that each straight line of three hexagons contains one each of the three different symbols.
50. (A) Ball in image 'A' is heavier.

==== The End =====