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Unified International Mathematics Olympiad

UNIFIED INTERNATIONAL MATHEMATICS OLYMPIAD (UPDATED)

CLASS - 5

Question Paper Code : 4P104

KEY

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A	B	D	A	B	B	B	D	B	C
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21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
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D	C	D	D	C	A	D	C	B	C
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A	C	A	D	B	B	D	C	A	A

SOLUTIONS

MATHEMATICS

01. (A) The correct number for Ninety-nine million is 99,000,000.

02. (B) $4\frac{1}{8} = \frac{33}{8}$ reciprocal of $\frac{33}{8} = \frac{8}{33}$

03. (D) 100 pens = Rs. 2000

1 pen = Rs. 20

80 Pens = 80 × Rs. 25 = Rs. 2000

20 Pens = 20 × Rs. 20 = Rs. 400

Total = Rs. 2400

Rs. 2400 – Rs. 2000 = Rs 400 (profit)

04. (A) $7.65 \times 1000 m\ell = 7.65\ \ell$

05. (B) First, let's find the prime numbers less than 50 and count them. The primes less than 50 are:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 472, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 472, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47

So, there are 15 primes less than 50. Thus, x = 15.

Next, let's find the prime numbers less than 60:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 592, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 592, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59

So, there are 17 primes less than 60.

Therefore, the number of primes less than 60 is x + 2 (since 17 is 2 more than 15).

06. (B) 50,000,000 – 49,000,000 = 1,000,000 (one million)

07. (B) 72 is multiple of 4, 9 and 12.

08. (D) 365 × 24 × 60 × 60 = 31,536,000 seconds

09. (B)

$$\begin{array}{r} 555 \\ \times\ 3 \\ \hline 1665 \end{array}$$

10. (C) 1. Capacity of the cylindrical tank = 32 liters.

2. The tank is 4/5 full of water. So, the amount of water in the tank is:

$$\frac{4}{5} \times 32 = 25.6 \text{ liters of water.}$$

3. A quarter of this water is poured into a pail. So, the amount of water poured out is:

$$\frac{1}{4} \times 25.6 = 6.4 \text{ liters}$$

5. The amount of water left in the tank is:

$$25.6 - 6.4 = 19.2 \text{ liters.}$$

So, the amount of water left in the cylindrical tank is 19.2 liters.

This is 1/5 of 32 liters or 19 1/5 liters.

11. (D) $\frac{19}{1000} = 0.019$

12. (A)

(A) 543217 ÷ 181072

When you divide 543217 by 181072, you get approximately 3. This is a small number.

(B) 543217 – 181072

When you subtract 181072 from 543217, you get 362145, which is much larger than 3.

(C) 543217 × 181072

When you multiply 543217 by 181072, you get 98357496304, which is a very large number.

(D) 543217 + 181072

When you add 181072 to 543217, you get 724289, which is larger than 3 but smaller than the result from multiplication.

13. (B) In Roman numerals, only I, X, C, and M can be repeated, but there are rules on how many times they can be repeated:

- I can be repeated up to 3 times (e.g., III for 3).
- X can be repeated up to 3 times (e.g., XXX for 30).
- C can be repeated up to 3 times (e.g., CCC for 300).
- M can be repeated more than 3 times (e.g., MMM for 3000).

However, L cannot be repeated. It represents 50, and in Roman numerals, there is no repetition of the letter L.

14. (C) The correct place to insert commas in a large number is to group the digits in sets of three, starting from the right side of the number. These groups are called periods, which help in reading and understanding large numbers.

15. (A) $20\frac{1}{4}m = \frac{81}{4}m$

$$9\frac{1}{5}m = \frac{46}{5}m$$

$$\frac{81}{4}m - \frac{184}{5}m$$

$$\frac{405m - 184m}{20} = \frac{221m}{20}$$

$= 11\frac{1}{20}\text{m}$

16. (D) When multiplying numbers, if any of the numbers in the multiplication are 0, the entire result will be 0.

17. (B) When setting the temperature of an oven, the unit commonly used is celcius.

18. (D) 1. Prime factorization of each number:

$9 = 3 \times 3$ or 3^2

$12 = 2 \times 2 \times 3$ or $2^2 \times 3$

$15 = 3 \times 5$

2. LCM is found by taking the highest power of each prime factor:

For 2, the highest power is 2^2 (from 12).

For 3, the highest power is 3^2 (from 9).

For 5, the highest power is 5^1 (from 15).

3. Multiply these together:

LCM = $2^2 \times 3^2 \times 5 = 4 \times 9 \times 5 = 180$

So, the smallest number divisible by 9, 12, and 15 is 180.

19. (D) $5\frac{2}{3} = \frac{17 \times 6}{3 \times 6} = \frac{102}{\boxed{18}}$

20. (A) $\frac{4}{8} = \frac{1}{2} = 0.5$

21. (B)

(A) Thirty seven lakh three hundred – 3700300

- Thirty seven lakh = 37,00,000
- Three hundred = 300
- Correct match: 37,00,300

This is correct.

(B) Fifty lakh nine hundred five – 5009005

- Fifty lakh = 50,00,000
- Nine hundred five = 905
- Correct match: 50,00,905

This is incorrect because 5009005 is wrong.

(C) Two crore twenty lakh eighty thousand ten – 22080010

- Two crore = 2,00,00,000
- Twenty lakh = 20,00,000
- Eighty thousand = 80,000
- Ten = 10
- Correct match: 2,20,80,010

This is correct.

The incorrect match is in option (B).

So, the correct answer is (B) Fifty lakh nine hundred five – 5009005.

22. (A) To convert 2.02 into a percentage, follow these steps:

Multiply by 100 to convert the decimal to a percentage: $2.02 \times 100 = 202\%$

So, the correct equivalent of 2.02 is 202%.

23. (D) Let's break it down simply:

- There are three times as many rabbits as monkeys.
- The total number of rabbits and monkeys is 12.

If we think about it:

- For every 1 monkey, there are 3 rabbits.
- So, let's try with 3 monkeys. If there are 3 monkeys, then there must be 9 rabbits (because 3 times 3 is 9).
- Now, 9 rabbits + 3 monkeys = 12.

So, there are 3 monkeys in the zoo.

24. (A) (W) = 24 cm^2

(X) = 16 cm^2

(Y) = 24 cm^2

(Z) = 4 cm^2 + 8 cm^2

= 12 cm^2

25. (C) 99 has 6 divisors.

101 has 2 divisors.

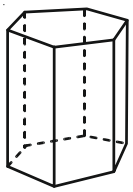
176 has 10 divisors.

182 has 8 divisors.

The number with the most divisors is 176.

26. (A) 50,00 – 5 = 4995

27. (C) 7-digit number starts with the ten lakh place in the Indian system.

28. (D) 

29. (B) The smallest three-digit palindrome is 101, and the largest three-digit palindrome is 999.

To find the difference between them:

999 – 101 = 898

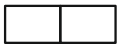
So, the difference between the smallest and largest three-digit palindrome is 898.

30. (D) (A) 13142 ÷ 15 = Q = 876 R = 2

(B) 13542 ÷ 5 = Q = 2708 R = 2

(C) 13452 ÷ 5 = Q = 2690 R = 2

(D) 13452 ÷ 15 = Q = 896 R = 12

31. (D) 

P = 48 cm

$S = \frac{48\text{ cm}}{4} = 12\text{ cm}$

Peri = 2(l + b)

= 2(12 + 24)

= 2('36)

= 72 cm

32. (C) last day 7 miles

7 + 2 = 9 miles

9 + 2 = 11 miles

11 + 2 = 13 miles

7 + 9 + 11 + 13 = 40 miles

33. (D) Step 1: Understand the given ratio

The perimeter to length ratio is 10:3.

This means: $\frac{\text{Perimeter}}{\text{Length}} = \frac{10}{3}$

Let the length of the rectangle be L cm.

So, the Perimeter (P) = $\frac{10}{3} \times L$.

Step 2: Use the perimeter formula

The formula for the perimeter of a rectangle is:

P = 2(Length + Breadth)

We are given Breadth = 8 cm, so:

P = 2(L + 8)

Step 3: Solve for Length (L)

Since we know that:

$\frac{10}{3} L = 2(L + 8)$

Multiply everything by 3 to remove the fraction:

10 L = 6 L + 48

Now, subtract 6L from both sides:

4L = 48

Divide by 4:

L = 12 cm

Step 4: Find the Area

The area of a rectangle is:

Area = Length × Breadth

= 12 × 8

= 96 cm^2

34. (D) 5 × 1000 = 5000 grams

35. (C) Step 1: Understanding Angle Types and Their Measures

1. Acute Angle → Less than 90°

2. Right Angle → Exactly 90°

3. Obtuse Angle → Between 90° and 180°

4. Straight Angle → Exactly 180°

5. Reflex Angle → Between 180° and 360°

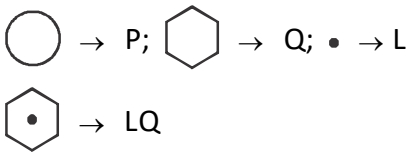
Step 2: Arranging in Ascending Order

The correct order from smallest to largest is:

Acute → Right → Obtuse → Straight → Reflex

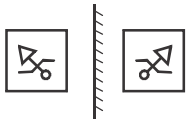
REASONING

36. (A) There are three triangles.

37. (D)  → P; → Q; • → L

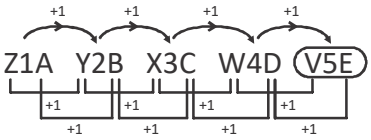
 → LQ

38. (C) The outer lines of all the figures are obtained by rotating, flip or mirror / water image of any of them. The corresponding change is not seen in the figure in option (C).

39. (B) 

40. (C) 

41. (A) The first figure flips vertically.

42. (C) 

43. (A) The order of a dictionary of the given words is :

Prabha

Prakash

Pralok → 3rd

Praveen

44. (D) $2 \times 2 - 1 = 3$;

$5 \times 4 - 5 = 15$;

$5 \times 5 - 3 = 22$

45. (B) Number of angles increase by one and alternately the triangles are dark, white and dark.

Hence, the missing figure in the square is  .

CRITICAL THINKING

46. (B) This sequence follows the typical process of the scientific method:

1. Observation: Identifying a problem or question.

2. Hypothesis: Formulating a testable explanation.

3. Experiment: Conducting tests or experiments to gather data.

4. Analysis: Analyzing the data collected during the experiment.

5. Conclusion: Drawing conclusions based on the analysis of the data.

47. (D) As per given conditions, there are three possible combinations for 2nd, 3rd and 4th digits. They are:

3, 0, 7 or 4, 1, 8 or 5, 2, 9

It is given that there are 3 pairs whose sum is 11. All possible pairs are

2, 9 3, 8

4, 7 5, 6

Now required number is 5 digit number and it contains 3 pairs of 11. So it must not be having 0 and 1 in it.

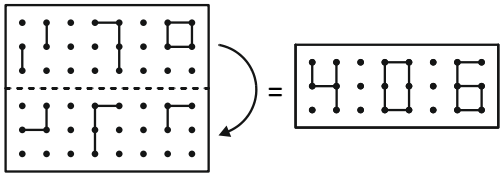
Hence, the only possible combination for 2nd, 3rd and 4th digits is 5, 2, 9

Also, the 1st digit is thrice the last digit. The possible combinations are

3, 1 6, 2 9, 3

Out of these only (6, 2) with (5, 2, 9) gives 3 pairs of 11. Hence, the answer is 65292.

48. (C) Education is correlated with employment. This conclusion follows logically from the premise provided.

49. (A) 

50. (A) $5 + 2 + 3 = 6 + 4 \rightarrow 10$ Equal balance.

So, remaining weight is 1 kg.