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Unified International Mathematics Olympiad

UNIFIED INTERNATIONAL MATHEMATICS OLYMPIAD

CLASS - 6

Question Paper Code : 4O119

KEY

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

EXPLANATIONS

MATHEMATICS

01. (B) LCM of 4, 5, 6, 7, 8 = 840 seconds = 14 minutes

02. (B) 1 + 2 = 3, 2 + 3 = 5, 3 + 5 = 8, ... 21 + 34 = 55

03. (C)
$$
\begin{array}{r}
7\overline{)\,86{,}409\,(\,12344} \\
7 \\
\hline
16 \\
14 \\
\hline
24 \\
21 \\
\hline
30 \\
28 \\
\hline
29 \\
28 \\
\hline
1
\end{array}
$$

7 – 1 = 6 to be added

04. (B)

2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
2	1, 1, 3, 2, 5, 3, 7, 4, 9, 5
3	1, 1, 3, 1, 5, 3, 7, 2, 9, 5
5	1, 1, 1, 1, 5, 1, 7, 2, 3, 5
	1, 1, 1, 1, 1, 1, 7, 2, 3, 1

Required LCM

= 2 × 2 × 3 × 5 × 7 × 2 × 3 = 2520

05. (C) 12321 is the palindrome number.

06. (D) 71 and 73 are the pair of twin primes

07. (B) $6 + 6 - 6 \times 6 + 6 \div 6 = 12 - 36 + \frac{6}{6}$

$= -24 + 1$

$= -23$

08. (D) Given $2(l + b) = 170$

$l + b = \frac{170}{2}$ m = 85 m

50 m + b = 85 m

b = 85m – 50 m = 35 m

$\therefore$ Area = $l \times b$

= 50 m × 35 m

= 1750 m^2

09. (A) Sum of three prime numbers is even then

Even + odd + odd result is even

$\therefore$ Smallest prime = 2

10. (C) 1 – 2 = –1, 1 – 2 + 3 – 4 = – 2

$\therefore$ 1 – 2 + 3 – 4 + ...+ 99 – 100 = – 50

11. (B) Greatest 5 digit number using the digits 8, 7, 0, 1 = 88710

Smallest 5 digit number using the digits 8, 7, 0, 1 = 10078

$\therefore$ required difference = 88710 – 10078 = 78632

12. (B) $LHS = \frac{1}{3} \times \frac{2}{4} \times \frac{3}{5} \times \frac{4}{6} \times ..... \times \frac{18}{20} \times \frac{19}{21} \times \frac{20}{22}$

$= \frac{2}{21 \times 22} = \frac{1}{231}$

13. (D) Divisor = 5 times remainder = 46 × 5 = 230

$\text{Quotient} = \frac{\text{Divisor}}{10} = 23$

$\therefore$ Dividend = Divisor × Quotient + Remainder

= 230 × 23 + 46 = 5336

14. (C)

$$8\overline{)789}\,(98$$
$$\underline{72}$$
$$69$$
$$\underline{64}$$
$$5$$

$\therefore$ 123456789 is divided by 8 then the remainder = 5

15. (A) Area of the shaded region

$= \frac{\text{Total area}}{2} = 50 \text{ cm}^2$

16. (C) Charge for first km = ₹ 25

Charge of each next km = ₹ 18

$\therefore$ Total charge of a trip of 10 km

= ₹ 25 + ₹ 18 × 9

= ₹ 25 + ₹ 162

= ₹ 187

17. (A) $\frac{2023 \times 2023 - 2024 \times 2024}{4047}$

$= \frac{40,92,529 - 40,96,576}{4047}$

$= \frac{-4047}{4047} = -1$

18. (D) Use distributive property to simplify

555 × 193 – 555 × 93

= 555 × (193 – 93)

= 555 × 100 = 55,500

19. (D) Cost of 2 dozen pens = Rs. 112

$\Rightarrow$ Cost of 1 dozen pen = Rs. $\left(\frac{112}{2}\right)$ = Rs. 56

$\Rightarrow$ Cost of 12 dozen pens = 56 × 12 = Rs. 672

Since, cost of 5 dozen bottles = Cost of 12 dozen pens

$\Rightarrow$ Cost of 60 bottles = Rs. 672

$\therefore$ Cost of 10 bottles = $\frac{672}{60}$ × 10 = Rs. 112

20. (B) $-12-(-28)=(-12)+(+28)=+16$

21. (C) l = 900 m, b = 700 m

Perimeter = 2 (900 + 700) m

= 2 (1600) m = 3200 m

Perimeter for 3 rounds fence

= 3 (3200) m = 9600 m

$\therefore$ Total amount spent = 9600 × ₹ 8

= ₹ 76,800

22. (A) 987789 is the required number

required number = – 150 – 67 = –217

23. (D) required number = – 150 – 67

= – 217

–217 should be added to 67 to get –150.

24. (C) No. of adult passengers = 85

No. of children = 35

Their difference = 85 – 35 = 50

$\therefore$ Adult passengers on board were 50 more than the children

25. (D) $\frac{5}{15}+\frac{5}{15}+\frac{1}{15}=\frac{11}{15}$

$\frac{2}{15}+\frac{4}{15}+\frac{5}{15}=\frac{11}{15}$

Hence $\frac{11}{15}-\frac{1}{15}-\frac{2}{15}=\frac{8}{15}$

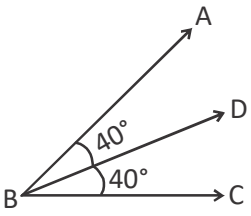
26. (C) Since P is the predecessor of q

So p = q – 1 $\therefore$ p – q = –1

eg: 7 is the predecessor of 8

$\therefore$ 7 – 8 = –1.

27. (B)



Given BD is the bisector of $\angle ABC$

$\therefore \angle ABD = \frac{80^\circ}{2} = 40^\circ$

28. (B) Lcm of 3,6,8,14= 168

$\frac{7}{8}=\frac{7}{8}\times\frac{21}{21}=\frac{147}{168}, \frac{5}{6}=\frac{5}{6}\times\frac{28}{28}=\frac{140}{168}$

$\frac{2}{3}=\frac{2}{3}\times\frac{56}{56}=\frac{112}{168}, \frac{9}{14}=\frac{9}{14}\times\frac{12}{12}=\frac{108}{168}$

$=\frac{108}{168}<\frac{112}{168}<\frac{140}{168}<\frac{147}{168}$

i.e $\frac{9}{14}<\frac{2}{3}<\frac{5}{6}<\frac{7}{8}$

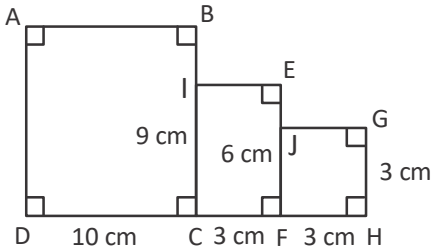
29. (A) 54321 × 99999

= 54321 × (100000 – 1)

5432100000 – 54321

$$\begin{array}{r} 5432100000 \\ - \quad 54321 \\ \hline 5432045679 \end{array}$$

30. (D)



Area of ABCD = 10 cm × 9 cm

= 90 cm^2

Area of CFEI = 6 cm × 3 cm

= 18 cm^2

Area of FHGJ = 3 × 3 cm^2

= 9 cm^2

Total area = 90 cm^2 + 18 cm^2 + 9 cm^2

= 117 cm^2

MATHEMATICS - 2

31. (A,C,D)

A,C and D are having line symmetries.

32. (A,C,D)

Factors of area 1,2,3 & 6

$\therefore$ $1 + 2 + 3 + 6 = 12 = 2 \times 6$

$\therefore$ '6' is a perfect factor of 496 are

1, 2,4,16,31,62,124,248,496

$\therefore$ $1 + 2 + 4 + 8 + 16 + 31 + 62 + 124 + 248 + 496$

$\therefore$ 496 is a perfect number.

Factor of 28 are 1,2,4,7,14,28

$1 + 2 + 4 + 7 + 14 + 28 = 56 = 2 \times 28$

$\therefore$ 28 is a perfect number

33. (A,B,C,D)

$$\begin{array}{r} 1001 \\ 51\overline{)51051} \\ 51 \\ \hline 051 \\ 51 \\ \hline 0 \end{array}$$

$51051 = 51 \times 1001$

$\therefore 3 \times 17 \times 13 \times 11 \times 7$

Factor of 51,051

34. (A,B,C,D)

All options are prime numbers

35. (A,B,C)

$$\begin{array}{r} 25 \\ 517\overline{)12925} \\ 1034 \\ \hline 2585 \\ 2585 \\ \hline 0 \end{array}$$

$\therefore \dfrac{12925}{517} = 25$

which is an odd number

Option 'B' odd number - even number = odd number.

Option 'C' The product of two odd numbers is odd

Option The product of one odd number and one even number is even.

REASONING

36. (D) From sentences: "good listener become aveena home" $\rightarrow$ codes "ye hi to na". "home is very famous" $\rightarrow$ "to to ha ka". The only code common to the two containing "home" is "to", so "to" = home. In the third sentence the remaining words are "is", "very", "famous" mapped to "to", "ha", "ka" (with one code repeated). Since "is" appears in the first sentence but none of the first-sentence codes match "ha" or "ka", the remaining reasonable assignment is "ha" = "very" (and "ka" = "famous").

37. (D) Pattern check :

Option (A) : $\times 2, \times 3 \rightarrow 2 \rightarrow 4 \rightarrow 12$

Option (B) : $\times 2, \times 3 \rightarrow 5 \rightarrow 10 \rightarrow 30$

Option (C) : $\times 2, \times 3 \rightarrow 7 \rightarrow 14 \rightarrow 42$

Option (D) : $\times 2, \times 4 \rightarrow 9 \rightarrow 18 \rightarrow 72$

38. (B) Here, the number obtained is by multiplying by 3 and then add 3 in it i.e.,

$15 \times 3 + 3 = 48$

$48 \times 3 + 3 = 147$

Similarly, $147 \times 3 + 3 = 444$

Hence, 444 is the answer

39. (C) 

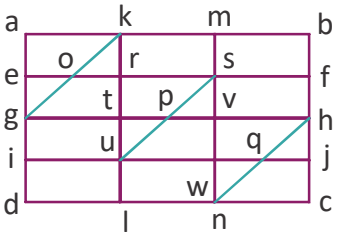
40. (A) N2676S

41. (A) 

42. (A) The first, 2nd and 3rd letters of the first group are moved one, three and five steps forward respectively to obtain the corresponding letters to the 2nd group. Thus the answer is (A).

43. (A) Clearly, b occurs twice.

44. (D) The figure, in question may be labeled as shown in following figure.



There are 12 triangles in the figure, namely Δ EOG, Δ AGK, Δ KOR, Δ KGT, Δ TUP, Δ RUS, Δ SPV, Δ SUW, Δ WNQ, Δ VNH, Δ HQJ and Δ HNC.

45. (A) 

CRITICAL THINKING

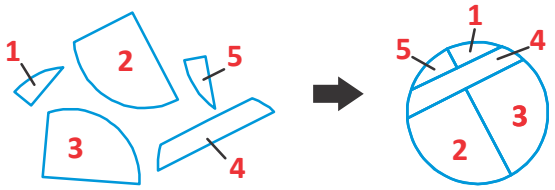
46. (D) 1 day = 24 hrs.

$\frac{100}{24}$ = 4 days 4 hr remaining.

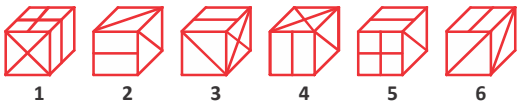
He came back 12 0' clock. So, he leave home to attend the camp is

12 – 4 = 8 am.

47. (C) In order to level the sea-saw, the person Q should shift rightwards.

48. (B) 

49. (A) From the given net of the cube, we have following cubes formed.



So the figures (3) and (5) are not correct in the problem.

50. (B) According to the first two statements, Tommy weighs the most and Jimmy weighs the least.

The End