GROUP I

MATHEMATICS OLYMPIAD
TEST FOR SELECTION TO THE TRAINING POOL - NATIONAL LEVEL, 2013

INDEX NO : …….. Time: 1 hour 30 min

General instructions

This paper consists of two parts. Answer all questions in both parts

Part 1 – Answers to be given for all questions, on the question paper itself. Write down the number of your choice in the cage provided.

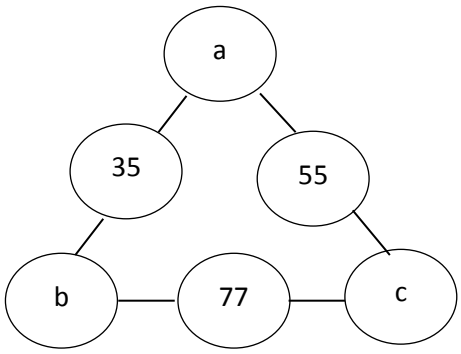
Part 11

- Answer to be written on the paper provided. How the answers were obtained has to be given step by step.
- No marks awarded for answers that are not clear

The figures given are not drawn to scale

Part 1

1.



a,b,c are positive integers. The number in the middle circle of any row is the product of the two numbers in circles on both ends.

Given bellow are three statements on a,b and c

(I) a,b,c are consecutive numbers
(II) a,b, c are prime numbers.
(III) One of the numbers is a two digit number

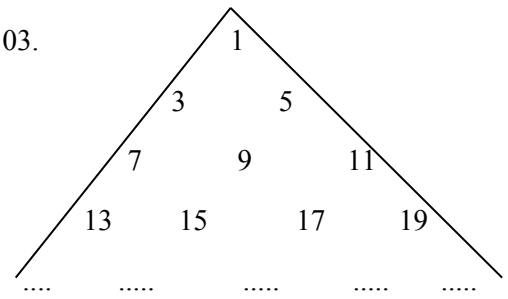
A statement true about (1),(11) and (111) above is

(1) Only (I) and (III) true (2) Only (I) and (II) true
(3) Only (II) and(III) true (4) All (I),(II) and (III) true

02. X is an integer such that $1 \leq X \leq 1000$ and X is not exactly divisible by 2 and 5. How many numbers are there which can be true for X

(1) 250 (2) 300 (3) 350 (4) 400

03.



Odd Numbers are written in the pattern given here.The first number of the 10th row is

(1) 85 (2) 87 (3) 89 (4) 91

marks

See page 3

04.

3	26	13	9
5	124	62	25
7	A	171	B
9	C	364	81
11	1330	665	121

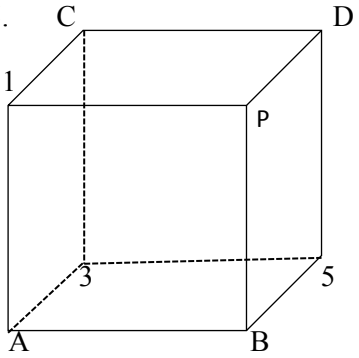
Numbers are written in the grid given here according to a certain pattern. A,B and C stand for 3 numbers.

The range of values most suitable for $\frac{C-B}{A+B}$ is

(1) $\frac{C-B}{A+B} < 2$ (2) $\frac{C-B}{A+B} > 1$

(3) $1 < \frac{C-B}{A+B} < 2$ (4) $1 \leq \frac{C-B}{A+B} \leq 2$

05.



Numbers from 1 to 8 are written at the vertices of the cube shown here, such that the product of the four numbers at the vertices of any face is the same value.

Set of numbers most suitable for A, B, C, D and P is

(1) 8, 2, 4, 7,6 (2) 7, 2, 6, 4, 8
(3) 8, 4, 2, 7,6 (4) 8, 2, 6, 4, 7

06. The number of times the numeral 9 occur in the product 123456789 × 999 999 is

(1) 0 (2) 1 (3) 3 (4) 5

07. If the number obtained by adding 1 to twice any prime number is also a prime number such prime numbers are known as Supper prime numbers. How many such supper prime numbers are there less than 15

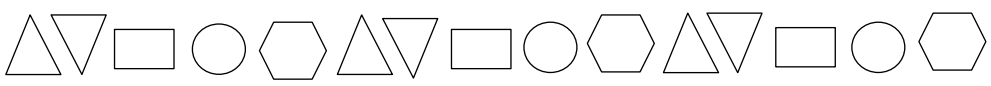
(1) 2 (2) 3 (3) 4 (4) 5

08.
$$\begin{array}{r} 1947 \\ -\ a8 \\ \hline 18b9 \end{array}$$

Given here is a subtraction, a and b are integers. A value suitable for a+b is

(1) 12 (2) 13 (3) 14 (4) 15

09. The figures  are placed in some order to obtain a pattern

 .....

What is the 142nd figure in the pattern

(1)  (2)  (3)  (4) 

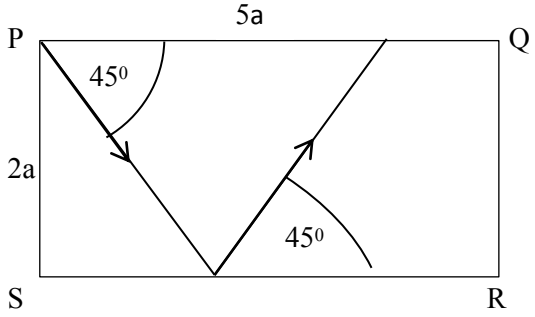
10. There are 5 fridays in the month of January in 2014. Three of them indicate prime numbers. What day of the week is 9th January 2014?

(1) Wednesday (2) Thursday (3) Friday (4) Saturday

Marks

See Page 3

11.

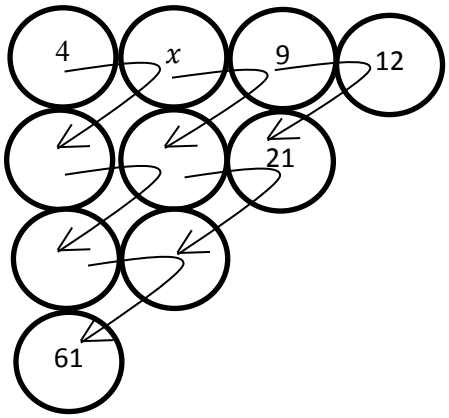


A rectangular frame of length 5a units and breadth 2a units is fixed to a smooth horizontal table top. A wooden ball is shot from P in a direction 45° inclined to PQ. Each time the ball hits an edge it turns in a direction 45° inclined to the edge.

How many times dose the ball hit the edges before comes to S

(1) 5 times (2) 6 times
(3) 7 times (4) 8 times

12.



The sum of the two numbers along each arrow is written inside the circle shown by the arrow head find the number suitable for x

(1) 5 (2) 6

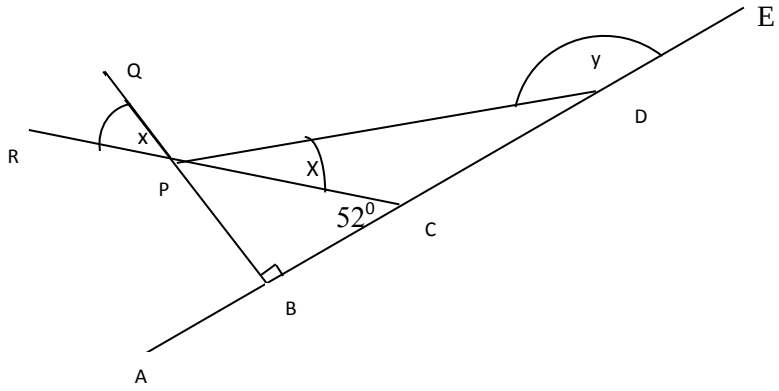
(3) 7 (4) 8

13. (10^{2013} + 2013) ÷ 9 = A $\frac{x}{9}$, where A $\frac{x}{9}$ is in the form of a mixed number.

What is the number suitable for x

(1) 7 (2) 6 (3) 5 (4) 4

14.



QPB is perpendicular to the straight line ABCDE. RPC is a straight line .If $P\hat{C}B = 52^0$ find the value of y

(1) 164^0 (2) 166^0 (3) 168^0 (4) 170^0

15. The number of Zeroes at the right hand end of the product $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10$ is?

(1) 2 (2) 3 (3) 4 (4) 10

Marks

See Page 4

Part II

Answer all questions. Use the sheets provided

1. Find the value of $\frac{368+1375+3401+6179-1325-318-335-6129}{2}$

2. Malisha wanted to divide a certain number by 4 . But she multiplied the number by 8.Then she wanted to add 20 to the result, but she subtracted 20 instead. The final answer she obtained was 76.Final the answer she would have obtained if she followed the correct operations.

3. Tetrahedrons of side 1cm were removed from the vertices of a tetrahedrons of side 4cm. Final the following with respect to the solid left.
   - (i) The number of vertices
   - (ii) The number of edges
   - (iii) The number of faces
   - (iv) The total length of all the edges