NATIONAL MATHEMATICS OLYMPIAD COMPETITION - 2012

Name:-.....

GROUP I

Class :-. .....

School :-.....

Answer all questions. Time : 1hour 30 minutes

PART A

Questions 1-15 Underline the correct answers each correct answer carries 3 marks. Each incorrect answer 1 mark diducted.

1. The nine- remainder (remainder when divided by 9) of $10^{2012} + 2012$ is,

   (i) 0 (ii) 4 (iii) 6 (iv) 8 (v) 7

2. A B

D C

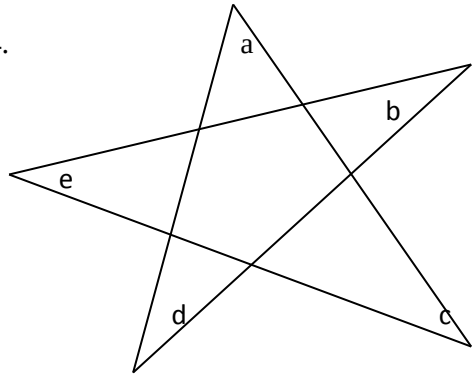
All the small rectangles inside the rectangles ABCD are equal in area. If BC = 30cm then length of AB is,

   (i) 30 cm (ii) 40cm (iii) 45cm (iv) 50cm (v) 60cm

3. The next closest year when the calendar for 2012 could be used is,

   (i) 2020 (ii) 2028 (iii) 2032 (iv) 2040 (v) None of these.

4.



a + b + c + d + e of the star shown here is,

   (i) 120^0 (ii) 135^0 (iii) 180^0
   (iv) 270^0 (v) 360^0

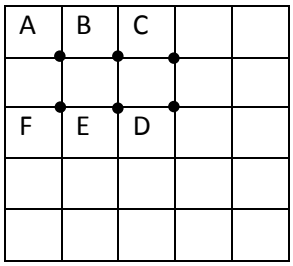
5. $\frac{x-\frac{1}{y}}{y-\frac{1}{x}}$ When simplified is,

   (i) $\frac{x}{y}$ (ii) $\frac{y}{x}$ (iii) 1 (iv) -1 (v) y-x

6. a,b,c,d are whole numbers
   If a(b+c+d) = 24 b(a+c+d) = 33 and
   c(a+b+d) = 40 d(a+b+c) = 45 Then a+b+c+d is

   (i) 12 (ii) 14 (iii) 18 (iv) 34 (v) None of these.

7.



The points A, B, C, D, E and F are marked on a peg board as shown here. What is the maximum number of triangles, which are not right angled, that could be formed joining 3 of these points.

(i) 4 (ii) 5 (iii) 6 (iv) 7 (v) 9

8. Pieces $2\frac{2}{7}$ metres long are cut of from a string 20 metres long, The length of the remaining piece is

(i) $\frac{3}{4}$ (ii) $1\frac{5}{7}$ (iii) $1\frac{7}{8}$ (iv) $\frac{3}{7}$ (v) $1\frac{2}{7}$

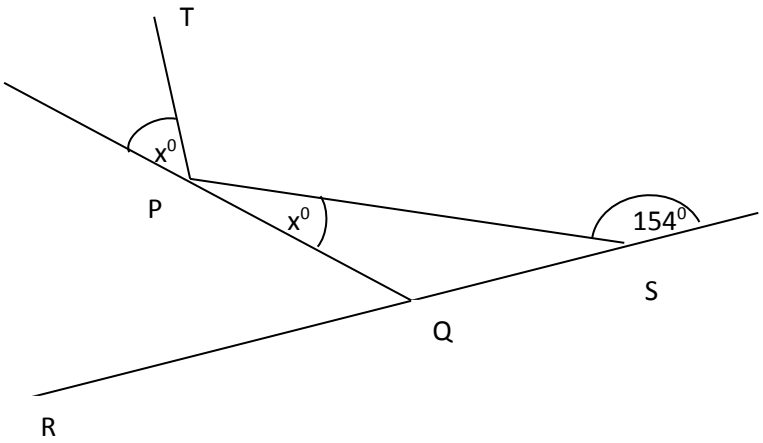
9. There were 5 Sundays in April 2000 . 3 of them are even numbers. Then 8 th of April is,

(i) Saturday (ii)Sunday (iii) Monday (iv) Tuesday (v) Friday

10. 24 different numbers can be written using all the four numerals 1, 2, 3 and 4. None of these numerals are repeated. When the 24 numbers are written in the ascending order. The position of 3142 is,

(i) 13 (ii) 14 (iii) 15 (iv) 16 (v) 17

11.



If TP of the above figure when produced meets RS at right angles the value of x is,

(i) 26 (ii) 30 (iii) 31 (iv) 32 (v) 64

12.

$$\begin{array}{r} 8\ 6\ 3 \\ +\ \square\ 9\ 1 \\ \hline 7\ \square\ 8 \\ \hline 2\ 1\ 8\ 2 \end{array}$$

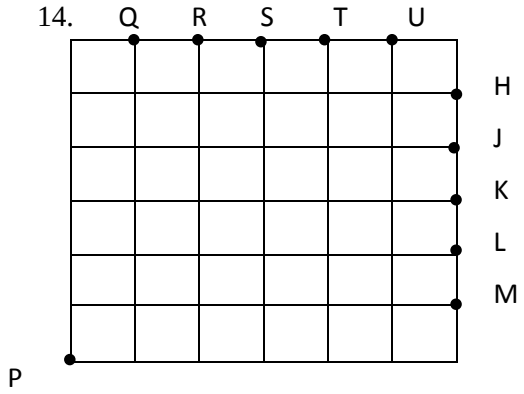
The sum of the two numerals that are not given in this addition is,

(i) 13 (ii) 11 (iii) 9 (iv) 7 (v) 3

13. x is a four digit odd number which consists of the digits 2 and 3. of $x > 3005$, then the number of all possible values of x is,

(i) 10 (ii) 8 (iii) 5 (iv) 4 (v) 3

14.



Shown here is a square grid 6 x 6. This figure can be divided into three regions of equal area by drawing two straight lines through P. The pair of points through which these two lines could be drawn is,

(i) M and Q (ii) L and R (iii) K and S (iv) H and U (v) J and T

15. 25 Contestants enrolled for a "Pillow fight" competition at a New Year festival. Any competitor is removed from the contest at the first time he loses. The total number of bouts that should be organized to chose the winner is,

(i) 24 (ii) 25 (iii) 26 (iv) 32 (v) 16

PART B

Indicate clearly how the answers were obtained.

1. A certain number consists of 5 digits. The product of the digits is 2000.
   I. Write down two numbers which satisfy these conditions.
   II. What is the smallest number which satisfies the conditions.

2. (a)

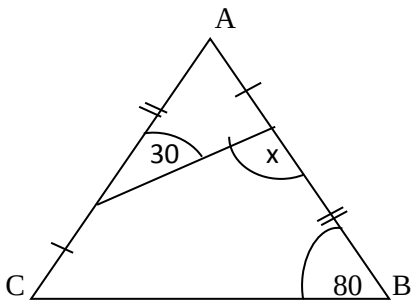
$$\begin{array}{cccc} & P & P & Q \times \\ & & & Q \\ \hline R & Q & 5 & Q \end{array}$$

Given above is a multiplication. Find the values of

(i) Q = …… (ii) P = …… (iii) R = ……..

(b) There is a 10 digit even number. The sum of all the digits is 89. What is the last digit?

3. (i)



Find the magnitude of $D\hat{E}B$ with reference to the above figure.

(ii) In a certain polygon five internal angles and only five are obtuse angles. What is the maximum number of sides of the polygon?