INTSO EDUCATION

MATHEMATICS TALENT SEARCH OLYMPIAD(MTSO) 2015 - 2016

STAGE - 1 **TIME : 60 min.**

CLASS : VIII **Max. Marks : 50**

Instructions:

- ➪ *Fill the OMR sheet completely and carefully.*
- ➪ *Each question carries one mark and has only one correct answer. No negative marks*
- ➪ *The question paper contains 50 questions to be answered in 60 minutes.*

1. If the average of 16,10 & n is between 18 & 21 .What is the greatest possible value of n
   1) 24 2) 34 3) 32 4) 36 [ ]

2. The $\frac{p}{q}$ form of $0.2\overline{35}$ is [ ]
   1) $\frac{233}{999}$ 2) $\frac{233}{900}$ 3) $\frac{233}{990}$ 4) $\frac{233}{909}$

3. The length and breadth of a rectangular field are in the ratio 5 : 3 . The area of the field is 1 hectare 3500 sq.mts., then its perimeter is [ ]
   1) 240cm 2) 150cm 3) 480cm 4) 180cm

4. If $\sqrt{a}+\sqrt{b}=\frac{1}{\sqrt{3}-\sqrt{2}}$ then a+b = [ ]
   1) 6 2) 1 3) 5 4) 12

5. If $\frac{\sqrt{7}+2\sqrt{3}}{2\sqrt{7}-\sqrt{5}}=\frac{C+\sqrt{P}+\sqrt{q}+\sqrt{r}}{23}$ (p < q < r) where p,q,r are rational numbers then q + r –p is
   1) 4 2) 1 3) 12 4) 35 [ ]

6. If H.C.F of three numbers is 12. If the numbers are in the ratio 1 : 2 : 3 then the numbers are
   1) 12,24,36 2) 10,20,30 3) 5,10,15 4) 4,8,12 [ ]

7. If P is a prime, d (N) means number of divisors of N. Then $d\left(d\left(d\left(p^5\right)\right)\right)$ [ ]
   1) 3 2) 2 3) 4 4) 1

8. The digit in the units place of $(45679)^{1239}$ [ ]
   1) 9 2) 6 3) 1 4) 2

9. There are n rational numbers between a and b where a<b then difference 'd' between any two consecutive rational numbers is [ ]
   1) $\frac{a-b}{n+1}$ 2) $\frac{b-a}{n-1}$ 3) $\frac{b-a}{n+1}$ 4) $\frac{a-b}{n-1}$

10. Given that a,b,c,d are natural numbers and that a = bcd, b= acd, d= abc then $(a+b+c+d)^2$ is
    1) 16 2) 14 3) 12 4) 11 [ ]

11. The remainder when $2010^{2011} + 2011^{2011}$ is divided by 4021 is [ ]
    1) 4000 2) 2010 3) 0 4) 2011

12. $(x+y)^n - (x^n + y^n)$ is always divisible by [ ]
1) x 2) xy 3) x + y 4) y

13. The factors of $x^3(y-z) + y^3(z-x) + z^3(x-y)$ are [ ]
1) x – y 2) y–z 3) z – x 4) all

14. $x^{n+1} - x^n - x + 1$ is exactly divisible by [ ]
1) x – 1 2) x +1 3) x + 2 4) both 1,2

15. 9 bus stops are equally spaced along a bus route the distance from first to third is 600m. How far is it from the first stop to last stop ? [ ]
1) 800m 2) 1600m 3) 1800m 4) 2400m

16. What should be added to twice the rational number $\frac{-7}{3}$ to get $\frac{3}{7}$ [ ]
1) 100 2) $\frac{107}{21}$ 3) $\frac{103}{21}$ 4) $\frac{98}{21}$

17. The perimeter of a rectangle is 13cm and its width is $2\frac{3}{4}$ cm then its length is [ ]
1) $3\frac{2}{3}$ cm 2) $3\frac{4}{3}$ cm 3) $3\frac{3}{4}$ cm 4) $3\frac{3}{5}$ cm

18. The present age of Sahil's mother is 3 times the present age of sahil. After 5 years their ages will added to get 66 years . Then their present ages are [ ]
1) 16,40 2) 14,42 3) 18,54 4) 20,60

19. The number of 3 digit numbers which end in 7 and are divisible by 11 is [ ]
1) 2 2) 4 3) 6 4) 8

20. Present age of Anu and Raj are in the ratio 4 : 5. Eight years from now the ratio of their ages will be 5 ; 6 then their present ages are [ ]
1) 32,40 2) 12,15 3) 28,35 4) 16 , 20

21. For any natural number m>1 what is the Pythagorean triplet [ ]
1) (M^2-1, M^2, M^2+1) 2) $(2M, M^2-1, M^2+1)$ 3) (M, M^2, M^3) 4) (M,M+1,M+2)

22. Find the smallest multiple of 2352 which is a perfect square. [ ]
1) 2 2) 5 3) 3 4) 7

23. The smallest square number which is divisible by each of the numbers 6,9,15 [ ]
1) 400 2) 900 3) 8100 4) 3600

24. The square root of 9801 is [ ]
1) 89 2) 101 3) 99 4) 109

25. The square root of 17.64 is [ ]
1) 3.2 2) 4.24 3) 4.26 4) 4.2

26. If a = 2012 , b= –1005, c= –1007 then the value of $\frac{a^4}{b+c} + \frac{b^4}{c+a} + \frac{c^4}{a+b} + 3abc =$ [ ]
1) 2 2) 5 3) 4 4) 0

27. The sum of the cubes of the divisors of 12 is [ ]
1) 1728 2)2044 3) 2032 4) 1854

28. The highest power of 3 contained in 1000! [ ]
1) 500 2) 333 3) 498 4) 524

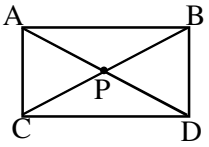
29. Which of the following is a Ramanujam number [ ]
1) 1729 2) 144 3) 2394 4) 2459

30. If the volume of a cube is 729 cm^3 then the side of he cube is [ ]
1) 8cm 2) 13cm 3) 9cm 4) 17cm

31. If a parallelogram and triangle are on the same base and same parallel lines then [ ]
1) Area of parallelogram = Area of triangle 2) Area of parallelogram = 2×Area of triangle
3) Area of parallelogram = 4 Area of triangle 4) Area of triangle = 2 × Area of parallelogram

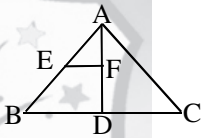
32. If P is a point in the interior of a parallelogram ABCD then Area of $\Delta APB + Area\ of\ \Delta PCD$ is equal to [ ]

1) $\frac{1}{3}\times$ Area of a parallelogram 2) $\frac{1}{4}\times$ Area of parallelogram



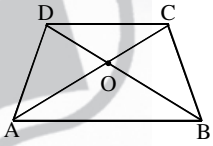
3) $\frac{1}{2}\times$Area of parallelogram 4) Area of parallelogram

33. If AD is the Median of a ΔABC and EF is the median of ΔABD then the area of ΔAEF : area of ΔABC [ ]



1) 1 ; 2 2) 1 ; 4
3) 4 ; 1 4) 3 ; 4

34. The diagonals AC and BD of a trapezium ABCD with $AB \parallel CD$ intersect each other at 'O' then area of ΔAOD is equal to [ ]



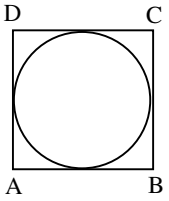
1) Area of ΔAOD 2) Area of ΔBOC
3) Area of ΔADC 4) Area of ΔABC

35. The figure formed by joining the midpoint of the Adjacent sides of a Rhombus is [ ]
1) Square 2) Parallelogram 3) Rhombus 4) Rectangle

36. The area of the triangle formed by the sides 8cm, 11cm, 13cm is [ ]
1) $\sqrt{30}$ cm^2 2) $4\sqrt{30}$ cm^2 3) $8\sqrt{30}$ cm^2 4) $2\sqrt{30}$ cm^2

37. Let $\square ABCD$ be a Quadrilateral with an in circle then which of the following is true [ ]

1) AB+AD = BC+CD
2) AB+CD = BC+AD
3) AD+CD = AB+BC
4) AC+BD = AB+BC+CD+AD



38. The area of a rhombus with length of diagonals 4cm and 6cm is [ ]
1) $24cm^2$ 2) $12cm^2$ 3) $8cm^2$ 4) $6cm^2$

39. The area of the sector of a circle with radius 14cm and corresponding arc making an angle 90° at centre of circle is [ ]
1) $154cm^2$ 2) $164cm^2$ 3) $134cm^2$ 4) $308cm^2$

40. The area of an equilateral triangle formed on the diagonal of a square of side is 4cm. [ ]
1) $12\sqrt{3}$ cm^2 2) $16\sqrt{3}$ cm^2 3) $8\sqrt{3}$ cm^2 4) $4\sqrt{3}$ cm^2

41. Sum of exterior angles of n - sided polygon is equal to [ ]
1) (2n-4) 180° 2) (n–2) 180° 3) 360° 4) n × 90°]

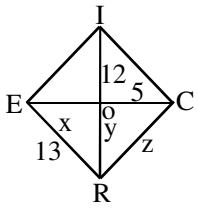
42. The number of rectangles with integer sides and with perimeter 16cm is [ ]
1) 8 2) 4 3) 3 4) 1

43. If a,b,c are the sides of ΔABC and $c^2 > a^2 + b^2$ then the triangle is [ ]
1) right angled triangle 2) Acute angled triangle
3) equilateral triangle 4) obtuse angled triangle

44. Number of diagonals of a '9' sided polygon is [ ]
1) 18 2) 36 3) 27 4) 45

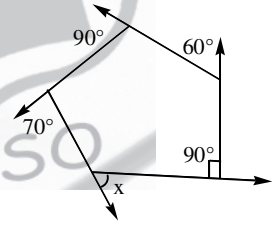
45. If $\square ABCD$ is a cyclic Quadrilateral and $\angle A = 100°$ then $\angle B + \angle D =$ [ ]
1) 200° 2) 100° 3) 180° 4) 120°

46. RICE is a Rhombus then x,y,z are [ ]
1) 5,12,13
2) 5,17, 7
3) 12,5,7
4) 13,12,5



47. RENT is a rectangle and OR = 2x + 4 , OT = 3x +1 then the value of x is [ ]
1) 4
2) 5
3) 3
4) 2

48. Find the value of x in the given figure [ ]
1) 70°
2) 60°
3) 90°
4) 50°



49. If one of the angle in a Quadrilateral is greater than 180° then the Quadrilateral is [ ]
1) square 2) convex Quadrilateral
3) Rhombus 4) Concave Quadrilateral

50. In Given figure $\angle ACB = 30°$ then $\angle AOB = ?$ [ ]
1) 30°
2) 90°
3) 60°
4) 15°