GG RS LEARNING HUB PVT. LTD.

IMO CLASS 9 (MATHS)

Total Questions: 50 **Time: 1hr.**

Section – 1 : Verbal and Non-Verbal Reasoning.

Section – 2 : Integers, Fractions and Decimals, Exponents and Powers, Algebraic Expressions, Simple Linear Equations, Lines and Angles, Comparing Quantities, The Triangle and its Properties, Symmetry, Congruence of Triangles, Rational Numbers, Perimeter and Area, Data Handling, Visualising Solid Shapes, Practical Geometry.

Section – 3 : Syllabus as per Section – 2.

Section – 4 : Higher Order Thinking Questions - Syllabus as per Section – 2.

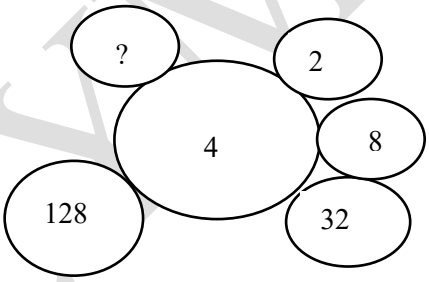
SECTION 01 LOGICAL REASONING

1. In the given question, which pair of numbers is different from the other three.
(A) 729 B. 1000 C. 1331 D. 1628

2. How many pairs of letters are there in the word "SACCHARINE" which have as many lettersbetween them in the word as in the alphabet in both directions?
(A) 2 B. 6 C. 4 D. 3

3. Some boys are sitting in a row. *P* is sitting fourteenth from the left and *Q* is seventh from theright. If there are four boys between *P* and *Q*, then how many boys are there in the row?
(A) 19 B. 21 C. 25 D. 28

4. **Directions :** Find the missing number in each of the following figure



A. 512 B. 427 C. 417 D. 327

Directions (Q. 5 to 6) : Study the alpha-numeric series and answer the questions given below :
EF7298AG43BMDNI6QR39XS8UZLH938T54YW

5. How many digits are there which are immediately preceded by a vowel but not followed by adigit?
A. 0 B. 2 C. 1 D. 3

6. How many vowels are immediately followed by an even number?
A. 1 B. 2 C. 3 D. 4

Directions (7-10) : Find out which of the following conclusions logically follows.

7. Statements: Some dogs are pets, No lion is a tiger, No tiger is a dog.
Conclusions:

I. All tigers are pets is a possibility II. Some pets are not tigers

(A) Only I follows B. Only II follows C. Either I or II follows D. Both I and II follow

8. Statements: All books are pillows, Some fans are TVs, No TV is a book.
Conclusions:

I. Some books are not fans II. Some TVs are definitely not pillows

(A) Only I follows B. Only II follows C. Either I or II follows D. Neither I nor II follows

9. Statements: Some shirts are jeans, Some jeans is a pajamas, Some jeans are tees.
Conclusions:

I. All jeans being tees is a possibility. II. At least some pajamas are jeans.

(A) Only I follows B. Only II follows C. Either I or II follows D. Both I and II follow

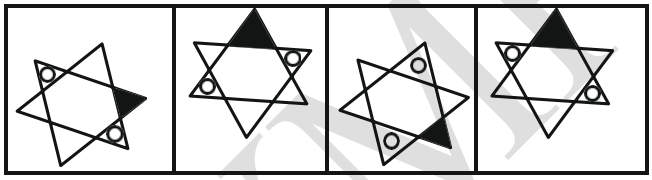
10. Statements: No drinks are burgers. Some fries are drinks, Some toffees are burgers.
Conclusions:

I. All fries being burgers is a possibility.

II. Some toffees are fries.

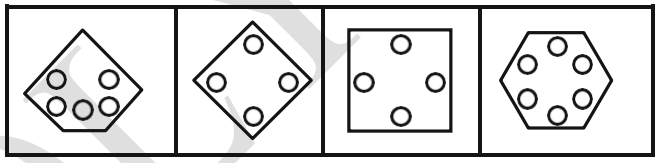
(A) Only I follows B. Only II follows C. Either I or II follows D. Both I and II follow

Directions (11-12): In each problem, out of the four figures marked (a) (b), (c) and (d), three aresimilar in a certain manner. However, one figure is not like the other three. Choose the figure which is different form the rest.

11. 

a. b. c. d.

(A) a (B) b (C) c (D) d

12. 

a. b. c. d.

(A) a (B) b (C) c (D) d

13. If 453945 stands for DECIDE, then 8978 stands for ____.

(A) BHEE B. CDEH C. GHEE D. HIGH

14. In a certain code language, "Tom Kun Sud" means "dogs are barking", "Kun Jo Mop" means "dogs and horses" and "Mut Tom Ko" means "Donkeys are mad". Which word in the given language means "Barking"?

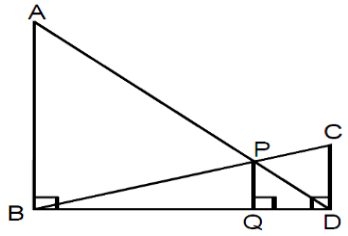
(A) Kun B. Jo C. Sud D. Ko

15. If '+' means '÷', '÷' means '–', '–' means '×', '×' means '+', then 12 + 6 ÷ 3 – 2 × 8 =

(A) – 2 B. 2 C. 4 D. 8

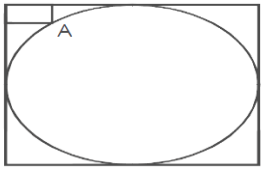
SECTION02 MATHEMATICAL REASONING

16. In the diagram given below, ABD = CDB = PQD=90°. If AB:CD = 3:1, the ratio of CD: PQ is



(A) 1 : 0.69 B. 1 : 0.75 C. 1 : 0.72 D. None of the above

17. In the figure below, the rectangle at the corner measures 10cm × 20cm. The corner A of the rectangle is also a point on the circumference of the circle. What is the radius of the circle incm?



(A) 10 cm B. 40 cm C. 50 cm D. None of the above

18. Let T be the set of integers {3, 11, 19, 27, …451, 459, 467} and S be a subset of T such thatthe sum of no two elements of S is 470. The maximum possible number of elements in S is

(A) 32 B. 28 C. 29 D. 30

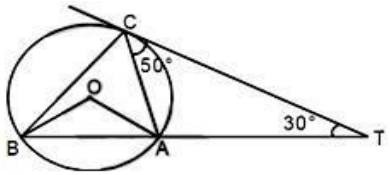
19. The length of the circumference of a circle equals the perimeter of a triangle of equal sides, and also the perimeter of a square. The areas covered by the circle, triangle, and square are c, t and s, respectively. Then,

(A) s > t > c B. c > t > s C. c > s > t D. s > c > t

20. In the figure given below (not drawn to scale), A, B and C are three points on a circle with centre O.

The chord BA is extended to a point T such that CT becomes a tangent to the circle at pointC.

If ATC = 30° and ACT = 50°, then the angle BOA is



(B) 100^0 B. 150^0 C. 80^0 D. Not possible to determine

21. Consider the sequence of numbers a_1, a_2, a_3, ... to infinity where $a_1 = 81.33$ and $a_2 = -19$ and $a_j = a_{j-1} - a_{j-2}$ for $j \geq 3$. What is the sum of the first 6002 terms of this sequence?

(A) –100.33 B. –30.00 C. 62.33 D. 119.33

22. A shop stores x kg of rice. The first customer buys half this amount plus half a kg of rice. The second customer buys half the remaining amount plus half a kg of rice. Then the third customer also buys half the remaining amount plus half a kg of rice. Thereafter, no rice is left in the shop. Which of the following best describes the value of x?

(A) $2 \leq x \leq 6$ B. $5 \leq x \leq 8$
C. $9 \leq x \leq 12$ D. $11 \leq x \leq 14$

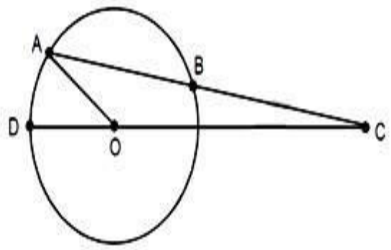
23. Consider obtuse-angled triangles with sides 8 cm, 15 cm and x cm. If x is an integer, thenhow many such triangles exist?

(A) 5 B. 21 C. 10 D. 15

24. There are 8436 steel balls, each with a radius of 1 centimetre, stacked in a pile, with 1 ball on top, 3 balls in the second layer, 6 in the third layer, 10 in the fourth, and so on. The number of horizontal layers in the pile is

(A) 34 B. 38 C. 36 D. 32

25. In the figure below, AB is the chord of a circle with centre O. AB is extended to C such that BC = OB. The straight line CO is produced to meet the circle at D. If ACD = y degrees and $\angle AOD = x$ degrees such that x = ky, then the value of k is

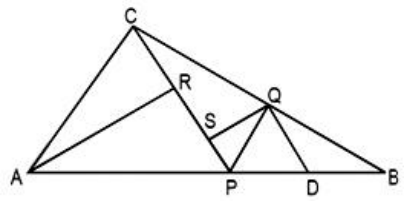


(A) 3 B. 2 C. 1 D. None of the above

26. If x, y, z are distinct positive real numbers the $\frac{x^2(y+z)+y^2(x+z)+z^2(x+y)}{xyz}$ would

A. Greater than 4
B. Greater than 5
C. Greater than 6
D. None of the above

27. In the figure (not drawn to scale) given below, P is a point on AB such that AP : PB = 4 : 3.PQ is parallel to AC and QD is parallel to CP. In ΔARC, ∠ARC = 90°, and in ΔPQS , ∠PSQ = 90° . The length of QS is 6 cm. What is the ratio of AP : PD?



(A) 10 : 3 B. 2 : 1 C. 7 : 3 D.

(B) 8 : 3

28. Consider the sets T_n= {n, n +1, n + 2, n + 3, n + 4} , where n = 1, 2, 3,…, 96. How many ofthese sets contain 6 or any integral multiple thereof (i.e. any one of the numbers 6, 12, 18,…)?

(A) 80
(B) 81
(C) 82
(D) 83

29. What is the distance in cm between two parallel chords of lengths 32 cm and 24 cm in acircle of radius 20 cm?

(A) 1 or 7
(B) 2 or 14
(C) 3 or 21
(D) 4 or 28

30. The rightmost non-zero digits of the number $30^{2720}$is

(A) 1
(B) 3
(C) 7
(D) 9

31. If the perpendicular distance of a point P from xaxis is 5 units, then the point P has

(A) xcoordinate = –5 or 5
(B) ycoordinate = 5
(C) ycoordinate = –5
(D) ycoordinate = 5 or –5

32. A right circular cone, a right circular cylinder and a hemisphere, all have the same radius, and the heights of the cone and cylinder equal to their diameters. Then their volumes are proportional, respectively to

(A) 1 : 3 : 1
(B) 2 : 1 : 3
(C) 3 : 2 : 1
(D) 1 : 2 : 3

33. A circle is inscribed in a given square and another circle is circumscribed about the square.What is the ratio of the area of the inscribed circle to that of the circumscribed circle?

(A) 2 : 3 B. 3 : 4 C. 1 : 4 D. 1 : 2

34. A piece of paper is in the shape of a right-angled triangle and is cut along a line that is parallel to the hypotenuse, leaving a smaller triangle. There was 35% reduction in the length of the hypotenuse of the triangle. If the area of the original triangle was 34 square inches before the cut, what is the area (in square inches) of the smaller triangle?

(A) 16.665

(B) 16.565

(C) 15.465

(D) 14.365

35. Find the largest prime factor of 314 + 313 – 12 ?

(A) 73

(B) 81

(C) 69

(D) 54

SECTION 03 EVERYDAY MATHEMATICS

36. Find the number of perfect cubes between 1 and 1000001 which are exactly divisible by 7?

(A) 7

(B) 13

(C) 14

(D) 18

37. Find the number of perfect cubes between 1 and 1000009 which are exactly divisible by 9.

(A) 33

(B) 37

(C) 47

(D) 39

38. Find the remainder when 2^{2005} is divided by 13

(A) 21

(B) 13

(C) 14

(D) 19

39. A triangular array of 2016 coins has 1 coin in the first row, 2 coins in the second row, 3 coins in the third row and so on up to N coins in the Nth row, What is the sum of the digits of N?

(A) 6

(B) 7

(C) 8

(D) 9

40. For some positive integer n, the $110n^3$ has 110 positive integer divisors, including 1 and the number $110n^3$. How many positive integer divisors does the number $81n^4$ have?

(A) 110 B. 191 C. 325 D. 425

41. How many five-digit numbers can be formed using the digits 2, 3, 8, 7, 5 exactly once suchthat the number is divisible by 125?

(A) 0

(B) 1

(C) 4

(D) 3

Direction for questions 42 and 43: Answer the questions based on the following information. In a locality, there are five small cities: A, B, C, D and E. The distances of these cities from each other are as follows.

AB = 2 km	AC = 2km
AD > 2 km	AE > 3 km
BC = 2 km	BD = 4 km
BE = 3 km	CD = 2 km
CE = 3 km	DE > 3 km

42. If a ration shop is to be set up within 2 km of each city, how many ration shops will berequired?

(A) 2

(B) 3

(C) 4

(D) 5

43. If a ration shop is to be set up within 3 km of each city, how many ration shops will berequired?

(A) 1

(B) 2

(C) 3

(D) 4

44. If n is any odd number greater than 1, then $n(n^2 - 1)$ is

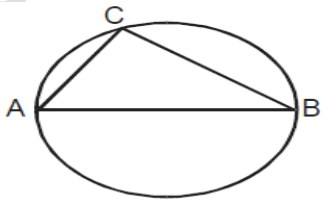
(A) Divisible by 96 always

(B) Divisible by 48 always

(C) Divisible by 24 always

(D) None of

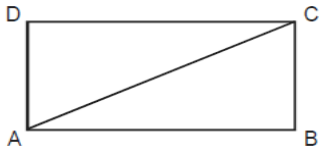
45. The figure shows a circle of diameter AB and radius 6.5 cm. If chord CA is 5 cm long, findthe area of ΔABC



(A) 60 sq. cm B. 30 sq. cm C. 40 sq. cm D. 52 sq. cm

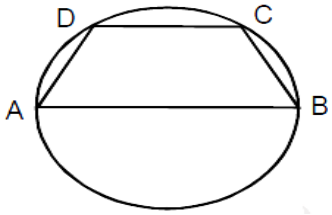
SECTION04 ACHIEVER SECTION

46. In the adjoining figure, AC+ AB = 5AD and AC – AD = 8. Then the area of the rectangleABCD is



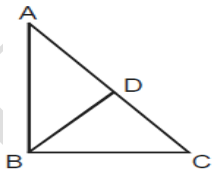
(A) 36 B. 50 C. 60 D. Cannot be answered

47. In the given figure, AB is diameter of the circle and points C and D are on the circumference such that ∠CAD = 30° and ∠CBA = 70°. What is the measure of ∠ACD?



(A) 40° B. 50° C. 30° D. 90°

48. In ΔABC, ∠B is a right angle, AC = 6 cm, and D is the mid-point of AC. The length of BDis

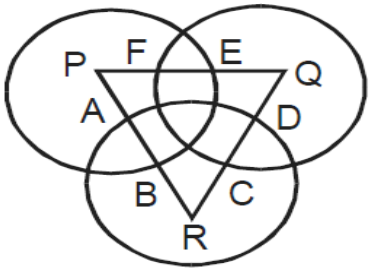


(A) 4 cm B. 6 cm C. 3 cm D. 3.5 cm

49. The length of a ladder is exactly equal to the height of the wall it is learning against. If lower end of the ladder is kept on a stool of height 3 m and the stool is kept 9 m away from the wall, the upper end of the ladder coincides with the top of the wall. Then the height of the wall is

(A) 12 m B. 15 m C. 18 m D. 11 m

50. Three circles, each of radius 20, have centres at P, Q and R. Further, AB = 5, CD = 10 andEF = 12. What is the perimeter of □PQR?



(A) 120 B. 66 C. 93 D. 87