SMART SOCIETY INTERNATIONAL MATHEMATICS OLYMPIAD (SSIMO)

Organized by

Department of Basic Science and Humanities
INSTITUTE OF ENGINEERING & MANAGEMENT,
IEM-UEM GROUP and SMART SOCIETY, USA

TOTAL QUESTIONS: 40

DURATION: 1 HOUR

INSTRUCTIONS TO THE CANDIDATES:

1. The following question paper is divided into 3 sections
   a) Section A (Logical Reasoning) : 10 Questions
   b) Section B (Mathematical reasoning) : 10 Questions
   c) Section C (Achiever's Level Mathematics): 20 Questions
2. Each question of section A carries 2 mark. Each question of section B carries 2 marks and each question of section C carries 3 marks.
3. All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
4. There is only ONE correct answer. Choose only ONE option for an answer.
5. To mark your choice of answers by darkening the circles on the OMR sheet, use HB Pencil or Blue/Black ball point pen.
6. Rough work should be done in the blank space provided in booklet.
7. Return the OMR sheet to the invigilator at the end of exam.
8. Please fill in your personal details in the space provided below.

NAME: .....

SCHOOL NAME: .....

CONTACT DETAILS OF GUARDIAN: .....

SECTION A

LOGICAL REASONING

1. In a certain code RAIN in written as 8$%6 and MORE is written as 7#8@. How will REMAIN be written in the same code?

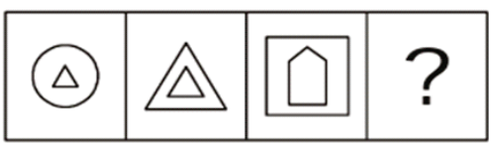
   a) 8@7$%6 b) 7@#$%6

   c) #@&$%6 d) #@7$%6

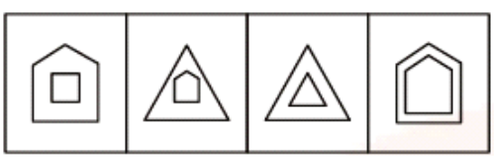
2. How many digits are there in the number 57692483, which after rearranging the digits of the number in descending order from left to right will remain at the same position as before the rearrangement?

   a) None b) One

   c) Two d) Three

3. 

   Answer figure:

   1 2 3 4

   a) 1 b) 2

   c) 3 d) 4

4. The next term of the series: 3F, 6G, 11I, 18L is:

   a) 21O b) 27P

   c) 27O d) 25N

5. Sonali walks 20 m North. Then she turns right and walks 30 m. Then she again turns right and walks 35 m. In which direction and how many meters away is she from her original direction?

   a) 15 m, West

   b) 15√5 m, South East

   c) 15√5 m, South West

   d) 15√3 m, South East

6. Which of the following best represent the relationship between “Scooter”, “Bus” and “Conveyance”?

   a) 

   b) 

   c) 

   d) 

7. Among 5 boys, Vasant is taller than Manohar but not tall as Raju. Jayant is taller than Dutta, but shorter than Manohar. Who is the tallest in the group?

   a)Raju b)Manohar

   c)Vasant d)Cannot be determined

8. Seen through a mirror, the time in a wall clock is 9:30. What is the actual time in the clock?

   a) 3:30 b) 2:30

   c) 9:30 d) 4:30

9. If 31z^5+51z^3 is divisible by 3, where z is a digit less than 5, then the values of z are:

   a) 0,1 b) 0,3

   c) 1,3 d) 1,4

10. A polyhedron has 7 faces and 10 vertices. How many edges does the polyhedron have?

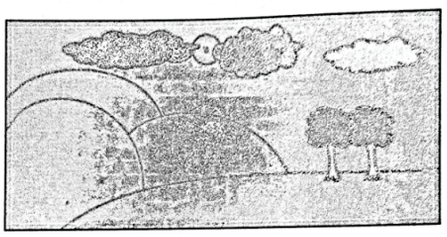
    a) 15 b) 17

    c) 10 d) 2

SECTION B

MATHEMATICS

11. The actual length of a painting was 2m. What was its length in the photograph if the scale used is 1mm: 20cm?



a) 9mm b) 13mm

c) 10mm d) 12mm

12. One card is drawn from a well shuffled deck of 52 cards. Find the probability that the number on the card drawn is a multiple of 5.

a) $\frac{4}{52}$

b) $\frac{4}{13}$

c) $\frac{7}{52}$

d) $\frac{2}{13}$

13. Rs. 8000 invested at compound interest gives Rs. 1261 as interest after 3 years. The rate of interest per annum is:

a) 25% b) 10%

c) 17.5% d) 5%

14. The area of a quadrilateral is $342m^2$. The perpendicular from two of its opposite vertices to the diagonal are 12m and 12m. What is the length of the diagonal?

a) 28.6m b) 25.3m

c) 28.5m d) 22.5m

15. If $\frac{x}{pq}+\frac{x}{qr}+\frac{x}{pr}=p+q+r$, then "x" is

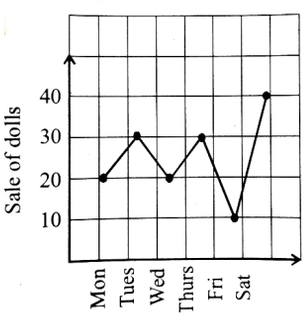
a) pqr

b) $\frac{pq}{r}$

c) $\frac{p}{qr}$

d) $\frac{q}{pr}$

16. The line graph shows the sales of dolls by Suhas from Monday to Saturday on a particular week. Given that the cost of one doll is Rs. 35, how much did Suhas receive from the sale of dolls on Saturday?



a) Rs. 200 b) Rs. 700

c) Rs. 1050 d) Rs. 1400

17. $2^{73}-2^{72}-2^{71}$ is the same as:

a) 2^{69} b) 2^{70}

c) 2^{71} d) 2^{72}

18. A rectangular sheet of paper, when halved by folding it at the midpoint of its longer side, results in a rectangle, whose longer and shorter sides are in the same proportion as the longer and shorter sides of the original rectangle. If the shorter side of the original rectangle is 2, what is the area of the smaller rectangle?

a) $4\sqrt{2}$ b) $2\sqrt{2}$

c) $\sqrt{2}$ d) None of the above

19. If $\frac{a}{b+c}+\frac{b}{c+a}+\frac{c}{a+b}=r$,
where a, b, c>0 then the minimum value of r is:

a) 0.5 b) 1

c) 1.5 d) 2

20. ABCD is a quadrilateral. The diagonals of ABCD intersect at a point P. The area of the triangles APD and BPC are 27 and 12 sq. units respectively. If the area of the triangles APB and CPD are equal, then the area of triangle APB is:

a) 21 sq. units b) 18 sq. units

c) 16 sq. units d) 15 sq. units

SECTION C

ACHIEVER'S LEVEL

21. There are 40 passengers in a bus, some with Rs. 3 tickets and the remaining with Rs. 10 tickets. The total collection from these passengers is Rs. 295. How many passengers have tickets worth Rs. 3?

a) 23 b) 19

c) 15 d) 11

22. The population of a city is 155625, for every 1000 men, there are 1075 women. If 40% of men and 20% of women are literate, then what is the percentage of literate people in the city?

a) 30.56% b) 32.24%

c) 32% d) 29.64%

23. The number (10^n-1) is divisible 11 if:

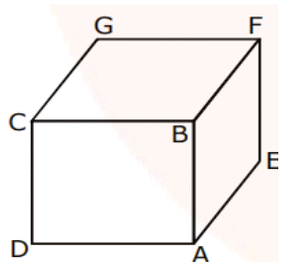
a) If n is a natural number

b) For odd values of n

c) For even values of n

d) If n is a multiple of 11

24. If the lengths of diagonals DF, AG and CE of the cube shown in the adjoining figure are equal to the three sides of a triangle, then the radius of the circle circumscribing that triangle will be



a) Equal to the side of the cube

b) $\sqrt{3}$ times the side of the cube

c) $\frac{1}{\sqrt{3}}$ times the side of the cube

d) $\frac{1}{2}$ times the side of the cube.

25. The value of $(27\times2744)^{1/3}$ is

a) 52 b) 42

c) 22 d) 32

26. If $3^{x+y}=81$ and $81^{x-y}=3^8$, then find x and y.

a) 3,1 b) 1,3

c) -1,3 d) -1,-3

27. Rs. 13500 are to be distributed among Salma, Kiran and Jennifer in such a way that Salma gets Rs. 1000 more than Kiran and Jennifer gets Rs. 500 more than Kiran. Find the amount of money received by Jennifer.

a) Rs. 4900 b) Rs. 5600

c) Rs. 4500 d) Rs. 5700

28. The mean weight of 120 students in a class is 56kg. If the mean weight of boys and that of the girls in the class are 60kg and 50kg, respectively, then the number of boys in the class are

a) 72 b) 38

c) 64 d) 57

29. Two regular polygons are such that the ratio between their number of sides is 1:2 and that between their interior angles is 3:4. Find number of sides of each polygon.

a) 7 and 14 b) 5 and 15

c) 5 and 10 c) 9 and 12

30. Find the value of:

$$\frac{(x^2-y^2)^3+(y^2-z^2)^3+(z^2-x^2)^3}{(x-y)^3+(y-z)^3+(z-x)^3}$$

a) (x+y)(y+z)(z+x)

b) -(x+y)(y+z)(z+x)

c) 0

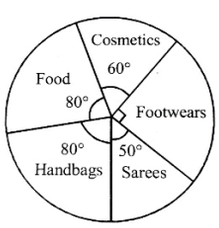
d) 1

31. A circular tent is cylindrical to a height of 3m and conical above it. If its diameter is 105m and the slant height of the conical portion is 53m, then the length of the canvas 5m wide required to make the tent is:

a) 1947m b) 1500m

c) 1497m d) 1600m

32. Riya spends Rs. 10800 in a month. The given pie chart shows the amount of money spent by Riya on various items. Study the pie chart carefully and answer the following questions.

HIEVER'S 

SECTION

(i) What fraction of money does Riya spend on saree?

(ii) How much less does she spend on handbags than on foot wears?

(iii) What percent of money is spent on food?

	(I)	(ii)	(iii)
a)	$\frac{5}{39}$	Rs. 300	$21\frac{1}{9}\%$
b)	$\frac{1}{35}$	Rs. 400	$22\frac{1}{9}\%$
c)	$\frac{5}{36}$	Rs. 300	$22\frac{2}{9}\%$
d)	$\frac{5}{36}$	Rs. 400	22%

33. A person standing on a railway platform noticed that a train took 21 seconds to completely pass through the platform which was 84m long and it took 9s to pass him. Find the speed of the train.

a) 25.2 kmph b) 32.4 kmph

c) 50.4 kmph d) 75.6 kmph

34. Solve the equation: $\frac{x}{5}+11=\frac{1}{15}$

a) $-\frac{164}{3}$ b) $\frac{164}{3}$

c) $\frac{162}{3}$ d) $-\frac{162}{3}$

35. Umesh tossed a coin three times. What is the probability that Umesh gets more heads than tails?

a) 0.5 b) 0.125

c) 0.375 d) None of these

36. If $\sqrt[3]{3\left(\sqrt[3]{x}-\frac{1}{\sqrt[3]{x}}\right)}=2$, then $\sqrt[3]{x}+\frac{1}{\sqrt[3]{x}}$ is

a) $\frac{10}{3}$ b) $\frac{1}{3}$

c) $\frac{1}{5}$ d) $\frac{3}{5}$

37. Which of the following is a linear equation in one variable?

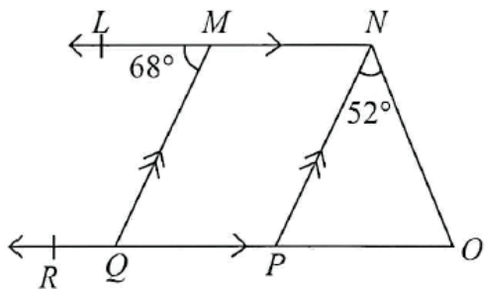
a) $(3x-1)^2=9x^2+4x-4$

b) $(9x-2)^2=-5x^2+5x+5$

c) $2x^2=3x-2$

d) None of these

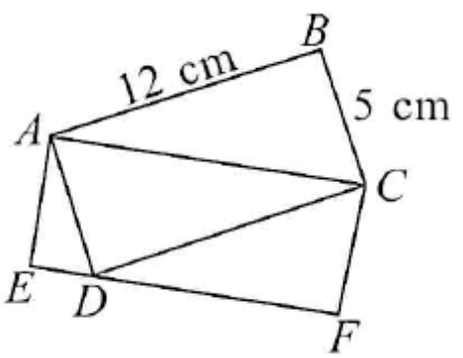
38. In the given figure (not drawn to scale), if "LN" ∥ "RO" and "QM" ∥ "PN" , the find the value of ∠"PON" .



a) 80° b) 90°

c) 60° d) 45°

39. ABCD is a rectangle of dimensions 12cm and 5cm. AEFC is a rectangle drawn in such a way that the diagonal AC of the first rectangle is one of its sides and side opposite to it is touching the first rectangle at D. What is the ratio of the area of rectangle ABCD to that of rectangle AEFC?



a) 3:1 b) 2:3

c) 1:1 d) 5:4

40. If the ratio of the ages (in years) of A and B, 5 years ago was 5:7, then which of the following can be the sum of their ages 5 years from now?

a) 90 b) 92

c) 98 d) 87