INTERNATIONAL MATHEMATICS OLYMPIAD 2012

Class VIII

Questions : 50 Time: 60 Minutes

There are 3 sections, 20 questions in Section-1, 20 questions in Section-2, 10 questions in Section-3

SET A

Section-1 - Logical Reasoning

1. Latika delivers bottled water to stores in Delhi. She delivers to MTC's Bookstore every 6th day and to Sammy's Bookstore every 8th day. On Thursday the 4th, she will deliver water to both of these stores. How many days after that will she deliver to both stores on the same day again?

(A) 17 (B) 16

(C) 18 (D) 16

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

2. Find out the correct letter pair from the options, to denote the same relationship among the group of letters as established between the sets given below.

RT : WZ ::

(A) AC : RU (B) AD : PW (C) PR : LM (D) TU : WX

3. If 'FRIHH' stands for 'COFFEE', how will you write 'NOODLES'?

(A) RSSHPW (B) PQQFNSU (C) QRRGOHV (D) RSSHPV

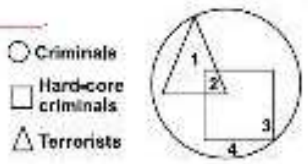
4. Terrorists who are not hard-core criminals are represented by _____.

(A) 2

(B) 3

(C) 4

(D) 1

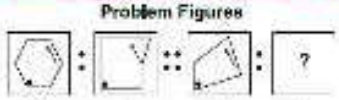


5. A tourist drives 10 km towards east and turns to the right hand and drives 3 km. Then he drives towards west (turning to his right) 3 km. He then turns to his left and drives 2 km. Finally he turns to his right and travels 7 km. How far is he from his starting point and in which direction would he be?

(A) 10 km. East (B) 5 km. South (C) 8 km. West (D) 5 km. West

6. The relationship in the first set (1 & 2) of Problem Figures is given. Based on the same relationship, find the suitable figure from answer figures to fit in the blank space of second set (3 & 4).

Problem Figures



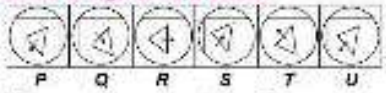
(A) 

(B) 

(C) 

(D) 

7. Find the odd one amongst the set of figures of a series.



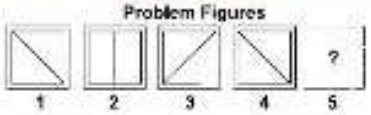
(A) Q (B) R (C) T (D) U

8. Find a figure from the options in which Fig. (X) is embedded as its part.

9. Select the figure from the options which completes the Fig.(X)

10. Select the figure from the options which should complete the series formed by Problem Figures 1, 2, 3 and 4.

Problem Figures



(A) (B) (C) (D)

11. The Sharmas have three children Sunita, Sanjay and Sheela. Sunita is married to Sonil Mahajan and they have a son Shaban. Sheela marries Sanjay Bhandari and Vinit and Lily are their children. Sanjay (Sunita's brother) is younger to Sunita but elder to Sheela. What is the surname of Shaban ?

(A) Bhandari (B) Sharma (C) Mahajan (D) None of these

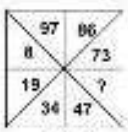
12. Study the following letter-number arrangement and answer the question given below:

B 8 4 C R M 9 P D K W F A 2 E J 7 X U Q H L T Y 6 G S

If every alternate letter/number is dropped in the above arrangement beginning with dropping '4' as first number to be dropped, which of the following will be third to the right of the fifth letter/number from left end?

(A) W (B) 2 (C) 7 (D) A

13. Find the missing number in Fig.(X).



(A) 56
(B) 58
(C) 60
(D) 62

14. If '>' denotes '+', '<' denotes '−', '=' denotes '÷', '^' denotes '×', '−' denotes '=', '×' denotes '>', and '÷' denotes '<', then which of the following options is correct?

(A) 13 > 7 < 6 + 2 − 3 ^ 4
(B) 28 + 4 ^ 2 − 6 ^ 4 + 2
(C) 9 > 5 > 4 − 18 − 9 > 16
(D) 9 < 3 < 2 > 1 × 8 ^ 2

15. The underlined letters indicate the end of the first word and beginning of second word. Choose the correct option.

E X | | A C L E

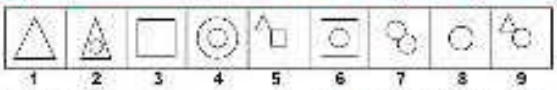
(A) PCRT (B) TANT (C) TDNT (D) ENCE

16. Which of the following options shows the mirror image of Fig.(X), if mirror is placed vertically left.

(A) 
(B) 
(C) 
(D) 


Fig.(X)

17. Group the given figures into three appropriate classes using each figure only once.



(A) 1, 7, 9; 2, 5, 6; 1, 3, 6
(B) 1, 3, 6; 2, 4, 6; 5, 7, 9
(C) 1, 4, 6; 2, 3, 7; 5, 8, 9
(D) 3, 5, 4; 1, 6, 9; 2, 7, 8

18. Find the odd one out in the following anagrams.

(A) P E N D R (B) D R O I A (C) I S P O (D) G N D R E A

19. How many such 3's are there in the following number sequence which are immediately preceded by an odd number and immediately followed by an even number?

5 3 8 9 4 3 7 2 3 8 1 3 8 4 2 3 5 7 3 4 2 3 6

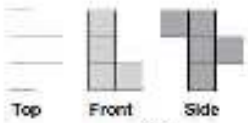
(A) One (B) Two (C) Three (D) Four

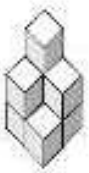
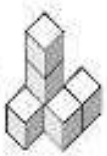
20. There are five pens 1, 2, 3, 4 and 5 of different colours, viz. Blue, Black, Maroon, Green and Red. Pen number 3 is of Black colour and Pen number 5 is of Green colour. Which of the following pen is of Red colour?

(A) Number 1 (B) Number 2 (C) Number 4 (D) Data inadequate

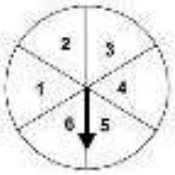
Section-2 – Mathematical Reasoning

21. The adjoining figure shows 3 different views of a three-dimensional figure constructed from cubes. Which could be the correct option ?



(A) 
(B) 
(C) 
(D) 

22. A spinner consists of six equal regions as shown. If Mohit spins the spinner once, what is the probability that the arrow will land on a region numbered less than or equal to 2 ?



(A) $\frac{1}{2}$ (B) $\frac{1}{3}$

(C) $\frac{1}{6}$ (D) $\frac{2}{3}$

23. Which of the following expressions is true ?

(A) $0.88 > \frac{7}{8}$ (B) $6\% < 0.06$ (C) $\frac{7}{9} < 8.0 \times 10^{-3}$ (D) $8.0 \times 10^{-1} > 6\%$

24. Which of the following describes a square root of 41 ?

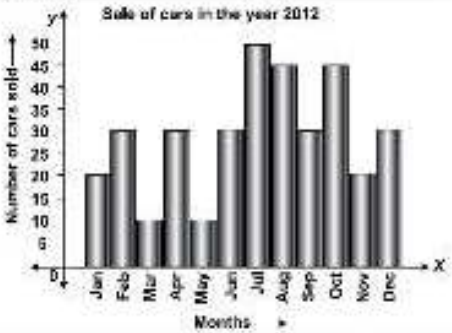
(A) Between 5 and 6 (B) Between 6 and 7

(C) Between 20 and 21 (D) Between 40 and 42

25. If $3^{x-1} + 3^{x+1} = 90$, then x is equal to

(A) 1 (B) 3 (C) 2 (D) 0

26. How many cars were sold in the first quarter of the year ?



(A) 60

(B) 90

(C) 50

(D) 100

27. A merchant marks his goods at ₹ 300 and allows a discount of 25 %. If he still gains 12.5 %, then the cost price of article is

(A) ₹ 220 (B) ₹ 200 (C) ₹ 240 (D) ₹ 260

28. Consider the following statements.

If a money is loaned at simple interest then the :

(i) money gets doubled in 5 years if the rate of interest is $16\frac{2}{3}$ %.

(ii) money gets doubled in 5 years if the rate of interest is 20 %.

(iii) money becomes four times in 10 years if it gets doubled in 5 years.

Of these statements :

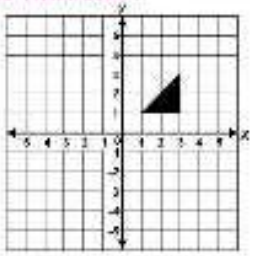
(A) (i) and (ii) are correct (B) (ii) alone is correct

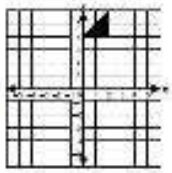
(C) (i) alone is correct (D) None of these

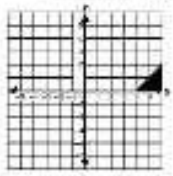
29. Evaluate $(326541829)^2 - 326541833 \times 326541825$.

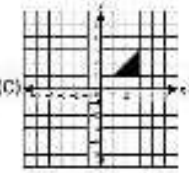
(A) 4 (B) 326541019 (C) 32651030 (D) 16

30. The figure shows a triangle on a coordinate plane. Which of the following shows the triangle translated 3 units to the right and 1 unit down?



(A) 

(B) 

(C) 

(D) 

31. Find the measure of largest angle of a quadrilateral if the measures of its interior angles are in the ratio of 3 : 4 : 5 : 6.

(A) 60° (B) 120° (C) 80° (D) Can't be determined

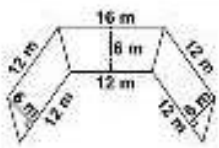
32. Solve for x : $x - \left| 2x - \frac{5x - 1}{3} \right| = \frac{x}{3} - \frac{1}{2}$

(A) $\frac{3}{2}$ (B) -31 (C) -20 (D) $-\frac{1}{2}$

33. How many numbers are there between 200 and 800 which are divisible by both 5 and 7?

(A) 36 (B) 16 (C) 17 (D) Can't be determined

34. Find the area of the given figure.



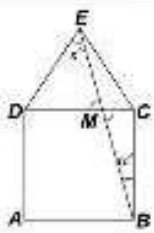
(A) 178 m²

(B) 228 m²

(C) 328 m²

(D) 678 m²

35. In the given diagram, equilateral triangle EDC surmounts square ABCD. Find ∠BED represented by x, where $EBC = \theta°$.



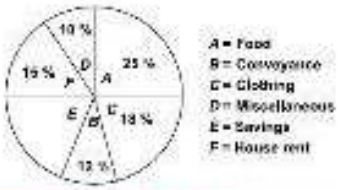
(A) 45°

(B) 60°

(C) 30°

(D) None of these

DIRECTION (36 & 37) : The Pie graph depicts the budget of a family 'X'. The total monthly income of the family is ₹ 3080.



36. How many degrees should be there in the central angle of the sector for miscellaneous expenses?
(A) 60 degrees (B) 55 degrees
(C) 46 degrees (D) 36 degrees

37. How much total expenses are incurred on food, clothing and conveyance every month ?
(A) ₹ 1794 (B) ₹ 1684 (C) ₹ 1884 (D) ₹ 1694

38. The largest four-digit number which is a perfect cube, is
(A) 8000 (B) 9261 (C) 9999 (D) None of these

39. If $x : y = 5 : 2$, then $(8x - 9y) : (8x + 2y)$ is
(A) 22 : 29 (B) 26 : 61 (C) 29 : 22 (D) 61 : 26

40. Closure property for rational numbers is satisfied in case of _____.
(A) Addition (B) Subtraction (C) Multiplication (D) All of these

Section-3 – Everyday Mathematics

41. For a journey the cost of a child ticket is 1/3rd of the cost of an adult ticket. If the cost of the tickets for 4 adults and 5 children is ₹ 85, the cost of a child ticket is _____.
(A) ₹ 5 (B) ₹ 6 (C) ₹ 10 (D) ₹ 15

42. The ratio of present ages of Rahul and Deepesh is 2 : 5. 10 years later this ratio becomes 5 : 7. What is the present age of Deepesh ?
(A) 20 years (B) 50 years (C) 25 years (D) 40 years

43. A person wants to reduce the trade tax so he calculates his profit on the sale price instead of on the cost price. In this way by selling an article for ₹ 280 he calculates his profit as $14\frac{2}{7}$ %. What is the actual profit percentage?
(A) 20 % (B) 16.66 % (C) 25 % (D) None of these

44. A rectangular tank 25 cm long and 20 cm wide contains water to a depth of 5 cm. A metal cube of side 10 cm is placed in the tank so that one face of the cube rests on the bottom of the tank. Find how many litres of water must be poured into the tank so as to just cover the cube ?
(A) 1 l (B) 1.5 l (C) 2 l (D) 2.5 l

45. In the morning batch at 'a school' we have observed that when five students took seat on each bench, 4 students remained unseated. But when eleven students took seat per bench, 4 benches remained vacant. The number of students in the morning batch were?
(A) 55 (B) 48 (C) 26 (D) 44

46. On the April 1, 2017 Megha's salary increased from ₹ 10,000 to ₹ 16,000. Simultaneously the rate of income tax decreased by 37.5%. So the amount of income tax paid by Megha remains constant. what is the amount of income tax paid by her?
(A) ₹ 3000 (B) ₹ 6000 (C) ₹ 1600 (D) Can't be determined

47. Mr. Gupta drives at a speed of 60 km/hr for 6 hours from Chandigarh to Delhi. Mr. Verma drives his car at an average speed of 45 km/hr for the same journey. How much time does Mr. Verma take to complete the journey?

(A) 7 hrs (B) 8 hrs (C) 9 hrs (D) 11 hrs

48. The volume of a cylinder is 48.125 cm^3, which is formed by rolling a rectangular paper sheet along the length of the paper. If a cuboidal box (without any lid i.e., open at the top) is made from the same sheet of paper by cutting out the square of side 0.5 cm from each of the four corners of the paper sheet, then what is the volume of this box?

(A) 20 cm^3 (B) 38 cm^3 (C) 19 cm^3 (D) 28 cm^3

49. Mrs. Priya earns 18000 per month. She spends $\frac{7}{12}$ on household items and $\frac{1}{11}$ on rest of the things. The amount she saves is _____.

(A) ₹ 7120 (B) ₹ 5250 (C) ₹ 5520 (D) ₹ 6562.5

50. Nita walks from her house 160 metres north and from there 630 metres west to visit her friend. While coming back, she walked diagonally from her friend's house, back to her home. What distance did she walk while returning ?

(A) 730 m (B) 800 m (C) 1250 m (D) 650 m