



Roll No.							
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A

- Please check that this questionnaire contains 11 printed pages.
- Code A, B or C given on the right hand top corner of the questionnaire should be written on the answer sheet in the space provided.
- Please check that this questionnaire contains 60 questions.

29th ARYABHATTA INTER-SCHOOL MATHEMATICS COMPETITION - 2012

CLASS - VIII

Time Allowed: 2 Hours

Max. Marks: 100

GENERAL INSTRUCTIONS:

1. Do not write your name on the questionnaire.
 2. Write your roll no. on each page of the questionnaire and the Answer Sheet in the space provided.
 3. All the questions are compulsory.
 4. Read questions carefully; think twice before you write the answer. **No overwriting or cutting is allowed on the Answer Sheet.** Another copy of the questionnaire or answer sheet will not be provided.
 5. Do your rough work in the space provided in the questionnaire.
 6. The questionnaire contains four sections. Section A contains 10 questions on Logical Reasoning of 1mark each, Section B contains 20 Multiple Choice Questions of 1 mark each, Section C contains 20 Free Response Type Questions of 2 marks each and Section D contains 10 Free Response Type Questions of 3 marks each.
 7. No working or descriptive answers of any question is to be given. Only the Answers are to be written on the Separate Answer sheet provided to you.
 8. Use Blue or Black pens to write the answer on the Answer Sheet.
 9. Answers should be clearly written in the space provided on the Answer sheet.
 10. Use of calculator is not allowed.
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SECTION -A

Rough Work

Write the correct option in the Answer Sheet.

1. Find the next number in the series:

14, 28, 20, 40, 32, 64, . . .

- a) 52
- b) 56
- c) 96
- d) 128

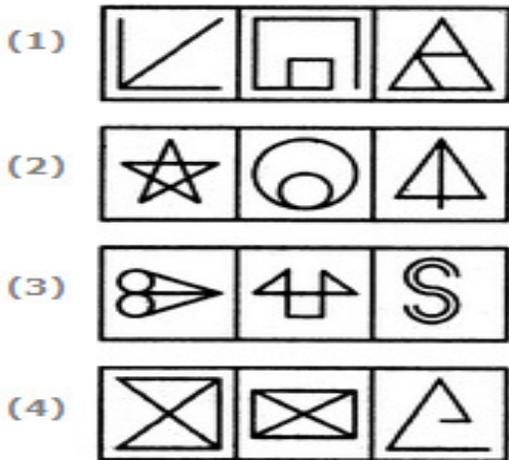
2. Choose the alternative which closely resembles the mirror image of the given combination.

ANS43Q12

- (1) AN24E01S (2) S10E42NA
 (3) 2NAE40S1 (4) 1S0E4AN2

- a) 1
- b) 2
- c) 3
- d) 4

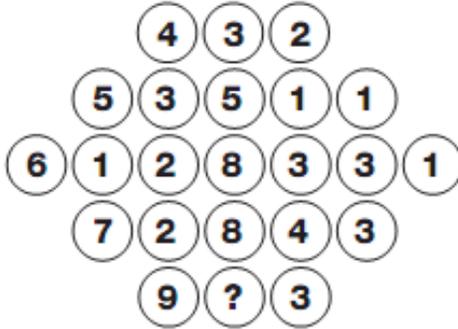
3. Choose the set of figures which follows the rule: Any figure can be traced by a single unbroken line without retracting.



- a) 1
- b) 2
- c) 3
- d) 4

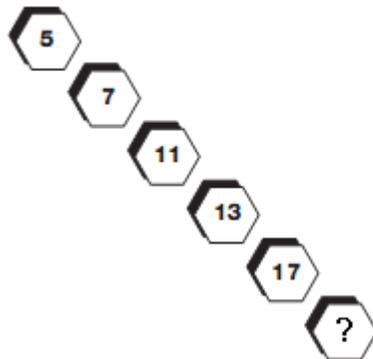
Rough Work

4. What number comes inside the circle?



- a) 5
 - b) 6
 - c) 8
 - d) 12
5. Peter went 20m to the east then he turned left and after walking 15m turned right and went 25m, and then turned right and went 15m. How far Peter was from the starting point?
- a) 40m
 - b) 30m
 - c) 45m
 - d) 50m

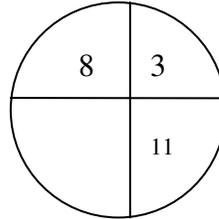
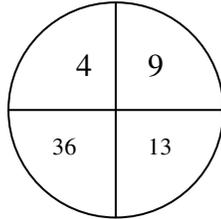
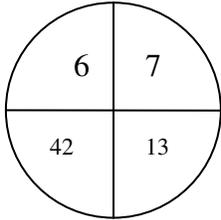
6. Which number completes the puzzle?



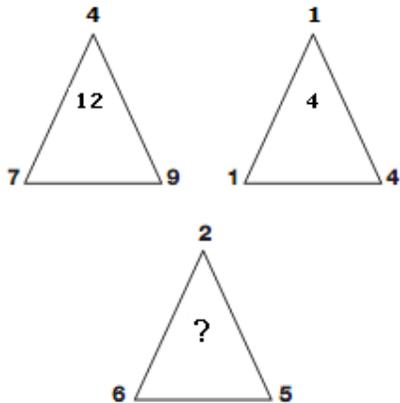
- a) 21
- b) 30
- c) 19
- d) 23

Rough Work

7. The figures given below are divided into certain parts. Each part bears a number and one part is blank. Numbers follow a certain pattern of rule. You are required to analyse the given figures and then fill in the blank.



- a) 33
 - b) 88
 - c) 14
 - d) 24
8. Five books are lying in a pile. E is lying on A and C is lying under B. A is lying above B and D is lying under C. Which book is lying at the bottom?
- a) A
 - b) B
 - c) C
 - d) D
9. Which number replaces the question mark?



- a) 8
- b) 11
- c) 7
- d) 9

Rough Work

10. The figure given below is divided into certain parts. Each part bears a number and one part is blank. Numbers follow a certain pattern of rule. You are required to analyse the given figures and find the missing number.

90	85	40	35
36	31	49	44
78	73	80	75
72	67	65	

- a) 60
- b) 62
- c) 70
- d) 77

SECTION - B

Write the correct option in the Answer Sheet.

11. The H.C.F. of two numbers is 23 and the other two factors of their L.C.M. are 13 and 14. The larger of the two numbers is:
- a) 276
 - b) 299
 - c) 322
 - d) 345
12. Two circles both of radii 6 cm each have exactly one point in common. If A is a point on one circle and B is a point on the other circle, what is the maximum possible length (in cm) for the line segment AB ?
- a) 12
 - b) 18
 - c) 24
 - d) 9
13. It was Sunday on Jan 1, 2006. What was the day of the week on Jan 1, 2010?
- a) Sunday
 - b) Saturday
 - c) Friday
 - d) Wednesday

Rough Work

14. The salaries A, B, C are in the ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be new ratio of their salaries?
- a) 3 : 3 : 10
 - b) 10 : 11 : 20
 - c) 23 : 33 : 60
 - d) Cannot be determined
15. Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?
- a) 9
 - b) 10
 - c) 12
 - d) 20
16. Three number are in the ratio of 3 : 4 : 5 and their L.C.M. is 2400. Their H.C.F. is:
- a) 40
 - b) 80
 - c) 120
 - d) 200
17. If there are two examination rooms A and B. If 10 students are sent from A to B, then the number of students in each room is the same. If 20 candidates are sent from B to A, then the number of students in A is double the number of students in B. The number of students in room A is:
- a) 20
 - b) 80
 - c) 100
 - d) 200
18. A fires 5 shots to B's 3 but A kills only once in 3 shots while B kills once in 2 shots. When B has missed 27 times, A has killed:
- a) 30 birds
 - b) 60 birds
 - c) 72 birds
 - d) 90 birds

Rough Work

19. In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?
- a) 6.25
 - b) 6.5
 - c) 6.75
 - d) 7
20. The sum of ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child?
- a) 4 years
 - b) 8 years
 - c) 10 years
 - d) 12 years
21. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3 . The ratio of its diameter to its height is
- a) 3 : 7
 - b) 7 : 3
 - c) 6 : 7
 - d) 7 : 6
22. $4^{61} + 4^{62} + 4^{63} + 4^{64} + 4^{65}$ is divisible by
- a) 5
 - b) 11
 - c) 17
 - d) None of the above
23. The last digit of the expansion $2^{12n} - 6^{4n}$ is
- a) 2
 - b) 4
 - c) 0
 - d) None of the above
24. $999\ 999 \times 222\ 222 + 333\ 333 \times 333\ 334 =$
- a) 333 333 000 000
 - b) 444 444 333 000
 - c) 444 444 000 000
 - d) 333 333 444 000

Rough Work

25. M being the mean of $x_1, x_2, x_3, x_4, x_5, x_6$, find the value of :
 $(x_1-M) + (x_2-M) + (x_3-M) + (x_4-M) + (x_5-M) + (x_6-M)$
 a) 1
 b) 0
 c) $6M$
 d) $M/6$
26. A basket ball is just packed in a cube of side 20cm, then the surface area of the ball is :
 a) 120 cm^2
 b) 2400 cm^2
 c) $400\pi \text{ cm}^2$
 d) 1256 cm^2
27. The class marks of a frequency distribution are given as follows: 15, 20, 25,.... The class corresponding to the class mark 20 is :
 a) 12.5-17.5
 b) 17.5-22.5
 c) 18.5-22.5
 d) 19.5-20.5
28. Diagonal of a cube is $\sqrt{6}$ cm . Then its lateral surface area is
 a) $6\sqrt{6} \text{ cm}^2$
 b) 36 cm^2
 c) 12 cm^2
 d) 8 cm^2
29. Let m be the mid-point and l be the upper limit of a class in a continuous frequency distribution. The lower limit of the class is :
 a) $2m+l$
 b) $2m-l$
 c) $m-l$
 d) $m+2l$
30. What decimal of an hour is a second?
 a) $0.0002\bar{9}$
 b) $0.0002\bar{28}$
 c) $0.0002\bar{7}$
 d) $0.0002\bar{6}$

SECTION - C

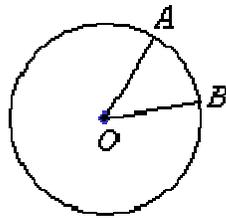
Rough Work

Write only the answers of the following questions in the Answer Sheet.

31. Evaluate:

$$\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{b-c}+x^{a-c}}.$$

32. In the figure above, if $\angle AOB = 40^\circ$ and the length of arc AB is 4π , what is the area of the sector AOB ?



33. How many diagonals do a 63 sided convex polygon have?

34. What is the measure of the radius of the circle that circumscribes a triangle whose sides measure 9, 40 and 41?

35. If $\sqrt{5} = 2.236$, then find the value of $\frac{\sqrt{5}}{2} - \frac{10}{\sqrt{5}} + \sqrt{125}$.

36. A towel, when bleached, was found to have lost 20% of its length and 10% of its breadth. Find the percentage of decrease in area.

37. A large cube is formed from the material obtained by melting three smaller cubes of sides 3, 4 and 5 cm. What is the ratio of the total surface areas of the smaller cubes to that of the large cube?

38. In what ratio must a grocer mix two varieties of pulses costing Rs. 15 and Rs. 20 per kg respectively so as to get a mixture worth Rs. 16.50 per kg?

39. 3 pumps, working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day?

Rough Work

40. Find the least perfect square which is divisible by 21, 36 and 66.
41. A man takes 6 hrs 15 minutes to walk a certain distance and riding back. He could walk both ways in 7 hrs 45 minutes. In how much time can he ride both ways?
42. A train 108 m long moving at a speed of 50 km/hr crosses a train 112 m long coming from opposite direction in 6 seconds. Find the speed of the second train.
43. OABC is a rhombus whose three vertices A, B and C lie on a circle with centre O. If the radius of circle is 10 cm, find the area of rhombus.
44. At what time between 8 and 9 will the hands of the clock be in the same straight line?
45. A printer numbers the pages of the book starting from 1 and uses 3189 digits in all. How many pages does the book have?
46. If $x + y = 2z$, Find the value of $\frac{x}{x-z} + \frac{z}{y-z}$.
47. Factorize: $4a^2 + 9b^2 - 8a - 12b + 12ab$
48. The sum of the digits of a two digit number is multiplied by 8. The result is 8 more than the 2-digit number. Find the number.
49. The mean of 1, 7, 5, 3, 4 and 4 is m. The observations 3, 2, 4, 2, 3, 3 and p have mean (m-1) and median q. Find p and q.
50. If $a + b + c = 0$, then find the value of $\frac{a^2 + b^2 + c^2}{c^2 - ab}$

SECTION -D

Write only the answers of the following questions in the Answer Sheet.

51. A sector of a circle of radius 12 cm has the angle 120° . It is rolled up so that two bounded radii are joined together to form a cone. Find the volume of the cone.

Rough Work

52. The sum of two numbers is 18 and the sum of their reciprocals is $\frac{1}{4}$. Find the greater number.
53. If the weight of a spherical shell is $\frac{7}{8}$ th of what it would be if it were a solid shell, find the ratio of the inner and outer radii of the shell.
54. A can contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 litres of mixture are drawn off and the can is filled with B, the ratio of A and B becomes 7 : 9. How many litres of liquid A was contained by the can initially?
55. The area of a square field is 24200 sq m. How long will a lady take to cross the field diagonally at the rate of 6.6 km/hr?
56. What is the percentage discount that a merchant can offer on her Marked Price so that she ends up selling at no profit or loss, if she had initially marked her goods up by 50%?
57. The compound interest on a certain sum for 2 years at 10% per annum is Rs. 525. Find the simple interest on the same sum for double the time at half the rate percent per annum .
58. A boatman goes 2 km against the current of the stream in 1 hour and goes 1 km along the current in 10 minutes. How long will it take to go 5 km in still water?
59. In $\triangle ABC$, D is the midpoint of BC. If $\angle ADB = 45^\circ$, $\angle ACB = 30^\circ$, determine $\angle BAD$.
60. In $\triangle ABC$, $AB = AC$. P and Q are points on AC and AB respectively such that $CB = BP = PQ = QA$. Find the measure of $\angle AQP$.