SAMPLE PAPER

Aakash
NATIONAL
YOUNG TALENT SEARCH EXAM
2014

Science, Mathematics & Mental Ability
(for VII Studying Students)

Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Pvt. Ltd.)

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1. Heat rays from the sun reach us by means of
   (1) Conduction  (2) Convection
   (3) Radiation  (4) Insulation

2. Buildings made of hollow bricks are not affected much by heat and cold outside because, the hollow bricks
   (1) Are quite thick
   (2) Have trapped layers of air, which is a poor conductor of heat
   (3) Are painted light so as to reflect the heat
   (4) Absorb or radiate appropriate amount of heat

3. If the average speed of an object is the same as its actual speed, then it must be travelling
   (1) Along a straight line  (2) Along a curved path
   (3) With constant speed  (4) With variable speed

4. Shyam takes 15 minutes to reach his school. If he walks at a constant speed of 7 km/h, then how far is his school?
   (1) 1.75 km  (2) 2.5 km
   (3) 1.5 km  (4) 3 km

5. Land breeze blows
   (1) From the sea towards the land during night
   (2) From the land towards the sea during day
   (3) From the sea towards the land during night
   (4) From the land towards the sea during night

6. A simple pendulum completes 20 oscillations in 10 s. The time period of one oscillation is about
   (1) 0.5 s  (2) 0.75 s
   (3) 1.8 s  (4) 1.3 s

7. The distance-time graph of three cars A, B and C are as shown below.

Then
   (1) Car B is not moving
   (2) Car C moves faster than car B
   (3) Car A moves faster than car C
   (4) Car B moves faster than car C

8. Which of the following are used as safety devices in electric circuits?
   (1) CFL, filament
   (2) Cell, switch
   (3) Electric fuse, MCB
   (4) CFL, switch
9. Choose the circuit diagram that shows all the connections correctly, to make the bulb glow.

![Diagram 1](image1)

![Diagram 2](image2)

![Diagram 3](image3)

![Diagram 4](image4)

10. A boy dips his hand in water kept at three different temperatures as given.

![Water temperatures](image5)

He will feel the water kept in beaker

(1) B warm had he dipped his hand first in beaker A
(2) A warm had he dipped his hand first in beaker C
(3) A warm had he dipped his hand first in beaker B
(4) B warm had he dipped his hand first in beaker C

11. When an iron nail is placed in copper sulphate solution, the colour of the solution turns

(1) Blue to green
(2) Green to blue
(3) Blue to white
(4) White to green

12. Match the following:

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Calamine</td>
<td>(i) Magnesium hydroxide</td>
</tr>
<tr>
<td>b. Milk of magnesia</td>
<td>(ii) Calcium oxide</td>
</tr>
<tr>
<td>c. Quick lime</td>
<td>(iii) Calcium hydroxide</td>
</tr>
<tr>
<td>d. Slaked lime</td>
<td>(iv) Zinc carbonate</td>
</tr>
</tbody>
</table>

13. Which of the following oxides does not form acid when dissolved in water?

(1) Carbon dioxide (2) Calcium oxide
(3) Sulphur dioxide (4) Nitrogen dioxide

14. Which of the following processes is not a chemical change?

(1) Rusting (2) Crystallization
(3) Digestion (4) Neutralisation

15. Consider the steps involved in the given process:

**Step-I.** A magnesium ribbon is burnt in air.

**Step-II.** Formed residue is dissolved in water.

Now, choose the correct option.

(1) Step-I is physical change and Step-II is chemical change
(2) Step-II is physical change and Step-I is chemical change
(3) Both the steps are physical changes
(4) Both the steps are chemical changes

16. Phenolphthalein indicator, in the basic solution becomes

(1) Colourless (2) Pink
(3) Red (4) Blue

17. The colour of litmus in distilled water is

(1) Red (2) Blue
(3) Purple (4) Yellow
18. When carbon dioxide gas is passed in lime water it turns milky due to the formation of
(1) Calcium carbonate (2) Calcium
(3) Calcium oxide (4) Oxygen
19. Generally neutralisation reaction does not result in
(1) The formation of a salt
(2) The formation of water
(3) The evolution of heat
(4) The absorption of heat
20. Which of the following processes involves a chemical change?
(1) Boiling (2) Burning
(3) Melting (4) Freezing
21. Rumen is a part of the
(1) Stomach (2) Oesophagus
(3) Small intestine (4) Large intestine
22. Which of the following is an insectivoruous plant?
(1) Pitcher plant (2) Cuscuta
(3) Bryophyllum (4) Fern
23. Glucose \( \xrightarrow{\text{Presence of oxygen}} \) A + B + Energy
Identify A and B.
(1) A – Oxygen, B – Water
(2) A – Water, B – Alcohol
(3) A – Alcohol, B – Carbon dioxide
(4) A – Water, B – Carbon dioxide
24. Haemoglobin is present in
(1) Red blood cells (2) White blood cells
(3) Plasma (4) Platelets
25. Green pigment essential for photosynthesis is
(1) Starch (2) Chlorophyll
(3) Protein (4) Chloroplast
26. Refer the diagram and identify the part which temporarily stores urine.

\[ A \rightarrow B \rightarrow C \rightarrow D \]
(1) A (2) B
(3) C (4) D
27. The breakdown of starch starts from which of the following parts of our alimentary canal?
(1) Large intestine (2) Small intestine
(3) Stomach (4) Mouth
28. Amoeba captures food with the help of
(1) Villi (2) Pseudopodia
(3) Food vacuole (4) Cud
29. Which of the following is the respiratory organ of earthworm?
(1) Skin (2) Lungs
(3) Gills (4) Tracheae
30. Statement-1: The leaves of plants have tiny pores on it called stomata.
Statement-2 : Stomata help in the exchange of oxygen and carbon dioxide.
(1) Statement 1 is correct and statement 2 is incorrect
(2) Statement 1 is incorrect and statement 2 is correct
(3) Both the statements are correct
(4) Both the statements are incorrect
31. One angle is \( \frac{7}{2} \) times another angle. If the two angles are complementary, then their measures are

(1) 49° and 41°  (2) 40° and 140°  (3) 20° and 70°  (4) 135° and 45°

32. Which of the following statements is false?

(1) Every integer is a rational number
(2) Every natural number is an integer
(3) Every natural number is a whole number
(4) Every rational number is a fraction

33. Shyam is four times as old as Ram. After 7 years, Shyam's age will be thrice of Ram. Shyam's present age is

(1) 14 years  (2) 48 years  (3) 52 years  (4) 56 years

34. Of the three angles of a triangle, if one is thrice the smallest and the other is six times the smallest, then the measure of the largest angle is

(1) 108°  (2) 54°  (3) 18°  (4) 96°

35. \( 14 \frac{1}{2} \% \) of 18 is

(1) 2.16  (2) 2.61  (3) 2.53  (4) 2.41

36. Product of fractions \( \frac{4}{9} \) and \( \frac{7}{11} \) is

(1) \( \frac{4 \times 7}{9 + 11} \)  (2) \( \frac{4 + 7}{9 + 11} \)  (3) \( \frac{4 + 7}{9 \times 11} \)  (4) \( \frac{4 \times 7}{9 \times 11} \)

37. Out of the following statements, how many statements are true?

a. An exterior angle of a triangle is greater than each of its interior opposite angles
b. A triangle can have atmost 2 obtuse angles
c. Every equilateral triangle is an isosceles triangle

(1) 3  (2) 2  (3) 0  (4) 1

38. Which of the following rational numbers is in the standard form?

(1) \( \frac{1}{2} \)  (2) \( \frac{11}{209} \)  (3) \( \frac{255}{17} \)  (4) \( \frac{19}{344} \)

39. In the given figure, if \( AD \parallel BC \) and \( CG \) is a straight line, then the value of \( x \) is

(1) 55°  (2) 35°  (3) 25°  (4) 45°

40. Which of the following is the greatest?

(1) \( \frac{56}{0.040} \)  (2) \( \frac{0.560}{40} \)  (3) \( \frac{5.6}{0.040} \)  (4) \( \frac{5.6}{40} \)
41. If \(5(x - 2) - 2(2x - 7) = 10\), then the value of \(x\) is
   (1) 34  (2) 6  (3) 4  (4) -14

42. In an examination, 96% of the candidates passed and 128 failed. Number of candidates who appeared for the examination is
   (1) 3600  (2) 3200  (3) 2800  (4) 4000

43. If two angles of a triangle are 90º and 45º, then the triangle is
   (1) Equilateral  (2) Obtuse angled  (3) Scalene  (4) Isosceles right angled

44. The number that must be subtracted from \(\frac{4}{5}\) to get \(\frac{3}{7}\) is
   (1) \(-\frac{34}{35}\)  (2) \(-\frac{6}{35}\)  (3) \(\frac{34}{35}\)  (4) \(\frac{6}{35}\)

45. Which of the following is the solution of the equation \(0.03y + 0.04 = 0.028y + 1.016\)?
   (1) 38  (2) 488  (3) 528  (4) 268

46. If two sides of a triangle are 20 cm and 10 cm, then the length of the third side cannot be
   (1) 19 cm  (2) 18 cm  (3) 17 cm  (4) 10 cm

47. If 20% of \(x\) = 30% of \(y\), then \(x : (x - y)\) is
   (1) 1 : 3  (2) 3 : 1  (3) 2 : 3  (4) 3 : 2

48. If \((-43) \times 109 = a + (-487)\), then the value of \(a\) is
   (1) -4100  (2) -4200  (3) -4300  (4) -4400

49. Which of the following numbers lie between \(\frac{1}{5}\) and \(\frac{1}{2}\)?
   (1) 0.2  (2) 0.5  (3) 0.32  (4) 0.04

50. If Lata's salary is 20% more than Aasha's salary, then Aasha's salary is less than Lata's salary by
   (1) \(\frac{16}{3}\)%  (2) 20%
   (3) 25%  (4) \(\frac{16}{3}\)%

51. In the given figure, if \(l, m\) and \(n\) are straight lines, then the value of '\(x\)' is
   (1) 90º  (2) 105º  (3) 95º  (4) 85º
52. Which of the following equations cannot be solved in integers?
   (1) $2x + 3 = 9$
   (2) $3(x - 5) + 7 = 14$
   (3) $(7x + 5) + (x + 9) = 46$
   (4) $7x + 5 = 40$

53. The percent that represents the shaded region in the given figure is
   (1) 20%  (2) 30%  (3) 25%  (4) 35%

54. $\frac{30}{31} \left(\frac{1}{2} + \frac{1}{3} + \frac{1}{5}\right)$ is equal to
   (1) $\frac{1}{2}$  (2) $\left(\frac{30}{31}\right)^2$
   (3) $\frac{1}{30}$  (4) 1

55. In the given figure, if $m \parallel n$ and $l$ is a transversal, then $x + y$ is equal to
   (1) 180°  (2) 90°  (3) 135°  (4) 150°

56. If $x = \left\{ \frac{35}{7} \times \frac{2}{5} + \left(\frac{2}{9} \times -\frac{3}{8}\right) - \left(\frac{4}{8} \times -\frac{24}{2}\right) \right\}$, then the reciprocal of $x$ is
   (1) $\frac{12}{95}$  (2) $\frac{95}{12}$
   (3) $-\frac{47}{12}$  (4) $-\frac{12}{47}$

57. Which of the following is true?
   (1) $\frac{3}{5}$ of 7 is same as $\frac{3}{5} \times 7$
   (2) $-1$ is the only number which is its own reciprocal
   (3) The reciprocal of a proper fraction is an improper fraction
   (4) The reciprocal of $\frac{1}{2}$ is $-\frac{1}{2}$

58. Which of the following pair of angles are supplementary?
   (1) 58° and 32°
   (2) 67° and 113°
   (3) 64° and 36°
   (4) 36° and 140°

59. If the length of a rectangle is 24 cm and the diagonal is 25 cm long, then its perimeter is
   (1) 112 cm  (2) 146 cm  (3) 98 cm  (4) 62 cm

60. 0.32 mm = _______ km
   (1) 0.00000032  (2) 0.000032  (3) 0.00000032  (4) 0.00032
SECTION-C : MENTAL ABILITY

61. Find the missing number.

<table>
<thead>
<tr>
<th>10</th>
<th>5</th>
<th>2</th>
</tr>
</thead>
<tbody>
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<td>14</td>
</tr>
<tr>
<td>54</td>
<td>18</td>
<td>?</td>
</tr>
</tbody>
</table>

(1) 10 (2) 3 (3) 5 (4) 13

62. Find the missing number.

| 4 | 19 | ? |

(1) 68 (2) 97 (3) 76 (4) 79

Directions for Qs. 63 & 64 : If ‘p’ means ‘×’, ‘q’ means ‘–’, ‘r’ means ‘+’, ‘s’ means ‘÷’ then find the values of the following expressions.

63. 16 s 64 q 2 p 5 r 10

(1) 8 (2) \(\frac{3}{4}\) (3) 32 (4) 0.25

64. 120 s 3 r 25 p 3 q 70

(1) 1020 (2) 75 (3) 45 (4) 40

65. Find the number of squares in the figure given below.

(1) 15 (2) 14 (3) 13 (4) 16

66. Find the required number in the following series.

2, 3, 6, 11, 18, ?, 38

(1) 29 (2) 27 (3) 23 (4) 28

67. Find the mirror image of

(1) (2) (3) (4)

68. Find the mirror image of

PQRSTU

(1) \(\text{PQRSTU}\) (2) \(\text{UTSRQP}\) (3) \(\text{PQRSTU}\) (4) \(\text{UTSRQP}\)

Directions for Qs. 69 to 71 : A lies to the north of B as well as C. D is to the south of B but north of C. E is to the west of B and F is to the north-east of C and to the east of A. Note : A, B, C, D, E and F are six places respectively.

69. D lies to the north of

(1) B (2) F (3) E (4) C

Space for Rough Work
70. F lies to the north-east of
   (1) E  (2) B
   (3) D  (4) All of these

71. E lies to the ? of A.
   (1) South-east  (2) South-west
   (3) North-west  (4) West

72. Find the missing number in the following series
    2, 5, 11, 20, 32, ?
   (1) 49  (2) 47
   (3) 42  (4) 51

73. Find the number of triangles in the above given figure.
   (1) 11  (2) 13
   (3) 9   (4) 10

74. If 53 = 15 and 43 = 12, then 63 = ?
   (1) 10  (2) 50
   (3) 35  (4) 18

75. If 3 = 9 and 10 = 100, then 15 = ?
   (1) 150  (2) 225
   (3) 200  (4) 275

76. A, D, G, I, K, N, Q, S, 'a', 'b'.
    Find 'a' and 'b' in the above given letter series.
    (1) 'U' and 'W'  (2) 'U' and 'X'
    (3) 'V' and 'X'  (4) 'V' and 'Y'

77. Ram started travelling in north, he then took a right turn and travelled the whole day. At the end of the day he took a left turn and moved fast to reach his home. In which direction did he move finally to reach home?
   (1) Northeast  (2) North
   (3) Northwest  (4) South

78. In a conference, seven people shake hands with each other once. How many handshakes will there be altogether?
   (1) 14  (2) 20
   (3) 21  (4) 25

79. Find the water-image of

80. Find the missing figure in the following series.
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