Learn About the National Talent Search Tests

It is always best to know as much as possible about the test before you take it. The National Talent Search Examination will be conducted for students studying at class VIII level. The examination consists of two tests namely the Mental Ability Test (MAT) and the Scholastic Aptitude Test (SAT). Each test consists of 90 multiple choice type questions.

Each question has four alternatives marked 1,2,3 and 4. The candidate has to select one correct answer from the given alternatives and mark its number in the answer-sheet. Each correct answer carries one mark. Thus the total score of a candidate in a test is equal to the number of questions answered correctly by him/her.

To make the candidates acquainted with the questions in the above tests, some sample questions in each of the two tests are given below. These questions will give the candidate, a feel of the nature and level of the questions expected in the test. The answer for each question is provided at the end. The rationale has also been given for some questions, which will help you to understand the logic of the correct answer.

Mental Ability Test Items

This test is given to the candidates to judge their power of reasoning, ability to think, ability to judge, evaluate or discriminate, ability to visualize in the space, spatial orientation, etc. A variety of questions e.g. analogies, classification, series, pattern perception, hidden figures, coding-decoding, block assembly, problem solving etc. are used for this purpose. To acquaint the candidates with such questions, some examples are given below. The rationale to find the answer to each question is given at the end. The candidates are advised to try to solve these questions themselves first. Later on, they may look at the solutions to find their correct answer and the rationale.

Sample Questions for Mental Ability Test (MAT)

1-3. There is some relationship between the two terms (figures/letters) on the left side of the sign (::). The same relationship exists between the two terms on the right of the sign (::) of which one is missing. Find the missing one from the given four alternatives.

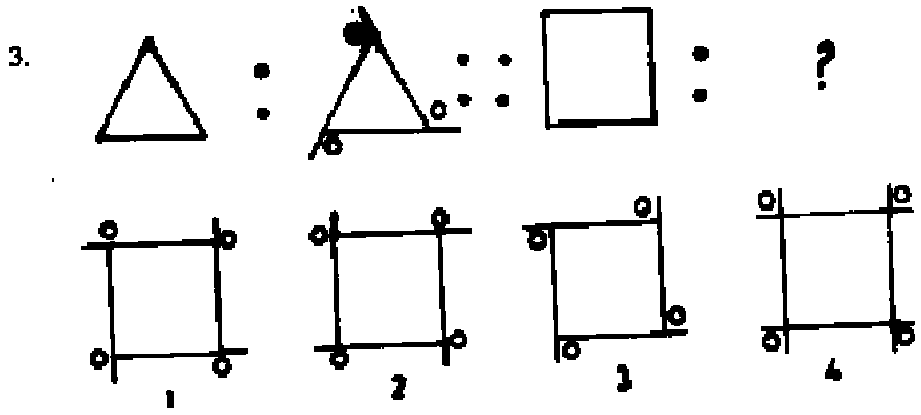
1. L L M O : M M N O :: A A B D : ?

   1. B B C E
   2. B B C D
   3. A A B D
   4. A B B C

2. 9 : 25 :: 49 : ?

   1. 36
   2. 81
   3. 64
   4. 100

3.



4 – 5 The capital letters in each of the following words are coded and written in small letters on the right side of each word, but the small letters do not appear in the same order as the letters in the word. Find out the codes for letters and answer the questions that follow.

K I N G	:	b d m e
R I N G	:	d e o b
I N K	:	e m b
I R K	:	o e m

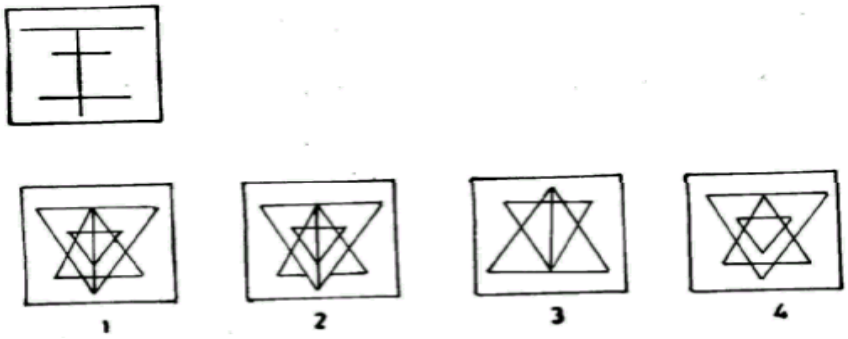
4. Which is the code for letter K?

   1. e
   2. m
   3. d
   4. b

5. What would be the code (in correct order) for the word K I N ?

   1. e m b
   2. m b e
   3. o m e
   4. m e b

6. In the following question the problem figure on the right is hidden in one of the four figures marked 1, 2, 3 and 4. Find the alternative, which the problem figure is hidden.



7.– 8 Study the following number line and answer the questions that follow .
7 5 9 5 2 3 5 9 4 8 5 9 5 4 5 9 3 5 5 9 5 3 5 9 4 5 2 5 3 5 6 5 9 .

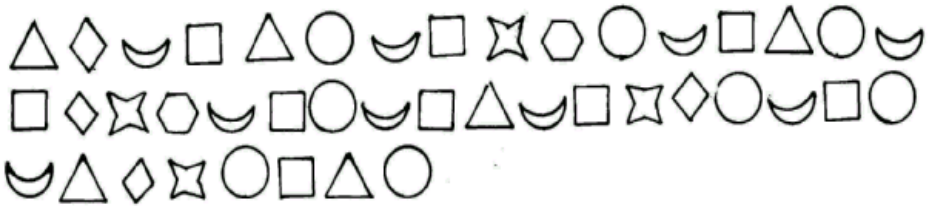
7. How many times is '5' is followed by '9'? But in such pairs, '3' should not come before '5'.

   1. 3
   2. 4
   3. 5
   4. 6

8. How many times do the two consecutive numbers (numbers one after the other) have a difference of 2?

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

9-10. Study the following patterns and answer the questions that follow.



9. How many times does the moon  come after a circle  and before a  ?

1. 6
2. 3
3. 4
4. 5

10. How many times does a triangle  come before a circle  and a square  before the triangle?

1. 3
2. 4
3. 2
4. 5

11. If ÷ means ×, × means − , + means × and − means ÷ , then

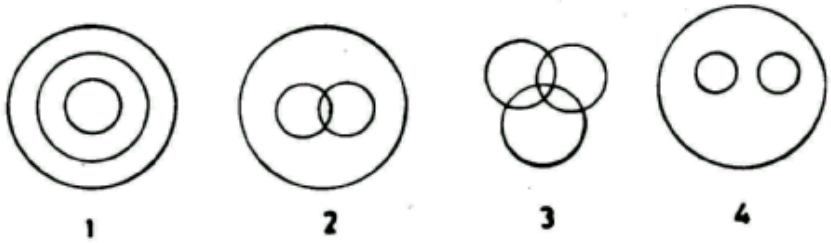
2 + 8 × 16 − 4 ÷ 2 = ?

1. 4
2. 8
3. 10
4. 12

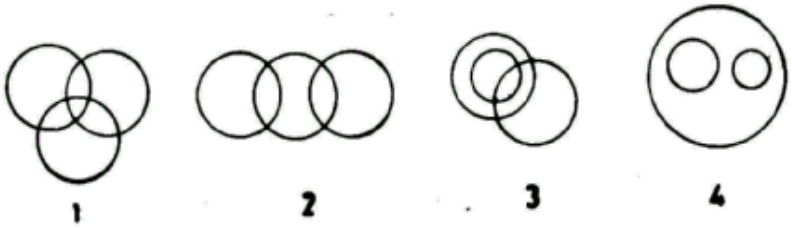
12. A boy started from his home. After walking for 5 km towards east, he turned to his right and walked for 8 km. Then he again turned to his right and walked for 10 km.. In which direction was he from his house?

1. West
2. South-West
3. North
4. North – West

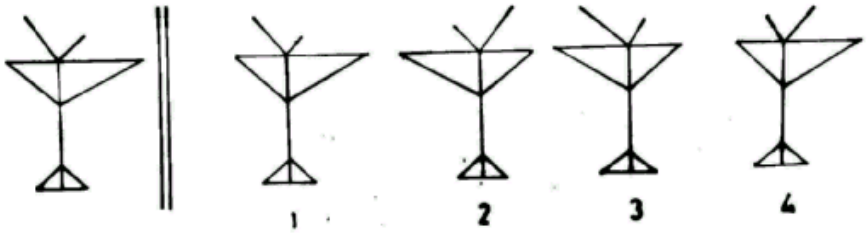
13. Which one of the four diagrams given below represents school, teachers and students?



14. Which one of the four diagrams given below represents educated persons, musicians and signers?



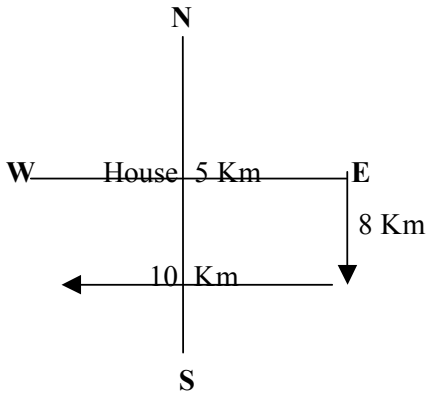
15. There is a figure to the left of the vertical parallel lines. Its mirror image is given as one of the four figures given to the right of these lines. Examine these figures carefully and find the one, which is the exact mirror image of the figure given to the left of the vertical line.



Solutions to MAT Questions

Question	Answer	Rationale
1.	2	In this question two sets of letters are given to the left of the sign **(::)**. In the first group the second set has MM corresponding to LL. M is the next letter to L in the alphabetical series. Similarly M in the first set is replaced by N (the next letter in the sequence). O remains same in both the sets. Using the above logic, AA shall be replaced by BB, B should be replaced by C and D remains the same. Therefore, the answer is BBCD given at alternative 2.
2.	2.	In the first group of numbers two numbers are given. The first number 9 is the square of 3, 25 is square of 5. Here these numbers are increasing by 2 i.e. 3+2 = 5. Similarly in the next group 49 is the square of 7, using the same logic; the next number should be the square of 9 (7+2). i.e. 81, given at alternative 2.
3.	3	The first figure is a triangle. In the next triangle the arms are extended. Small circles are placed above the arms anticlockwise. In the second set, the first figure is a square. If you extend its arms in the same manner and place the circles above the extended arms anticlockwise, the answer figure would be 3.
4.	2	You can see that in KING and RING, ING is common. Therefore, the three letters, which represent ING, should be 'b d e' which is also common in the given code. The left out letter in the word KING is K i.e. m in the given code. Similarly in RING the left out letter is R which is 'o' in the code. The rest of the code you can work out.

5.	4	To work out the Code for KIN you have to see the next two words i.e. INK and IRK. I and K are common in both the words. In the code, you can see that 'e' and 'm' are common. You know that 'm' represents K. So 'e' represents I. Now, you can see that 'b' represents N. Therefore KIN can be coded as 'm e b' which is at alternative 4.
6.	1	See the problem figure carefully, which has one vertical line and three horizontal parallel lines cutting the horizontal line at three places. Observe the distance of these lines too. Now observe the alternatives. In alternative 2, almost the same pattern is available, but the bottom horizontal line is broken. In alternative 3, the middle horizontal line is missing. In alternative 4, the vertical line is missing. Therefore, correct alternative is 1 where the full pattern is hidden.
7.	3	First observe and mark the pairs of 5 and 9. You will find 7 such pairs. Again observe that two pairs have 3 before 5. Therefore, you are left with 5 pairs of 5 and 9. So the correct alternative is 3.
8.	2	Let us find the two numbers, which have a difference of 2. We see that first two numbers '7' and '5' have the difference of 2, next 3 and 5 have the same difference, and again there are 3 and 5. Then there are 5, 3, and 5. Here 5 and 3 and 3 and 5 both have the difference of 2. A similar pair we find further again. Thus, there are 7 such pairs and the answer is 2.
9.	4	Using the same logic as given in questions 7 and 8 find the pattern as asked in questions 9 and 10.
10	1	

11.	2	In the given question replace division symbol (÷) with multiplication symbol (×), multiplication symbol (×) with minus symbol (-), plus (+) with multiplication (×) and minus (-) with division (÷). You will get this equation: $2 \times 8 - 16 \div 4 \times 2$ This can be worked out using normal rules. The value of the equation will be 8 which is placed at alternative 2.
12.	2	 Observe the figure and see that the boy will be in the South West direction from his house.
13.	4	All schools have teachers and students. No teacher is a student. Therefore, these two are independent of each other but part of the school. Therefore, alternative 4 is the answer wherein the big circle represents school and two small circles within it represent teachers and students separately.
14.	3	All singers are musicians, some singers and musicians are educated. Therefore, the large circle represents musicians and the circle inside it represents singers. The third circle, which cuts across these two circles, represents educated persons, as some of the musicians and singers may be educated. The alternative 3 shows this possibility.
15.	2	In the mirror image there is a lateral inversion i.e. right side appears to be on the left and vice-versa. So, out of the four given figures, figure given in alternative 2 is the mirror image of the given figure.

Scholastic Aptitude Test (SAT)

Below are given sample questions on SAT in different subjects. These questions are basically multiple-choice questions where one alternative is correct. However, some questions are of different types like matching type, arrange the sequence, true and false statements and questions based on passages apart from simple multiple choice questions. After the questions, the key has been provided for each question. The rationale of some questions has also been given which will help you to solve these questions. The rest of the questions, you solve yourself by exercising your thinking, reasoning ability and logic.

Sample Questions in Social Sciences

1. Which of the following pairs is correctly matched?

    1. ILO - London
    2. ICJ - Hague
    3. UNESCO - Washington
    4. WHO - Paris

2. Arrange the following Indo-Pak events in correct chronological order.
    A. Creation of Bangladesh
    B. Tashkant Declaration
    C. Simla Agreement
    D. Lahore Declaration

    Which order is correct?
    1. A C D B
    2. B A C D
    3. D B A C
    4. A B C D

3-4 **Direction:** Read the following statement and answer the questions that follow.

"India with over 2 percent of the world's geographical area is inhibited by 16 percent of the world population".

3. From the above statement, it is inferred that in the world population almost every

    1. 5^{th} person is Indian
    2. 6^{th} person is Indian
    3. 7^{th} person is Indian
    4. 8^{th} person is Indian

4. Which of the following countries fits in a completely reverse position explained in the above statement?

   1. China
   2. Bangladesh
   3. United Kingdom
   4. Australia

5. Which pairs are correctly matched? Select the correct alternative.

   a. Brahmo Samaj - Dayanand Saraswati
   b. Arya Samaj- Vivekananda
   c. Ramakrishna Mission - Raja Ram Mohan Roy
   d. Aligarh Movement - Syed Ahmed Khan
   e. Veda Samaj - Cembeti Sridharlu Naidu

   1. a and d
   2. b and e
   3. d and e
   4. c and d

6. Some persons and events are stated below:

A.	Warren Hastings	I	Theosophical Society of India
B.	Col. Olcott	II	Duel Government in Bengal
C.	Lord Ripon	III	The French Revolution
D.	Tipu Sultan	IV	The Local Self Government

   Which of the following indicates the correct matching of the above [7]

   1. A I B. II C. Ill D. IV
   2. A II B. III C. II D. I
   3. A II B. I C. IV D. III
   4. A IV B. II C. I D. III

7. Stated below are some statements.

   a. The Modern Age suddenly came into existence
   b. The Renaissance emphasized the value of reason and scientific temper in life.
   c. The Industrial Revolution in England led to the decline of Cottage Industries in India.

   Which statements are true?

   1. a and b
   2. b and c
   3. a and c
   4. a, b and c

8-9. Read the passage given below and answer the questions that follow.

The later part of the eighteenth century saw two revolutions, which played an important role in the making of the modem world.

The first one involved English Government against its thirteen colonies. Most of the people settled in these colonies had come from England.

8. The passage is referring to two revolutions. Which of the following are these?

1. Russian Revolution and French Revolution
2. American Revolution and French Revolution
3. American Revolution and Chinese Revolution
4. French Revolution and Chinese Revolution

9. Which of the following Revolutions is related to the thirteen English Colonies?

1. Russian Revolution
2. American Revolution
3. Industrial Revolution
4. French Revolution

10. A volcano erupts on the ocean floor and a ship is located on the oceanic surface very close to the epicentre. Which one of the following conditions will the ship face?

1. get toppled
2. drift away
3. wreck
4. not much of a change

11. Read the following statements

A. The towns in Canadian prairies developed after the construction of Canadian Pacific Railway.

B. Most of the Cities of India were connected by railways after these had already developed.

Which one of the following is correct?

1. A is true, B is false
2. A is false, B is true
3. Both A and B are true
4. Both A and B are false

12. Which one of the following sequences of the atmospheric layers will a space shuttle encounter while returning to the earth?

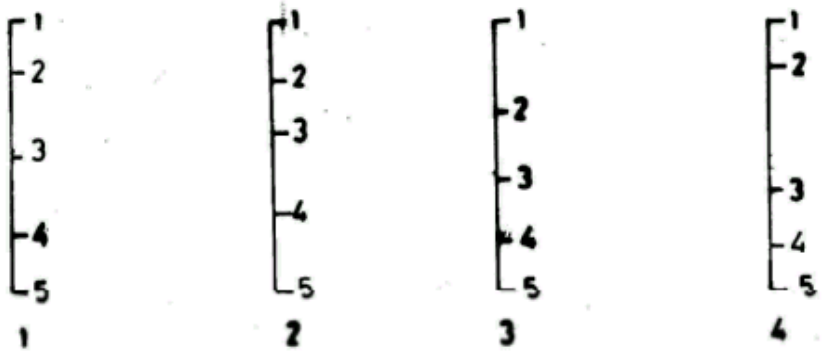
    1. Ionosphere, Mesosphere, Stratosphere, Troposphere
    2. Mesosphere, Stratosphere, Ionosphere, Troposphere
    3. Stratosphere, Ionosphere, Mesosphere, Troposphere
    4. Ionosphere, Stratosphere, Mesosphere, Troposphere

13. Given below are some characteristics of a region.
    a. Rainfall is scanty
    b. Difference between day and night temperature is high
    c. Very little vegetation is found

    Which of the following regions has all these features?

    1. coasts
    2. deserts
    3. plateaus
    4. plains

14. Given below is the scale, which shows in sequence the limits of crust, outer mantle, inner mantle, outer core and inner core represented by 1,2,3,4 and 5 respectively. Which of the following scales represents the correct pattern of measurement?



15. Read the following:

    a. 80% of forests have been cleared.
    b. A quarter of world's mammals are at risk of extinction.
    c. Global warming will trigger a devastating rise in sea levels.

    Which of the following best explains all of the above?

    1. Increasing industrialization
    2. Large scale urbanization
    3. Increased human activity
    4. Large scale mechanization

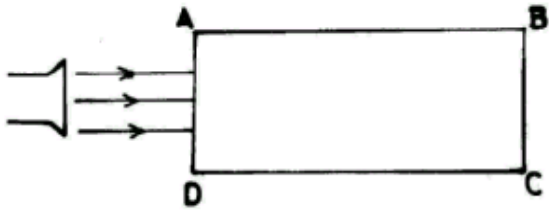
Solutions to Questions on Social Science

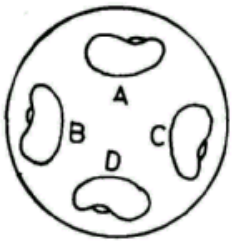
Q.No.	Key	Rationale
1.	2	International Court of Justice is located at Hague. WHO is not at Paris, UNESCO at not at Washington, and ILO not at London. Therefore alternative 2 is the answer.
2.	3	Lahore Declaration took place in 1929, Tashkent Declaration in 1966, creation of Bangladesh in 1971, and Shimla Agreement in 1972. Therefore alternative 3 is the answer.
3	2	16% of the World Population means $1/6^{th}$ of the population, which implies that every 6^{th} person is an Indian.
4	4	Australia has a large area of land but is sparsely populated. All the other three countries are thickly populated. Therefore, the answer is alternative 4.
5	3	The answer key gives the clue.
6	3	Warren Hastings was associated with dual Government in Bengal, Col. Olcott with Theosophical Society of India, Lord Ripon with the Local Self Government and Tipu Sultan with the French Revolution. The answer therefore is at alternative 3, which shows the correct matching.
7	**2**	In this question you have to reason out which statements are true. Here the first statement is not true, as the Modern Age could not come into existence suddenly. Hence, alternative 2 is correct which shows that statements b and c are true.
8	2	This question is based on a given passage. You have to find out which revolutions the passage is referring to. For the first revolution the hint is given in the passage. It involved 13 English Colonies, where the settlers were from England. You will realize that their colonies were located in America. So one Revolution is American Revolution, and the second one is French Revolution as it was important in shaping the modern world. The Russian Revolution and the Chinese Revolution took place in 20^{th} Century only. So the answer is alternative 2.
9	2	This question is related to the first question. You can reason it out because the 13 colonies mentioned here were in America. So the answer is 2.

10	4	The rest of the questions you may reason out yourself.
11	3	
12	1	
13	2	
14	1	
15	3	

Sample Questions in Science

1.	Metals generally have the following physical properties: A. They are conducting B. They have luster C. They are hard D. They are ductile Mercury has been classified as a metal because of the properties 1. B and C 2. D and B 3. A and B 4. A and D
2.	Alina was asked to list the causes of air pollution. She made the following list: A. Burning of coal B. Burning of Liquefied Petroleum Gas C. Burning of Compressed Natural Gas D. Occurrence of ozone at low altitude Which are the correct causes in this list? 1. Only A 2. A and B 3. A, B and C 4. All the four
3.	In some countries it is compulsory to install smoke detectors in all buildings. If you have to install a smoke detector in a room, where would you install it? 1. Near a window, a few feet from the floor 2. Near an electric switch board, about 4 feet from the floor 3. Near or on the ceiling 4. Near the floor
4.	Graphite is very soft as compared to other substances because 1. Carbon atoms are arranged in hexagonal structure 2. Carbon atoms are arranged in such way that they form flat layers 3. Linkages between atoms within a layer of graphite are weak 4. Linkages between atoms of two layers are weak

5 -7.	**Direction:** Read the given paragraph and answer the questions that follow: In any cell, nucleus controls cellular activities and ribosomes are the sites of protein synthesis. While lysosomes are bags of digestive enzymes, energy formation takes place in the mitochondria.
5.	Which cells are likely to posses the highest numbers of mitochondria? 1. hair cells 2. skin surface cells 3. red blood cells 4. muscle cells
6.	A cell is able to survive when 1. nucleus may be removed but cytoplasm is intact 2. cytoplasm may be removed but nucleus is intact 3. both cytoplasm and nucleus are intact 4. cytoplasm is lost but nucleus and cell membrane are intact
7.	Which cells are likely to show much lysosomal activity? 1. damaged cells 2. gland cells 3. hair cells 4. skin cells
8.	The teacher asked Alisha to perform an experiment on refraction of light using a glass slab. Alisha, being a smart girl, decided to make the light of a torch incident as parallel rays on the face AB as shown in the diagram. What would happen to the light?  1. The light will be completely reflected from the face AB 2. The light will spread as it enters the glass slab and will come out from faces BC and AD 3. The light will converge as it enters the slab and all the rays will meet at a point 4. The light will neither spread nor converge and come out of the face CD as parallel rays

9.	Examine the following statements: A. When two bodies are rubbed against each other, the charges are created. B. When two bodies are rubbed against each other, charges in these bodies are redistributed. C. When two bodies are rubbed against each other, similar charges appear on each D. When two bodies are rubbed against each other, dissimilar charges appear on both. The correct statements are: 1. All four 2. None 3. Only A and C 4. Only B and D
10.	Ahmed was advised by an architect to make outer walls of his house with hollow bricks. The correct reason is that such walls 1. make the building stronger 2. help keep the inside cooler in summers and warmer in winters 3. prevent seepage of moisture from outside 4. protect the building from lightning
11.	In which of the seeds shown in the diagram will the root grow downwards?  1. in A 2. in A & B 3. in A, B & C 4. in A, B, C & D

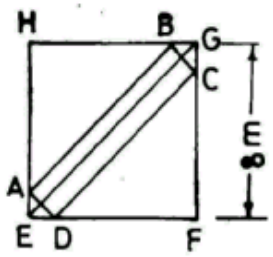
12.	Which term is used for a relationship between two organisms living together, one of which can trap energy from the sun and absorb a certain gas from air, while the other can not, but is able tosupply water and minerals? 1. saprophytic 2. parasitic 3. symbiotic 4. commensal
13.	A man ate only rice, eggs and fish in all his meals. What will be the consequences of such a diet? 1. no energy to do anything 2. frequent constipation 3. hungry all the time 4. unhealthy teeth
14.	Three of the five major types of Primary air pollutants are non-metal oxides. Which of the following is list of Primary air pollutant? 1. Carbon monoxide, Nitric oxide and Phosphorus Penta oxide 2. Carbon monoxide, Nitric oxide and Sulphur oxides 3. Phosphours Penta oxide, Nitric oxide and Sulphus oxide 4. Sulphur oxide, Nitric oxide and Carbon Monoxide
15.	For which purpose do the two organisms live together in a symbiotic relationship? 1. nutrition 2. respiration 3. excretion 4. reproduction

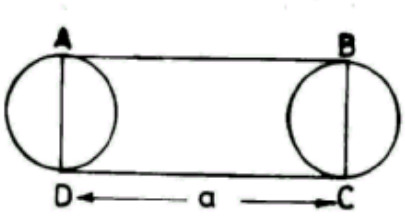
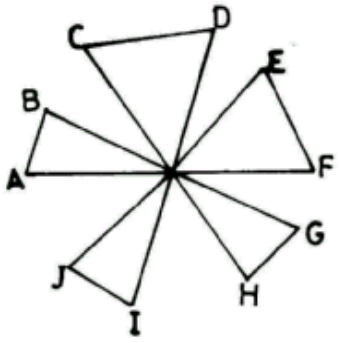
Solutions to Questions in Science

Q.No.	Key	Rationale
1.	3	Mercury is considered as a metal because it has luster and conducting properties. So the alternative 3 is the answer.
2.	4	Burning of coal, LPG, CNG and occurrence of ozone at low altitude are causes of air pollution. It is a misconception that CNG does not pollute air. But it is true that as compared to other fuels it pollutes very little. Since all the causes are correct, the answer is alternative 4.
3.	3	As the hot air becomes lighter, it rises up. Therefore a smoke detector near or on the ceiling will detect smoke faster than if it is installed at any other place in a room. The correct alternative, therefore, is 3.
4.	4	Graphite is very soft because linkage between atoms of two layers of graphite is very weak as compared to other substances. The answer lies at alternative 4.
5.	4	Muscles cell will posses the highest number of mitrochondria because they need more energy to work properly as compared to remaining types of cells. The answer, therefore, is 4.
6.	3	Both cytoplasm and nucleus are essential for survival of a living cell. The key, therefore, is 3.
7.	1	The rest of the questions you may reason out yourself.
8.	4	
9.	4	
10.	2	
11.	4	

12	3	
13.	2	
14.	4	
15.	1	

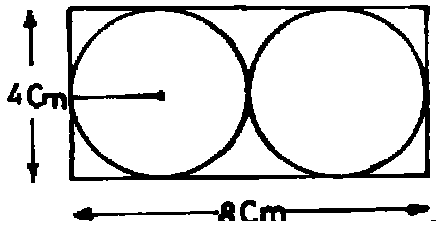
Sample Questions in Mathematics

1.	If a and b are positive integers such that $a^b = 125$, then $(a - b)^{a+b-4}$ is equal to 1. 16 2. 25 3. 28 4. 30
2.	$5\sqrt{5} \times 5^3 \div 5^{-3/2} = 5^{a+2}$ then the value of a is equal to 1. 4 2. 5 3. 6 4. 8
3.	An electric contractor purchases a certain amount of wire. 10% of which is stolen. After using 85% of the remainder, he had 54 m of the wire left. How much wire did he purchase? 1. 300 m 2. 350 m 3. 375 m 4. 400 m
4.	x, y and z are three sums of money such that y is the simple interest on x. z is the simple interest on y for the same time and the same rate of interest. Then we have 1. $x^2 = yz$ 2. $z^2 = xy$ 3. $y^2 = xz$ 4. $xyz = 1$
5.	A rectangular plank $\sqrt{2}$ meters wide is placed on a square lawn parallel to its diagonal as shown in the figure. What is the area of the plank?  1. 14 sq m 2. 12 sq m 3. $7\sqrt{2}$ sq m 4. $14\sqrt{2}$ sq m

6.	Two circular wheels of same radius 'r' centimeter are their central hubs at a distance of 'a' centimeter from one another. The minimum length (in cm) of the fan belt which will pass around both the wheels is  1. $a + \frac{\pi r}{2}$ **2.** $(a + \pi r)/2$ 3. $2a + \pi r$ 4. $2(a + r)$
7.	From a rectangular sheet of cardboard measuring 8 cm x 4 cm , two largest circular discs of same radius touching each other were cut off. What is the area (in cm^2) of the remaining cardboard sheet?. 1. $32 - 8$ 2. $32 - 4\pi$ 3. $32 -$ 4. $32 - 2\pi$
8.	In which of the following cases a triangle ABC, with base BC given, can be constructed? 1. $\angle B$ and $\angle C$ acute angles 2. $\angle B$ and $\angle C$ right angles 3. $\angle B$ and $\angle C$ obtuse angles 4. $\angle B$ obtuse and $\angle C$ right angles
9.	In the figure A F, BG, C H, D I, E J are straight lines. What is the sum of $\angle A$, $\angle B$, $\angle C$,……..$\angle J$  1. 600^0 2. 720^0 3. 900^0 4. 360^0

Solution/Rationale for Mathematics Questions

Q. No.	Answer	Solution/Rationale
Q1.	1	$a^b = 125 \Rightarrow 5^3 = 125$ Then $(a-b)^{a+b-4} = (5-3)^{5+3-4} = 2^4 = 16$
Q2.	1	Given $5\sqrt{5} \times 5^3 \div 5^{-\frac{3}{2}} = 5^{a+2}$ LHS $= \frac{5 \times 5^{\frac{1}{2}} \times 5^3}{5^{-\frac{3}{2}}} = 5^{\frac{9}{2}} \times 5^{\frac{3}{2}} = 5^6$ Thus equating both the sides we have $A + 2 = 6 \Rightarrow a = 4$
Q3.	4	Let the total wire be equal to 'x' meters Lost $= \frac{x}{10}$ meters Remainder $= x - \frac{x}{10} = \frac{9x}{10}$ metres Wire used $= \frac{9x}{10} \times \frac{85}{100} = \frac{153}{200}x$ Remainder after use $= \frac{9x}{10} - \frac{153}{200}x = \frac{27}{200}x$ Thus $\frac{27}{200}x = 54$ Or x^2 $\frac{54 \times 200}{27} = 400$ *meters*

Q4.	3	Let 'r' be the rate % & 't' be the time then $\frac{xrt}{100} = y$ & $\frac{yrt}{100} = z$ Dividing y by z we have $\frac{y}{z} = \frac{x}{y}$ i.e. $y^2 = xz$
Q5.	1	AD = $\sqrt{2}$ by Pythagorus Theorem AE = DE = 1 There by BG = GC = 1 Again in triangle by Pythagorus Theorem Area of Plank = $7\sqrt{2} \times \sqrt{2} = 14 sq.m.$
Q6.	4	Length of fan belt = AB + Arc BC + CD + Arc DA = AB + CD + Perimeter of the wheels $a + a + 2\pi r = 2(a + \pi r)$
Q7.	1	Portion left out 32 - 8 
Q8.	1	
Q9.	2	