



**SOF NATIONAL  
SCIENCE OLYMPIAD**

**SYLLABUS**

**Section – 1 :** Verbal and Non-Verbal Reasoning.

**Section – 2 :** Motion, Force and Laws of Motion, Gravitation, Work and Energy, Sound, Matter in Our Surroundings, Is Matter Around Us Pure, Atoms and Molecules, Structure of Atom, Cell-The Fundamental Unit of Life, Tissues, Diversity in Living Organisms, Why Do We Fall Ill, Natural Resources, Improvement in Food Resources.

**Section – 3 :** Higher Order Thinking Questions - Syllabus as per Section – 2.

Total Questions : 50

Time : 1 hr.

PATTERN & MARKING SCHEME			
Section	(1) Logical Reasoning	(2) Science	(3) Achievers Section
No. of Questions	10	35	5
Marks per Ques.	1	1	3

**LOGICAL REASONING**

1. A number series is given with one term missing. Choose the correct option that will continue the same pattern.

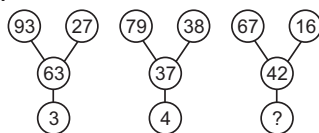
(2, 3), (3, 5), (5, 7), (7, 11), (11, 13), (....)

- (A) (13, 15)                      (B) (15, 16)  
(C) (13, 17)                      (D) (13, 26)

2. In a certain code language, EXPLAINING is written as PXEALNIGNI. How is PRODUCTION written in that language?

- (A) ORPUDTINOC                      (B) ROPUDTIONC  
(C) ORPUDTCNOI                      (D) ORPUDTCNIO

3. A set of figures carrying certain characters, is given. Assuming that the characters in each set follow a similar pattern, find the missing character.



- (A) 5                                      (B) 6  
(C) 8                                      (D) 9

4. Which of the following options shows the correct mirror image of the given combination of letters and numbers, if the mirror is placed vertically to the left?

A 2 N 6 Z 8 W 9

- (A) 9 W 8 Z 0 N 5 A  
(B) 9 W 8 5 0 N 5 A  
(C) 9 W 8 Z 9 N 5 A  
(D) 9 W 8 5 0 N 5 A

5. In the given series, how many 5's are there which are immediately preceded by 9 and immediately followed by 6?

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

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

**SCIENCE**

6. Some statements about the Rutherford's  $\alpha$ -particle scattering experiment are given :

- I. As most of the  $\alpha$ -particles passed through the gold foil without getting deflected, the positive charge of the atom occupies the entire space.  
II. As very few particles were deflected from their path, very little space inside the atom is empty.  
III. As a very small fraction of  $\alpha$ -particles were deflected by  $180^\circ$ , all the positive charge and mass of the gold atom were concentrated in a very small volume within

the atom.

Select the correct statement(s).

- (A) I and II                                      (B) I and III  
(C) II and III                                      (D) III only

7. A metal sphere of mass 12 kg has the same diameter as another sphere of mass 4 kg. Both spheres are dropped simultaneously from a tower. When they are 8 m above the ground, they have the same \_\_\_\_.

(Neglect air resistance.)

- (A) Kinetic energy                      (B) Potential energy  
(C) Momentum                      (D) Acceleration

8. Read the given statements and mark the correct option.  
**Statement 1** : Echo is always produced when sound is incident on hard and polished rough surface.  
**Statement 2** : Sound energy can be totally reflected by objects with soft and loose texture.  
 (A) Both statement 1 and statement 2 are true and statement 2 is the correct explanation of statement 1.  
 (B) Both statement 1 and statement 2 are true and statement 2 is not the correct explanation of statement 2.  
 (C) Statement 1 is true but statement 2 is false.  
 (D) Both statement 1 and statement 2 are false.

9. What happens to the inertia of an object when its velocity is doubled ?  
 (A) The object's inertia becomes 2 times lesser  
 (B) The object's inertia becomes 2 times greater  
 (C) The object's inertia becomes 4 times greater  
 (D) The object's inertia remains the same.

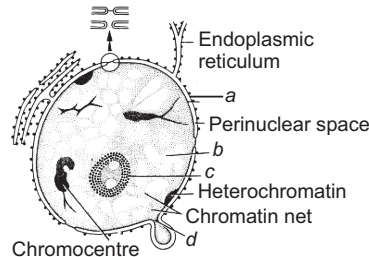
10. Filtration as a method of separation can be used for mixtures that are  
 (A) Homogeneous and liquid-in-gas mixtures  
 (B) Heterogeneous and liquid-in-liquid mixtures  
 (C) Homogeneous and solid-in-liquid mixtures  
 (D) Heterogeneous and solid-in-liquid mixtures.

11. The freezing and boiling points of a substance 'P' are  $-220^{\circ}\text{C}$  and  $-185^{\circ}\text{C}$  respectively. At which of the following range of temperatures will 'P' exist as a liquid?  
 (A) Between  $-175^{\circ}\text{C}$  and  $-210^{\circ}\text{C}$   
 (B) Between  $-190^{\circ}\text{C}$  and  $-225^{\circ}\text{C}$   
 (C) Between  $-200^{\circ}\text{C}$  and  $-160^{\circ}\text{C}$

(D) Between  $-195^{\circ}\text{C}$  and  $-215^{\circ}\text{C}$

12. Taxon Y includes non-vascular plants whose plant body is not differentiated into true roots, stems and leaves and they have unicellular and non-jacketed sex organs. These are chlorophyllous plants which are autotrophic in their mode of nutrition and may be of green, yellow, orange, red colour, etc.  
 In the above passage Y is \_\_\_\_\_.  
 (A) Bryophyta (B) Thallophyta  
 (C) Pteridophyta (D) Gymnosperms

13. Refer to the given figure and identify from the marked alphabets (a, b, c, d) which is responsible for the following functions.  
 (I) Protects the DNA from various chemical reactions that takes place outside the nucleus.  
 (II) Selective barrier, allowing certain substances in or out of the nucleus  
 (III) Means of sequestering many of the mRNA processing activities from the cytosol and separating nuclear and cytoplasmic constituents



- (A) a (B) b  
 (C) c (D) a and d

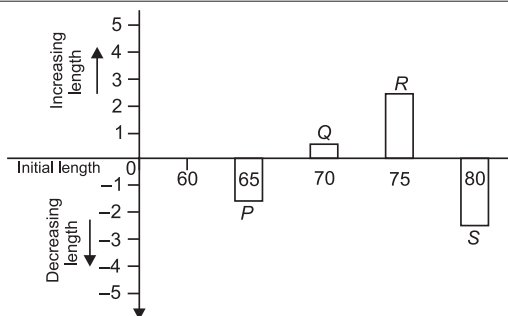
### ACHIEVERS SECTION

14. Fill in the blanks:

The (i) of a sound is determined by its (ii). The (iii) of the sound wave depends upon the force with which an object is made to vibrate. A sound of (iv) frequency is called a (v).

- | (i)           | (ii)      | (iii)     | (iv)   | (v)  |
|---------------|-----------|-----------|--------|------|
| (A) Amplitude | Loudness  | Loudness  | Double | Note |
| (B) Loudness  | Frequency | Amplitude | Single | Tone |
| (C) Loudness  | Amplitude | Amplitude | Double | Tone |
| (D) Amplitude | Loudness  | Loudness  | Single | Note |

15. Four strips of fresh potato P, Q, R and S were immersed in solutions of different concentrations. Osmosis occurred according to the concentration difference between cell sap and ambient solution. A graph was plotted between initial length of strips and the change in length after osmosis. Which of these strips was placed in the most diluted solution?



- (A) S (B) Q  
 (C) R (D) P

### ANSWERS

1. (C) 2. (C) 3. (D) 4. (D) 5. (B) 6. (D) 7. (D) 8. (D) 9. (D) 10. (D) 11. (D) 12. (B) 13. (A) 14. (A) 15. (C)