



**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.

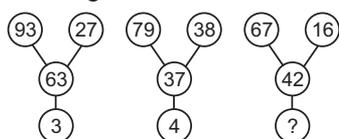
**(2, 3), (3, 5), (5, 7), (7, 11), (11, 13), (...)**

- (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. Find the missing number, if same rule is followed in all the three figures..



- (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) Ǝ W 8 Z Ɔ N Ǝ A  
(B) Ǝ W 8 Ǝ Ɔ N Ǝ A  
(C) Ǝ W 8 Z 9 N Ǝ A  
(D) Ǝ W 8 Ǝ Ɔ N Ǝ 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. A sample of ammonia weighs 4 g. What mass of sulphur dioxide contains the same number of molecules as are in 4 g of ammonia?

- (A) 64 g                                      (B) 32.02 g  
(C) 15.05 g                                      (D) 30 g

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 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. Boiling points of a few gases found in air are given below :

Gas	Krypton	Neon	Nitrogen	Oxygen
Boiling point (°C)	-152	-246	-196	-183

If liquid mixture is fractionally distilled, the order of gases distilling out is

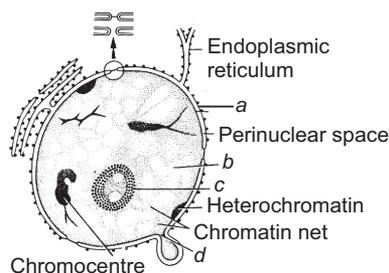
- (A) Krypton, Neon, Nitrogen, Oxygen  
 (B) Neon, Nitrogen, Oxygen, Krypton  
 (C) Nitrogen, Neon, Oxygen, Krypton  
 (D) Oxygen, Neon, Nitrogen, Krypton.
11. The freezing and boiling points of a substance 'P' are  $-220^{\circ}\text{C}$  and  $-185^{\circ}\text{C}$  respectively. At which of the following 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. Which of the following statements about *Spongilla*, leech, dolphin and penguin is correct?

- (A) Penguin is homoiothermic while the remaining three are poikilothermic.  
 (B) Leech is found in fresh water form while all others are marine.  
 (C) *Spongilla* has special collar cells called choanocytes, not found in the remaining three.  
 (D) All are bilaterally symmetrical.

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) Separates nuclear and cytoplasmic constituents



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

### ACHIEVERS SECTION

14. Fill in the blanks:

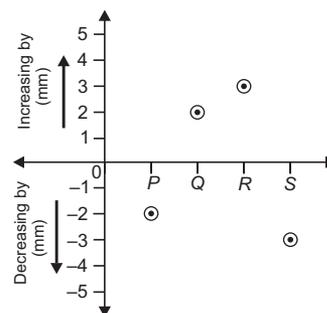
The (i) of a sound is determined by its (ii). The (iii) of the sound wave depends upon the force with which an object is made to vibrate. A sound of (iv) frequency is called a (v).

- | (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 of equal length were immersed in solutions of different concentrations. Osmosis occurred according to the concentration difference between cell sap and ambient solution. The results are shown in the given graph.

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. (C) 7. (D) 8. (D) 9. (D) 10. (B) 11. (D) 12. (C) 13. (A) 14. (A) 15. (C)