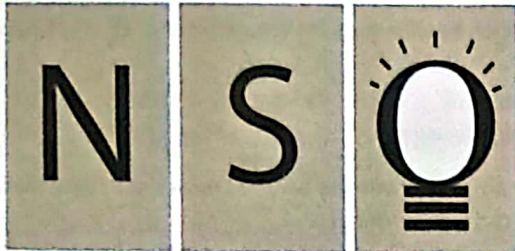




Techfest™
IIT Bombay
Asia's Largest Science & Technology Festival



**SOF NATIONAL SCIENCE
OLYMPIAD 2024-25**

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

CLASS **6**
SET-B

Total Questions : 50 | Time : 1 hr.

Guidelines for the Candidate

1. You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
2. Write your **Name, School Code, Class, Section, Roll No.** and **Mobile Number** clearly on the **OMR Sheet** and do not forget to sign it. We will share your marks / result and other information related to SOF exams on your mobile number.
3. The Question Paper comprises three sections:
Logical Reasoning (10 Questions), **Science** (35 Questions) and **Achievers Section** (5 Questions)
Each question in Achievers Section carries 3 marks, whereas all other questions carry one mark each.
4. All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
5. There is only ONE correct answer. Choose only ONE option for an answer.
6. To mark your choice of answers by darkening the circles on the OMR Sheet, use **HB Pencil** or **Blue / Black ball point pen** only. E.g.
Q.16: If a mixture can be separated by magnetic separation, one of the constituents must be
A. Ferrous B. Non-ferrous C. Precious D. Non-metallic.
As the correct answer is option A, you must darken the circle corresponding to option A on the OMR Sheet.
7. Rough work should be done in the blank space provided in the booklet.
8. Return the OMR Sheet to the invigilator at the end of the exam.
9. Please fill in your personal details in the space provided before attempting the paper.
10. **Participate in SOF-Techfest IIT Bombay Innovation Challenge. Open for class 8, 9 & 10. For details, please visit : www.sofworld.org**

16. ● (B) (C) (D)

Name:.....

SOF Olympiad Roll No.:..... Contact No.:.....



**THE WORLD'S
BIGGEST
OLYMPIADS**

Over
26 Years
of Trust

96,499+
Schools

72
Countries

7.2+ Crores
Assessments

8
Olympiads

LOGICAL REASONING

1. Some letters are coded as follows:

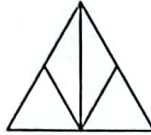
Letters	S	D	C	H	J	O	A	I
Codes	>	\$	*	α	<	5	#	3

What will be the code for ODISHA?

- A. \$53> α # B. 5\$3> α #
C. 5*3< α # D. 5\$3<*#

2. Find the number of triangles formed in the given figure.

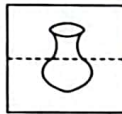
- A. 5 B. 6
C. 7 D. 8



3. Anuradha correctly remembers that she had planted the trees before 27th January but after 23rd January. Her husband correctly remembers that she had planted the trees before 29th January but after 25th January. On which date did Anuradha plant the trees?

- A. 28th January B. 24th January
C. 26th January D. 29th January

4. A square transparent sheet with a pattern and a dotted line on it is given. Select a figure from the options as to how the pattern would appear when the transparent sheet is folded along the dotted line.



- A. B.
C. D.

5. How many such consonants are there in the given sequence each of which is immediately followed by a number and immediately preceded by a symbol?

©A7P#L3M2@N5T9OQ

- A. One B. Two
C. Three D. More than three

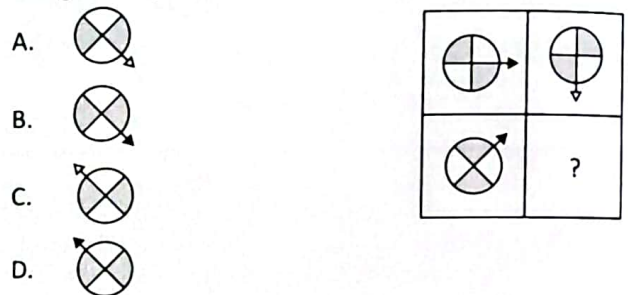
6. If 'M' denotes ' $\div$ ', 'N' denotes ' $\times$ ', 'P' denotes '+' and 'Q' denotes '-', then the value of 4 P 20 M 5 N 4 Q 20 is _____.

- A. 0 B. 64
C. 16 D. 20

7. Kartik is facing towards North. He makes a 90° clockwise turn followed by 180° clockwise and 45° anti-clockwise turn. In which direction is he facing now?

- A. North B. South-East
C. North-West D. South-West

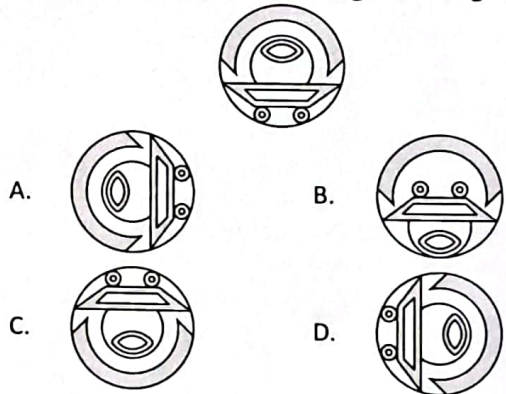
8. Select a figure from the options which will complete the given figure matrix.



9. Shubham is the husband of Sheetal, Sheetal is the daughter of Ritika and Ritika is the sister of Mahesh. How is Ritika related to Shubham?

- A. Sister-in-law B. Sister
C. Mother-in-law D. Aunt

10. Select the correct water image of the given figure.



SCIENCE

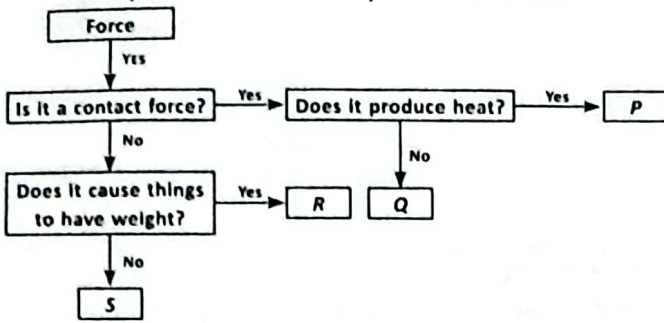
11. Read the given statements and select the option that correctly identifies them as true (T) and false (F) ones.

- (i) The predominant element in the composition of Earth is iron.
(ii) The Sun contains 75% of the mass of the solar system.
(iii) The radius of the Sun is comparable to the radius of the Earth.

- (iv) The Earth is the densest among all the planets in our solar system.

- | | (i) | (ii) | (iii) | (iv) |
|----|-----|------|-------|------|
| A. | T | T | F | F |
| B. | F | T | T | F |
| C. | F | F | T | T |
| D. | T | F | F | T |

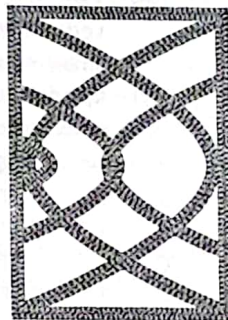
12. The given flow chart represents some observations about the types of forces (P-S). On this basis, select the option which correctly identifies them.



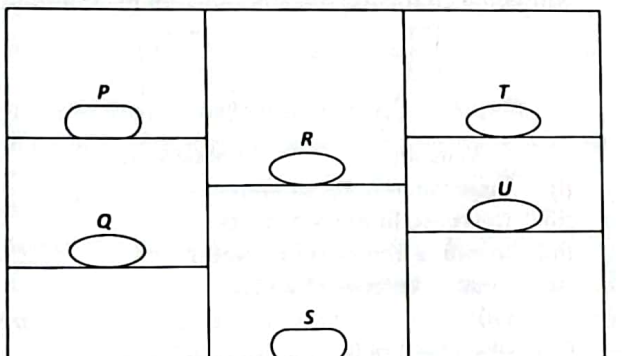
	P	Q	R	S
A.	Frictional force	Elastic spring force	Magnetic force	Gravitational force
B.	Magnetic force	Gravitational force	Frictional force	Elastic spring force
C.	Elastic spring force	Magnetic force	Gravitational force	Frictional force
D.	Frictional force	Elastic spring force	Gravitational force	Magnetic force

13. The given figure shows a door made up of iron bars. How will Amit measure the length of the bars in order to pay to the contractor?

- A. Using a scale only
B. Using his hand only
C. Using a thread only
D. Using both thread and scale



14. Six objects are placed on different shelves as shown in the given figure. Objects P and S are of weight 200 g each and objects Q, R, T and U are of weight 140 g each.

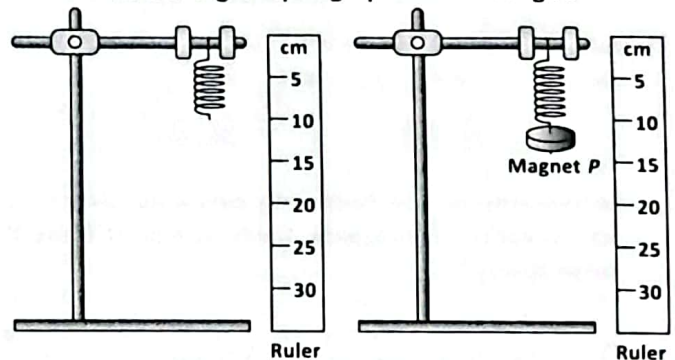


Ground level

Which one of the following options correctly represents the decreasing order of the value of gravitational potential energy of the objects?

- A. P, T, R, S, Q, U
B. T, P, R, U, Q, S
C. P, T, R, U, Q, S
D. S, Q, U, R, T, P

15. As shown in the given figure a magnet P is attached to a spring of original length 10 cm. This results in the stretching of spring upto 14 cm length.



Now, an object R is placed 2 cm below the magnet P which results in the length of the spring to become 9 cm. Which of the following statement(s) will explain this observation?

- (i) The object R is an iron nail which causes change in the length of spring due to its weight.
(ii) The object R is a magnet which causes change in the length of spring.
(iii) R is a magnet, and both previous magnet P and R are placed with opposite poles towards each other.
- A. (i) only
B. (ii) only
C. (iii) only
D. (ii) and (iii) only

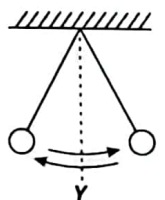
16. Consider the following constellations.

Constellations	Names
(i)	– Ursa Major
(ii)	– Orion
(iii)	– Scorpius

How many of the above are correctly matched?

- A. Only one
B. Only two
C. All the three
D. None of these

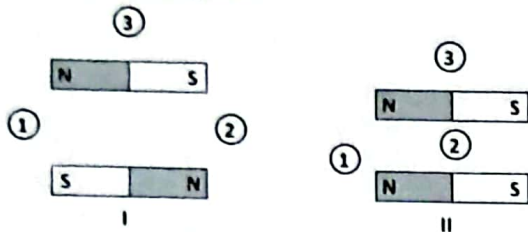
17. As shown in the given figure, a pendulum swings in backward and forward directions passing through Y, the middle point of the oscillations. First time the pendulum passes through Y, a stopwatch is started. The twenty-first time the pendulum passes through Y, the stopwatch is stopped. The reading is T.



What is the time period of oscillations of the pendulum?

- A. $T/40$
B. $T/21$
C. $T/20$
D. $T/10$

18. Magnets are arranged in two different ways as shown in the given figures I and II. Three compasses 1, 2 and 3 are placed at different locations as depicted in each of the figures.



Which one of the following correctly identifies the direction of magnetic fields in figures I and II respectively?

- A.
 B.
 C.
 D.

19. Rajiv recorded the following observations in a table. Identify the incorrect ones.

S. No	Activity	Oscillatory motion	Periodic motion	Rectilinear motion	Curvilinear motion
(i)	Movement of an object attached to a suspended spring	✓	✓	×	×
(ii)	Motion of blades of a fan	×	✓	✓	✓
(iii)	Motion of a ball hit by a batsman	✓	✓	×	×
(iv)	Motion of a cursor on the monitor of the computer	×	✓	✓	×

- A. (i), (ii) and (iii) only B. (i), (iii) and (iv) only
 C. (ii), (iii) and (iv) only D. (i), (ii), (iii) and (iv)

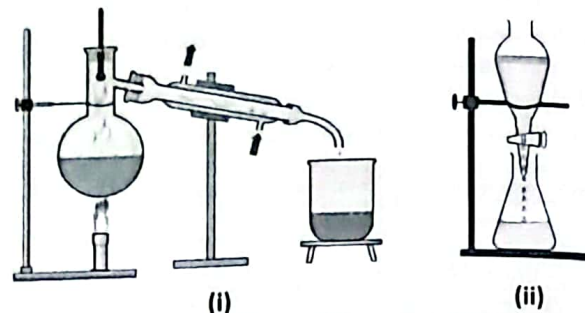
20. Read the given statements and select the correct option.

Statement 1 : When a horseshoe magnet is brought close to a pile of iron filings, more filings will get attracted to the U-shaped part of the magnet.

Statement 2 : Horseshoe magnet has only one pole that is its U-shaped part.

- A. Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
 B. Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
 C. Statement 1 is true but statement 2 is false.
 D. Both statements 1 and 2 are false.

21. Observe the methods of separation in the given figures (i) and (ii) and select the correct statement(s).



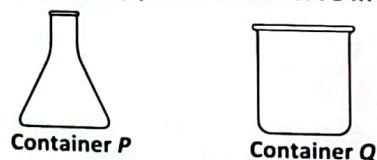
- I. Method (i) can be used to separate butter from milk.
 II. Method (ii) can be used to separate petrol and water mixture and petrol forms the upper layer.
 III. Method (ii) can be used to separate glycerine and water mixture and glycerine forms the upper layer.
 IV. Method (i) can be used to separate grains from stalks.
 A. (II) only B. (I) and (III) only
 C. (II) and (III) only D. (II), (III) and (IV) only

22. Read the following statements carefully and select the option that correctly identifies them as true (T) and false (F) ones.

- (i) Sieving is used to separate a solid-liquid mixture.
 (ii) Centrifugation is used to separate butter from milk.
 (iii) The process of decantation along with sedimentation is used to get clear water from sugar solution.
 (iv) Condensation is the process in which water is converted into its vapours on heating.

- (i) (ii) (iii) (iv)
 A. F T T F
 B. T F T T
 C. F T F F
 D. T F T F

23. The given figure shows two containers, P and Q of different shapes. Anwita filled container P with 200 mL of water. She then transferred all the water from container P to container Q. Which of the following change(s) did she observe in container Q?



- (i) Increase in mass of water
 (ii) Decrease in mass of water
 (iii) Increase in volume of water
 (iv) Change in level of water
 A. (iii) only B. (i), (ii) and (iii) only
 C. (i) and (iv) only D. (iv) only

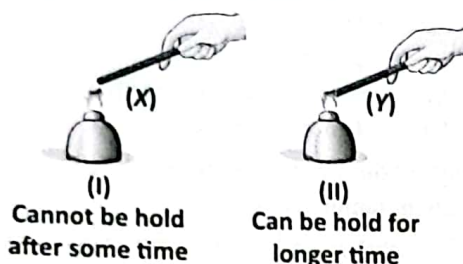
24. Match the mixtures given in column I with their methods of separation given in column II and select the correct option.

- | Column I | Column II |
|---------------------|------------------------|
| (P) Diesel + water | (i) Threshing |
| (Q) Sand + pebbles | (ii) Sublimation |
| (R) Camphor + sugar | (iii) Sieving |
| (S) Stalks + grains | (iv) Separating funnel |
- A. P-(iii), Q-(ii), R-(iv), S-(i)
 B. P-(iv), Q-(iii), R-(ii), S-(i)
 C. P-(iv), Q-(ii), R-(i), S-(iii)
 D. P-(iii), Q-(i), R-(ii), S-(iv)

25. A substance 'U' does not have a fixed shape but has a definite volume, whereas another substance 'V' has a definite shape as well as definite volume. 'U' and 'V' can be respectively

- A. Fruit juice, Oxygen B. Chalk, Sand
 C. Mustard oil, Book D. Nitrogen, Glass

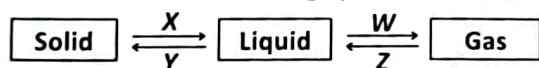
26. Rachita, a science teacher performed the following experiments to determine the heat conductivity of two different materials X and Y.



On the basis of the above experiments, select the correct statement from the following.

- A. X can be a plastic rod and Y can be a copper rod.
 B. X can be a silver rod and Y can be a glass rod.
 C. X can be a glass rod and Y can be an iron rod.
 D. X can be a plastic rod and Y can be an aluminium rod.
27. Select the option in which odd one is encircled incorrectly according to the property mentioned.
- A. Kerosene, Vinegar, Honey, Glycerine : Miscibility with water
 B. Clear glass, Lens, Stone, Diamond : Transparency
 C. Plastic toy, Rubber ball, Iron nail, Wooden block : Floatation on water
 D. Gold coin, Clay, Tin vessel, Silver chain : Hardness

28. Refer to the given diagram that represents change of state of a substance through processes W, X, Y and Z.



Select the correct option regarding W, X, Y and Z.

- A. Process Y is involved in obtaining salt from sea water whereas process W is involved in the formation of ice cubes.
 B. Process X is involved in the drying of wet clothes.
 C. Process Z is responsible for the disappearance of naphthalene balls over a period of time.

D. The rate of process W increases with increase in temperature and surface area.

29. Nikita, a class 6 student classified different materials based on their properties. Which of the following sets are incorrectly matched?

Set	Material	Malle-able	Trans-parent	Sinks in water	Conductor of heat
I	Iron rod	✓	×	✓	✓
II	Plastic ball	×	✓	✓	✓
III	Sand paper	✓	✓	×	×
IV	Stone	×	×	✓	×
V	Butter paper	✓	✓	×	×

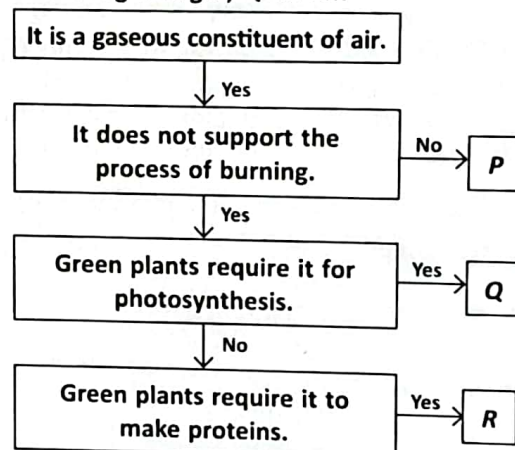
- A. I, II and III only B. IV and V only
 C. I and IV only D. II, III and V only

30. Refer to the given relationship and select the option that satisfies the same relationship.

Chapati : Ghee

- A. Rice : Kidney beans B. Egg : Oil
 C. Bread : Butter D. Milk : Sugar

31. Refer to the given flow chart and select the incorrect statement regarding P, Q and R.



- A. P helps to convert the food that we eat into energy.
 B. R is used in food packaging to keep the food fresh.
 C. R is a major greenhouse gas that traps the heat radiated from the Earth's surface and increases the temperature of Earth.
 D. Among P, Q and R, R is present in the highest percentage and Q is present in the lowest percentage in the Earth's atmosphere.

32. Abhishek performed an experiment in his school laboratory where he took a food sample X. He crushed it and added Benedict's solution to it. He then heated the solution for a minute and observed that colour of the food sample changed to brick red. X could be

- A. Ripe banana B. Egg
 C. Cheese D. Butter.

33. Sujal made four groups of plants on the basis of their edible parts. By mistake he placed one wrong member in each group. Identify the wrong members and select the correct option.

Group I : Carrot, Beetroot, Mango

Group II : Maize, Potato, Sugarcane

Group III : Sweet potato, *Tapoca*, Onion

Group IV : Bottle gourd, Ginger, Bitter gourd

- A. Mango of group I must be replaced with garlic.
B. Maize of group II must be interchanged with sweet potato of group III.
C. Onion of group III must be replaced with radish.
D. Ginger of group IV must be interchanged with carrot of group I.

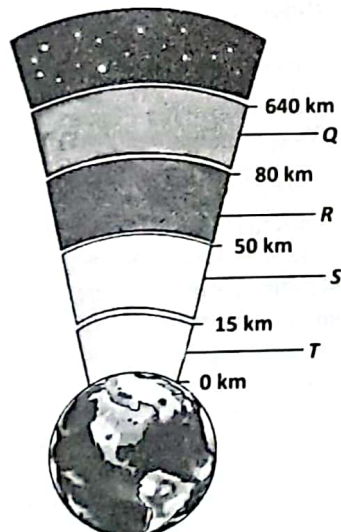
34. Given below is the list of adaptations shown by different animals.

- (a) Staying in deep underground burrows during the day time
(b) Presence of strong hooves
(c) Thick hair over the body
(d) Nostrils with flaps
(e) Streamlined body and presence of gills
(f) Long eyelashes

Select the option that correctly segregates a-f on the basis of adaptations of animals living in desert region (X), mountain region (Y) and aquatic habitat (Z).

- | | X | Y | Z |
|----|---------------|---------------|----------|
| A. | (e) | (a), (d), (f) | (b), (c) |
| B. | (a), (d), (f) | (b), (c) | (e) |
| C. | (a), (c) | (e), (d) | (b), (f) |
| D. | (d), (e), (f) | (a), (c) | (b) |

35. Identify the different layers of atmosphere labelled as Q, R, S and T in the given figure.



Now, select the incorrect statement regarding Q – T.

- A. In layer T, the temperature decreases with increasing altitude.
B. Layer Q is less turbulent, so most of the commercial passenger aircrafts fly in this layer.

- C. R is the coldest layer in the Earth's atmosphere.
D. S has ozone layer in it.

36. Which of the following practices can help in reducing air pollution?

- (i) Planting more trees
(ii) Using petrol instead of CNG in vehicles
(iii) Installing catalytic converters in automobiles
(iv) Treating wastewater before dumping it into rivers.
A. (i), (ii) and (iii) only B. (i) and (iii) only
C. (iii) and (iv) only D. (i) and (iv) only

37. Which of the following is a mismatched pair?

- A. Fibrous root – Wheat, Maize
B. Parallel venation – Banana, Sugarcane
C. Reticulate venation – Mustard, *Hibiscus*
D. Creeper – Watermelon, Pea plant

38. Manisha took some vinegar in a test tube and added some baking soda to it. Then she lit a matchstick and brought it near to the mouth of the test tube. The flame of matchstick got extinguished.

Which of the following is correct conclusion regarding the given experiment?

- A. Carbon dioxide gas does not support burning.
B. Atmospheric air contains carbon dioxide.
C. Oxygen gas present in the air is necessary for burning.
D. Oxygen gas can extinguish fire.

39. Select the incorrect match.

(i)	Roughage - Helps to prevent constipation
(ii)	Vitamin B ₁₂ - Cobalamin
(iii)	Complex carbohydrate - Fructose
(iv)	Fat - Pulses

- A. (ii) only B. (iii) and (iv) only
C. (i), (iii) and (iv) only D. (i), (ii) and (iv) only

40. X is a 26 m high structure with four turrets and intricate latticework. It is made up of yellow basalt and concrete.

X could be _____.

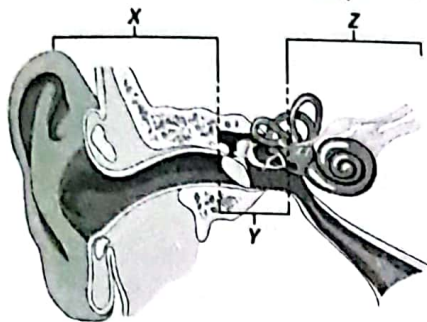
- A. Qutub Minar
B. Sun Temple of Konark
C. Gateway of India
D. None of these

41. Select the incorrect matches.

- (i) Migration – Arctic tern
(ii) Mimicry – Viceroy butterfly
(iii) Omnivore – Horse
(iv) Spiracle – Fish
(v) Blowhole – Whale

- A. (i), (iii), (iv) and (v) only
- B. (iii) and (iv) only
- C. (iii) and (v) only
- D. (ii), (iv) and (v) only

42. Refer to the given figure and select the correct statement regarding the labelled parts X-Z.



- A. X sends messages to the brain.
- B. Y collects sound and directs it towards the eardrum.
- C. Z is the main site of hearing and has receptors to sense sound.
- D. All of these

43. Read the given statements and select the incorrect one.

- A. The ability of an organism to react to a change in the environment is called stimuli.
- B. Herbs live for only one or two seasons.
- C. The movement of an organism from one place to another is called locomotion.
- D. Resin is the secretory product of plants which is used to make varnish and ointments.

44. Read the given statements (i)-(iv) and select the option that correctly identifies them as true (T) and false (F) ones.

- (i) Focus is the point under the ground where earthquake begins and its corresponding spot on the surface of Earth is known as epicentre.
- (ii) Mount Erebus is an extinct volcano, which has not erupted in last 10,000 years and is also not expected to erupt in a comparable time scale.
- (iii) National Cadet Corps (NCC) and World Health Organisation (WHO) are organisations that help in disaster management.
- (iv) An earthquake of magnitude 7-8 cannot be felt by us and it barely causes any damage.

	(i)	(ii)	(iii)	(iv)
A.	T	F	T	F
B.	F	T	T	T
C.	T	F	F	T
D.	F	F	T	T

45. Given below are few characteristics shown by different types of fruits/seeds for their dispersal.

- (i) Light weight
- (ii) Hairy
- (iii) Presence of hooks
- (iv) Winged
- (v) Presence of thick fibrous coat
- (vi) Spongy and porous

Which among the given characteristics are shown by seed of *Hiptage*?

- A. (i) and (iv) only
- B. (iv) and (vi) only
- C. (ii) and (vi) only
- D. (i), (iii) and (v) only

ACHIEVERS SECTION

46. Refer to the given dichotomous key.

- (i) (a) Energy giving component of food – Go to (ii)
- (b) Component of food that helps to protect our body from diseases – Go to (iii)
- (ii) (a) Mostly soluble in water – P
- (b) Insoluble in water – Q
- (iii) (a) It is a macromineral – R
- (b) It is a trace mineral – S

Identify P-S and select the correct statement regarding them.

- A. Deficiency of P could cause marasmus whereas deficiency of Q could cause kwashiorkor.
- B. Deficiency of R could cause scurvy whereas deficiency of S could cause rickets.
- C. Deficiency of R could cause hyponatremia whereas deficiency of S could cause anaemia.
- D. Excess of P and Q could get stored directly in the body for future use whereas R and S are manufactured by our body.

47. Read the given statements with few italicised words and select the correct option regarding them.

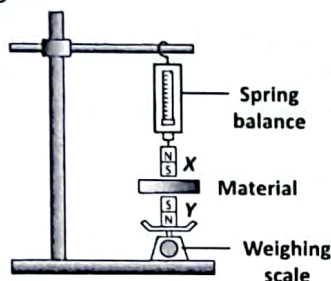
- I. *Atmospheric pressure* is measured with the help of *hygrometer*.
- II. *Oxygen* is released during the process of burning while *carbon dioxide* is used up during burning.
- III. Air is *translucent* and moves *downwards* on getting heated.
- IV. Air becomes *thinner* with *increasing* altitude.
- A. *Atmospheric pressure* should not be changed whereas *hygrometer* should be changed to *anemometer* as it is mentioned incorrectly.
- B. The positions of *oxygen* and *carbon dioxide* should be interchanged as they are mentioned incorrectly.
- C. *Translucent* should not be changed whereas *downwards* should be changed to *upwards* as it is mentioned incorrectly.
- D. *Thinner* should be changed to *thicker* and *increasing* should not be changed.

48. Identify the plants W-Z in the given table and select the correct option regarding them.

Plant	Characteristics		
	Hard and woody stem	Taproot	Reticulate venation
W	x	x	x
X	✓	✓	✓
Y	x	✓	✓
Z	✓	✓	✓

- A. W could be wheat while X could be rose.
 B. X could be radish while Y could be rice.
 C. Y could be mustard while Z could be bean.
 D. Z could be bamboo while W could be sugarcane.

49. A student uses two magnets X and Y of weight 4 kg-wt each to set up an experiment to identify the materials P, Q and R. His setup is shown in the given figure.



The readings on the weighing scale and spring balance when each material is placed between the two magnets are given below.

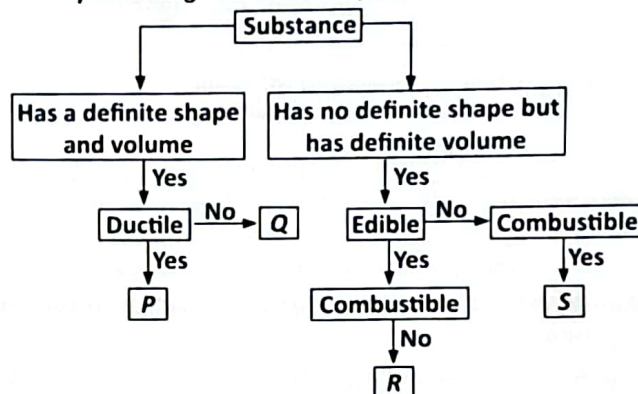
Material	Reading on the spring balance	Reading on the weighing scale
P	3 kg-wt	5 kg-wt

Q	5 kg-wt	5 kg-wt
R	5 kg-wt	3 kg-wt

On the basis of the readings given in the table, which one of the following statements is correct about materials P, Q and R? (Here, neglect the weight of the materials.)

- A. Material P is a button magnet.
 B. Material Q is a plastic sheet.
 C. Material R is a magnetic material.
 D. Materials P, Q and R allow themselves to get magnetised.

50. Study the given chart carefully and fill in the blanks by selecting the correct option.



	P	Q	R	S
A.	Plastic pen	Iron rod	Petrol	Kerosene
B.	Copper coin	Plastic pen	Mustard oil	Water
C.	Gold brick	Wooden block	Water	Diesel
D.	Aluminium rod	Glass rod	Sugar syrup	Water

SPACE FOR ROUGH WORK

Techfest
IIT Bombay

IGKO
SOF INTERNATIONAL GENERAL KNOWLEDGE OLYMPIAD

IEO
SOF INTERNATIONAL ENGLISH OLYMPIAD

NSO
SOF NATIONAL SCIENCE OLYMPIAD

IMO
SOF INTERNATIONAL MATHEMATICS OLYMPIAD

(Formerly SOF NCO)
ICSO
SOF INTERNATIONAL COMPUTER SCIENCE OLYMPIAD

ISSO
SOF INTERNATIONAL SOCIAL STUDIES OLYMPIAD

Introducing
IHO
SOF INTERNATIONAL HINDI OLYMPIAD

ICO
SOF INTERNATIONAL COMMERCE OLYMPIAD

For latest updates & information, please like our Facebook page (www.facebook.com/sofworld) or register on www.sofworld.org/subscribe-updates.html

For Level 1 and Level 2 preparation material / free sample papers, please log on to www.mtg.in

SOF
SCIENCE OLYMPIAD FOUNDATION

Head Office: Plot 99, Sector 44 Institutional area, Gurugram -122 003 (HR), India
 Email: info@sofworld.org | Website: www.sofworld.org