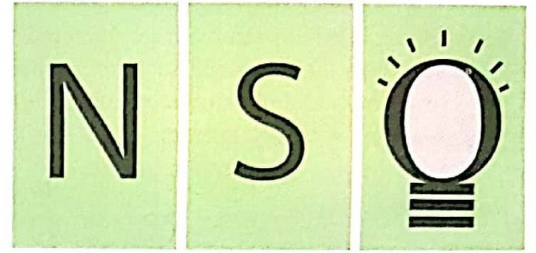


CLASS
6

LEVEL
2



**SOF NATIONAL SCIENCE
OLYMPIAD 2019-20**

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

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. In the school code column in the OMR Sheet, please fill in code allocated to your school and not the exam center code.
4. The Question Paper comprises two sections : **Science** Section (45 Questions) and **Achievers Section** (5 Questions).
Each question in Achievers Section carries 3 marks, whereas all other questions carry one mark each.
5. All questions are compulsory. There is no negative marking. Use of calculator / smart phone is not permitted.
6. There is only ONE correct answer. Choose only ONE option for an answer.
7. 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: In the water cycle, condensation is the process of
A. Water vapour cooling down and turning into a liquid
B. Ice warming up and turning into a liquid
C. Liquid cooling down and turning into ice
D. Liquid warming up and turning into water vapour
As the correct answer is option A, you must darken the circle corresponding to option A on the OMR Sheet.
8. Rough work should be done in the blank space provided in this booklet.
9. Please fill in your personal details in the space provided on this page before attempting the paper.
10. **RETURN THE OMR SHEET AND QUESTION PAPER TO THE INVIGILATOR AT THE END OF THE EXAM.**

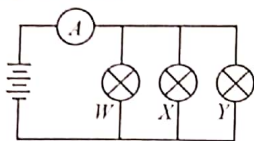
16. ● Ⓑ Ⓒ Ⓓ



Name:.....

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

1. Three identical lamps are connected to a battery as shown in the diagram. Each lamp operates at normal brightness and the ammeter (of negligible resistance) registers a steady current.



The filament of the lamp *W* breaks. What will happen to the ammeter reading and to the brightness of the remaining lamps?

Ammeter reading	Lamp brightness
A. Increases	Decreases
B. Decreases	Remains unchanged
C. Remains unchanged	Remains unchanged
D. Becomes zero	Becomes zero

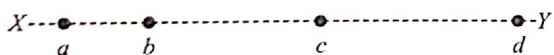
2. What should Seema do to find out whether a material is a magnet?

- Find out if the material is a metal or a non-metal.
- Find out if the material is a conductor or an insulator.
- Find out if the material can be attracted to a steel plate.
- Find out if the material can be repelled by a compass.

3. An object *O* is placed in front of a plane mirror *UV* as shown in the diagram. A student moves her eyes along the line *XY* to observe the image of *O*. Identify the point(s) on the line *XY* where the image of *O* can be seen.



• *O*



- a, b* and *c* only
 - a, c* and *d* only
 - b* and *c* only
 - d* only
4. Four students measured the length of a table which was about 2 m. Each of them used different ways to measure it.
- Which one of them would get the most accurate length?
- Sam measured it with a half metre long thread.
 - Gurmeet measured it with a 15 cm scale from her geometry box.
 - Reena measured it using her handspan.
 - Salim measured it using a 5 m long measuring tape.

5. The height of an electric pole is 6 m 25 cm. This is same as
- 6.25 m
 - 625 cm
 - 6250 mm
 - All of these

6. Match column I with column II and select the correct option from the given codes.

Column I	Column II
(i) A toy car moving on a straight track	(a) Rotational motion
(ii) Pendulum of a clock	(b) Circular motion
(iii) Motion of the earth	(c) Periodic motion
(iv) Mango falling from a tree	(d) Curvilinear motion
(v) Bicycle moving on a curved road	(e) Rectilinear motion

- (i)-(a, b), (ii)-(e), (iii)-(d), (iv)-(c), (v)-(a)
- (i)-(e), (ii)-(c), (iii)-(a, e), (iv)-(c), (v)-(d, e)
- (i)-(c, d), (ii)-(d), (iii)-(a, b), (iv)-(e), (v)-(a)
- (i)-(e), (ii)-(c), (iii)-(a, b, c), (iv)-(e), (v)-(d)

7. Reeta puts two different objects in each of the following containers.

Container (i) : Copper coin and iron nail

Container (ii) : Nickel nail and aluminium earring

Container (iii) : Marble and gold coin

Container (iv) : Nickel coin and iron nail

She can use a magnet to separate the objects in containers

- (i) and (ii) only
- (i), (ii) and (iii) only
- (i), (ii) and (iv) only
- (i), (ii), (iii) and (iv).

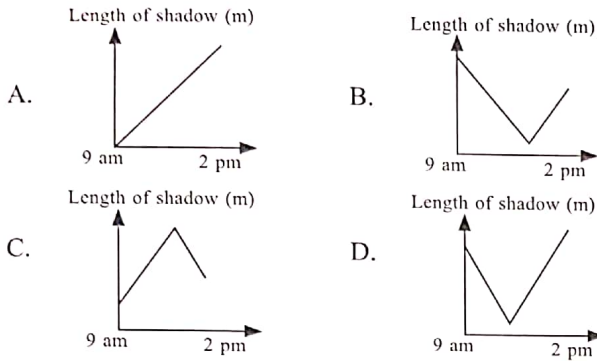
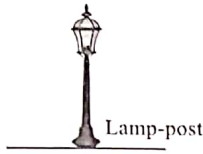
8. A plane mirror reflects a pencil of light to form a real image. Then the pencil of light incident on the mirror is

- Parallel
- Convergent
- Divergent
- None of these.

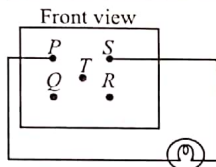
9. Which of the following statements are incorrect?

- The colour of light affects the characteristics of the shadow.
 - If light is allowed to pass through a piece of muslin cloth, a lighter shadow will be formed.
 - The magnetic properties are induced into an iron bar if a magnet is kept near it.
 - Bulb has only one terminal to connect the filament with the circuit.
- I and IV only
 - I, II and III only
 - II and III only
 - III and IV only

10. Which of the following graphs shows the best suitable plot for the length of the lamp-post's shadow from 9 am to 2 pm?



11. The diagram shows the front view of the circuit board.



There are wires connected behind the circuit board which allow the bulb to light up. Which are the possible circuit points?

- A. TQ and QR B. TR and SR
 C. PQ and TS D. PT and TS
12. When one end of an iron rod is placed near a compass,
- The N-pole of the compass needle always point towards it
 - The S-pole of the compass needle always point towards it
 - Any pole of the compass needle may point towards it
 - The compass needle will not be affected by the iron rod.

13. In the given diagram, when object P was placed near object Q , the plastic ball was pushed off the table. What could objects P and Q be?



- | | |
|-----------|---------|
| P | Q |
| A. Steel | Plastic |
| B. Nickel | Magnet |
| C. Iron | Steel |
| D. Magnet | Magnet |

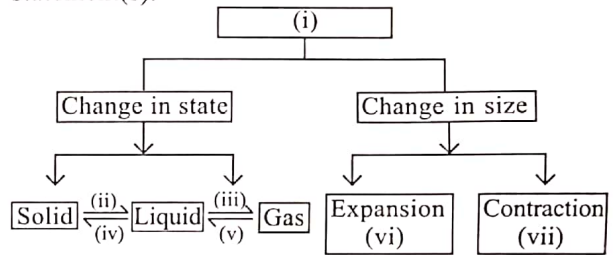
14. A few substances are listed in the box.

(i) Clay	(ii) Rubber band	(iii) Glycerine
(iv) Feather	(v) Thermocol	(vi) Copper coin
(vii) Mustard oil	(viii) Wax	

Which of the following statements is/are correct regarding these substances?

- Substances (i) and (viii) can be easily distinguished from each other on the basis of their miscibility with water.
 - Substances (iii) and (vii) are immiscible in water, and both form the upper layer.
 - Substances (iv), (v) and (viii), all are less dense than water.
 - Substance (ii) is denser than substance (vi).
- A. II only B. I, III and IV only
 C. II and IV only D. III only

15. Study the given flow chart and select the correct statement(s).



- (i) refers to physical irreversible changes.
 - All the changes (ii) to (vii) are endothermic in nature.
 - (i) refers to chemical changes as changes in state and size are accompanied by gain or loss of heat.
 - Changes (ii), (iii) and (vi) are endothermic in nature while changes (iv), (v) and (vii) are exothermic in nature.
- A. I only B. IV only
 C. I, II and III only D. I, III and IV only

16. Read the following statements carefully and state true (T) or false (F) by selecting an appropriate option.

- A mixture of milk and water can be separated by filtration.
- A powdered mixture of salt and sugar can be separated by sieving.
- Very fine muddy particles in water can be separated by using a magnet.
- Grains and husk can be separated by evaporation.

	I	II	III	IV
A.	F	F	F	F
B.	T	F	F	T
C.	T	T	T	F
D.	F	T	T	F

17. Substance W is very hard and lustrous, X is called universal solvent, Y is a good conductor of heat and electricity while Z does not allow light to pass through it. W , X , Y and Z could be respectively

- Wood, water, aluminium and mirror
- Diamond, water, copper and aluminium foil
- Graphite, alcohol, wood and frosted glass
- Gold, vinegar, aluminium and copper.

18. Rakhi has classified a few changes as :

S. No.	Change	Chemical	Physical	Reversible
1.	Cooking of rice	✓	✗	✓
2.	Formation of water from hydrogen and oxygen	✗	✓	✗
3.	Evaporation of petrol	✗	✓	✓
4.	Strong heating of sugar	✓	✗	✗
5.	Bending of a copper wire	✗	✓	✓

Changes classified incorrectly are

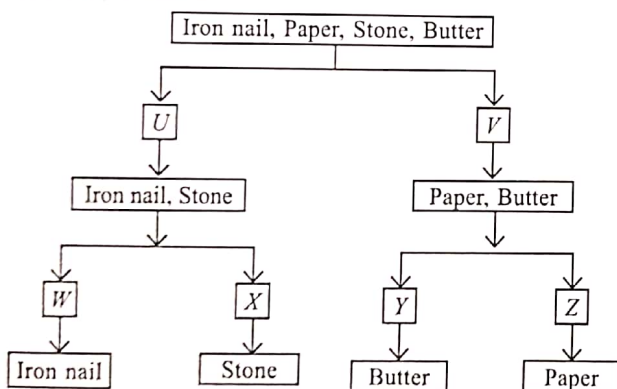
- A. 1, 4 and 5 only B. 1 and 2 only
C. 3, 4 and 5 only D. 2, 4 and 5 only.

19. A mixture of two immiscible liquids can be separated by (i), a mixture of two volatile liquids with a minimum difference of 25°C in boiling points can be separated by (ii), a soluble solid from water can be separated by (iii) while a mixture of two solids having different sizes can be separated by (iv).

(i), (ii), (iii) and (iv) could be respectively

- A. Separating funnel, boiling, filtration and sieving
B. Decantation, evaporation, sieving and winnowing
C. Separating funnel, distillation, evaporation and sieving
D. None of these.

20. Study the given classification chart carefully and identify the incorrect statements regarding the properties U, V, W, X, Y and Z.



- I. U refers to 'more dense than water' while Z refers to 'non-edible'.
II. W refers to 'malleability' while V refers to 'hardness'.
III. Y refers to 'more dense than water' while X refers to 'ductility'.
IV. W refers to 'magnetic material' while X refers to 'non-magnetic material'.
A. II and III only B. I and III only
C. I, III and IV only D. I, II, III and IV

21. Nitesh wanted to separate the components P, Q and R of a mixture. He put the mixture on a wide dish and moved a magnet over the mixture. Component P got separated with magnet. He transferred the remaining mixture into a China dish and subjected it to sublimation. Q was separated as the sublimate and R was left behind as residue which is insoluble in water.

P, Q and R could be respectively

- A. Iron dust, camphor and common salt
B. Allpins, wheat flour and sugar
C. Iron filings, naphthalene balls and sand
D. Allpins, camphor and sugar.

22. Consider the following phenomena :

- (i) Forest fire
(ii) Growth of plants
(iii) Low and high tides
(iv) Occurrence of a rainbow
(v) Earthquake
(vi) Opening of a morning glory flower

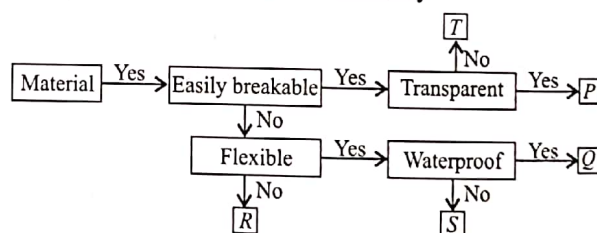
Which of the above phenomena can be classified as periodic changes?

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

23. Avani was given a saturated solution of sugar. She was asked to dissolve two more spoons of sugar into the saturated solution. Which of the following will help her in dissolving more sugar?

- (I) Stir the solution for longer time.
(II) Divide the solution into two separate glasses.
(III) Add more water to the solution.
(IV) Heat the solution.
A. I and II only B. II and III only
C. III and IV only D. IV only

24. Study the given flow chart carefully.



Which of the materials in the flow chart best represent a window glass and a raincoat respectively?

- A. P and T B. P and Q
C. R and S D. Q and P

25. The process of forging and casting metals is a _____ change.

- A. Chemical B. Permanent
C. Periodic D. Physical

26. Neena categorised plants into four groups on the basis of their parts that are generally eaten. In doing so, she unknowingly placed one wrong member in each group. Identify the wrong member of each group and select the correct option.

Group I : Carrot, Turnip, *Colocasia*
 Group II : Cauliflower, Cabbage, Broccoli
 Group III : Potato, Onion, Radish
 Group IV : Cardamom, Fennel, Cloves

- A. *Colocasia* of group I should be interchanged with radish of group III.
 B. Cabbage of group II should be replaced with banana flower.
 C. Cloves of group IV should be replaced with turmeric.
 D. Both A and B

27. Select the correct match.

- (i) Cotton - Retting
 (ii) Jute - Ginning
 (iii) Sliver - Combing
 (iv) Spinning - *Takli*
 (v) Knitting - Hand spindle
 (vi) Weaving - *Charkha*

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

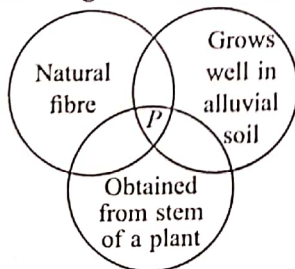
28. Match column I with columns II and III and select the correct option from the given codes.

Column I (Vitamin / Mineral)	Column II (Source)	Column III (Deficiency disease)
P. Vitamin A	1. Seafood	a. Goitre
Q. Vitamin B ₁₂	2. Meat	b. Scurvy
R. Iodine	3. Spinach	c. Night blindness
S. Vitamin C	4. Milk	d. Pernicious anaemia

5. Tomatoes
 6. Carrot

	P	Q	R	S
A.	6, d	2, c	1, 3, a	4, 5, b
B.	3, 6, c	2, 4, d	1, a	5, b
C.	2, 3, d	4, 6, c	1, b	5, a
D.	2, 6, b	3, 5, d	4, a	1, c

29. Identify *P* in the given Venn diagram.



- A. Jute
 B. Nylon
 C. Cotton
 D. Silk

30. Read the following passage carefully.

P helps to maintain strong eyesight and healthy skin. *Q* is required for normal growth of bones in children. *R* is essential for proper functioning of muscles and nerves. *S* is needed for natural clotting of blood.

Identify *P*, *Q*, *R* and *S* and select the incorrect statement regarding these.

- A. *Q* is produced when the skin is exposed to sunlight.
 B. *R* is a mineral, deficiency of which causes spasms, poor digestion, anxiety and sleeplessness.
 C. Cod liver oil is a good source of both *P* and *S*.
 D. *S* is synthesised in our body by bacteria present in the gut.

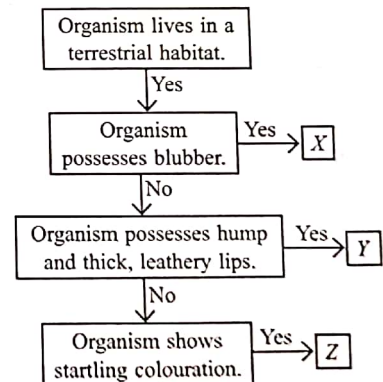
31. The given table shows the degree of angular movement shown by three different skeletal joints *P*, *Q* and *R*.

Skeletal joint	Degree of movement
<i>P</i>	360°
<i>Q</i>	180°
<i>R</i>	0°

Which of the following statements is incorrect regarding these joints?

- A. Joint *P* can be the joint between shoulder bone and arm.
 B. Joint *Q* can be the elbow joint.
 C. Joint *R* can be the joint between the bones of the skull.
 D. None of these

32. Refer to the given flow chart and select the correct statement regarding organisms *X*, *Y* and *Z*.



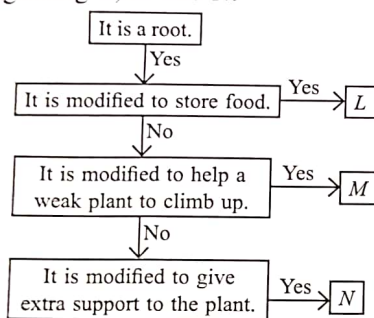
- A. Organism *X* could be a mammal which undergoes hibernation and is a good swimmer.
 B. Organism *Z* may inhabit the area where the leaves of most of the trees are needle-like and have a thick waxy layer.
 C. Organism *Y* inhabits the area which gets plenty of rainfall throughout the year.
 D. Organisms *X*, *Y* and *Z* show mimicry as a protective adaptation to escape their predators.

33. Consider the following statements (i)-(v) and select the option that correctly identifies true (T) and false (F) ones.

- (i) Unsaturated fats are liquids at room temperature whereas saturated fats are solids at room temperature.
- (ii) Deficiency of vitamin B₁ causes pellagra.
- (iii) Water soluble vitamins are not stored in the body and need to be regularly supplied through food items.
- (iv) Presence of protein in a food item can be tested by Benedict's solution.
- (v) Iron is an example of macromineral whereas magnesium is an example of trace mineral.

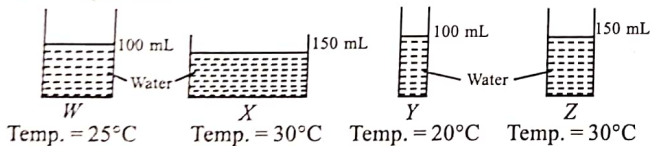
	(i)	(ii)	(iii)	(iv)	(v)
A.	T	T	F	T	T
B.	F	T	T	F	T
C.	T	F	T	F	F
D.	F	F	T	F	T

34. Refer to the given flow chart and select the correct option regarding L, M and N.



	L	M	N
A.	Sweet potato	Sugarcane	Money plant
B.	Ginger	Bamboo	Banyan
C.	Onion	Ivy	Sugarcane
D.	Carrot	Money plant	Maize

35. Which of the following set-ups are best suited to study the effect of exposed surface area on the rate of evaporation?



- A. W and X only
- B. X and Y only
- C. X and Z only
- D. W and Y only

36. Which of the following statements hold true for the root system shown in the given figure?



- (i) It is a fibrous root system.
- (ii) The branches that arise from the main root are called fibrous roots.
- (iii) It is a tap root system.
- (iv) Examples of this type of root system are pea, tulsi, radish, carrot and turnip.

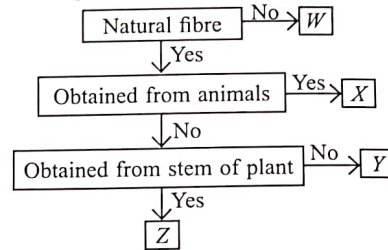
- A. (i) and (iii) only
- B. (ii) and (iv) only
- C. (iii) and (iv) only
- D. (ii) and (iii) only

37. Collecting rainwater and storing it for later use is called rainwater harvesting. Which of the following statements are true for the technique of rooftop rainwater harvesting?

- (i) Roadside drains store rainwater.
- (ii) Rainwater from roof top is collected in storage tanks.
- (iii) The collected rainwater contains soil, so it needs to be filtered.
- (iv) This practice reduces the groundwater available to us.

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

38. Refer to the given flow chart and select the incorrect statement regarding W, X, Y and Z.



- A. W could be synthetic fibre whereas Z could be cellulosic fibre.
- B. X could be protein fibre which is obtained by shearing the animal.
- C. Y could be flax fibre which is obtained from the fruit of kapok tree.
- D. Retting can be involved in processing of obtaining Z.

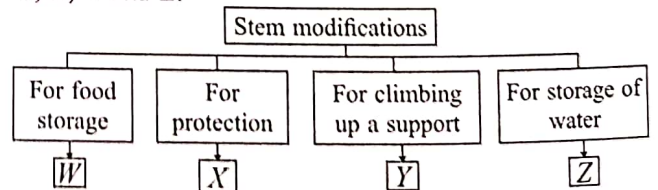
39. Read the given statements and select the correct option.

Statement 1 : The level of groundwater below the surface of Earth at a given place is known as the water table.

Statement 2 : Extensive use of groundwater in cities for domestic and industrial purposes is resulting in lowering of water table.

- 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.

40. Study the given classification chart and identify plants W, X, Y and Z.



	W	X	Y	Z
A.	Dahlia	Hibiscus	Gloriosa	Aloe
B.	Turmeric	Bougainvillea	Grapevine	Opuntia
C.	Asparagus	Potato	Pea	Passion flower
D.	Ipomoea	Rose	Cuscuta	Cucumber

41. Which of the following statements are incorrect?
- About 90% of the ozone in our atmosphere is contained in stratosphere.
 - The warmest parts of our atmosphere are located in mesosphere.
 - Commercial passenger aircrafts usually fly in lower troposphere.
 - Satellites orbit around the Earth in thermosphere.
- A. (iii) and (iv) only B. (ii) and (iii) only
C. (i) and (iii) only D. (i) and (iv) only

42. Which of the following statements is correct regarding skeletal support system of different organisms?
- Earthworms have liquid skeleton that serves as a support system.
 - The shell present in snail is made up of chitin and helps in moving from place to place.
 - Snakes and other limbless animals have bristles on body's under surface that help in movement.
 - The birds have bone marrow in their bones that assist in flying.

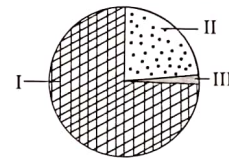
43. Organism *X* can drink large quantity of water at a time and can stay without water for a long time. Organism *Y* has thick skin and fur on its body. It has strong hooves to walk steadily on steep surfaces. Organism *Z* has bright colours and sticky pads on its fingers and toes. It lives on trees. Select the incorrect statement about the habitat of the organisms *X*, *Y* and *Z*.
- Organism *X* lives in a place which receives very little rainfall and daytime temperature in summer can reach above 50°C.
 - Organism *Y* lives in a place where trees like pine, deodar, spruce, fir etc., are of common occurrence.

- Organism *Z* lives in a place where heavy rains are of daily occurrence.
- Organism *X* lives in a place where animals like reindeer, snow leopards, weasels, etc., flourish.

44. Group the waste materials given below under biodegradable and non-biodegradable headings and select the correct option.

(i) Egg shell	(ii) Tin can
(iii) Jute bag	(iv) Plastic wares
(v) Tissue paper	(vi) Old batteries
Biodegradable	Non-biodegradable
A. (ii), (iii) and (v)	(i), (iv) and (vi)
B. (i), (iii) and (v)	(ii), (iv) and (vi)
C. (i), (iii) and (iv)	(ii), (v) and (vi)
D. (iii), (iv) and (vi)	(i), (ii) and (v)

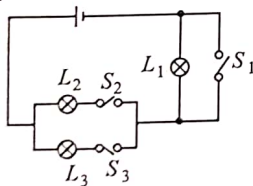
45. Refer to the given pie chart showing the composition of different gases in air. Identify the gases I, II and III and select the correct statement regarding them.



- Plants and animals cannot use gas II directly from air, animals obtain it from plants and plants take its soluble form from the soil.
- A burning candle enclosed in a glass jar filled with gas II extinguishes early as compared to a burning candle enclosed in a glass jar containing gas III.
- Insectivorous plants manufacture their carbohydrates but prepare their proteins by digesting insects as they grow in soil deficient in simple compounds of I.
- Activities like deforestation, crop burning, burning of fossil fuels increase gas I in the atmosphere.

ACHIEVERS SECTION

46. Which of the following statements about the circuit is/are incorrect?



- Lamp L_1 will light up when either L_2 or L_3 are lighted.
 - Electricity will flow only when all the switches are closed.
 - Electricity will flow as long as any one switch is closed.
- I only
 - II and III only
 - I and II only
 - I, II and III

47. A few mixtures are listed in the box.

(i) Air	(ii) Mustard oil and water
(iii) Vinegar and water	(iv) Soda water
(v) Wheat flour and bran	

Now, read the given passage and fill in the blanks by selecting an appropriate option.

Mixtures (p) are homogeneous in nature while mixtures (q) are heterogeneous in nature. Mixture (r) is separated into its components by using a separating funnel where the component having (s) density forms the upper layer.

	p	q	r	s
A.	i, ii, v	iii, iv	iii	Higher
B.	ii, iv	i, iii	v	Lower
C.	i, iii, iv	ii, v	ii	Lower
D.	i, iii, iv	ii, v	i	Higher

48. Refer to the given table.

Characteristics	Plants			
	P	Q	R	S
It has reticulate venation in leaves.	✓	✓	✓	✗
It has fibrous root system.	✗	✗	✗	✓
It is a herb.	✓	✗	✗	✓
It has modified leaf tendril.	✗	✓	✗	✗

Select the option that correctly identifies plants P, Q, R and S.

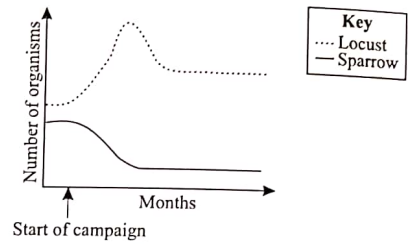
	P	Q	R	S
A.	Coriander	Banyan	Banana	Bamboo
B.	Basil	Grapevine	Rose	Sugarcane
C.	Mint	Pea	Hibiscus	Maize
D.	Mustard	Carrot	Mango	Barley

49. Read the given relationships and select the option that will correctly complete them.

- I. Hemp : Bast fibre :: L : Leaf fibre
- II. Cotton : Ginning :: M : Reeling
- III. Wool : Burning hair :: N : Burning paper
- IV. Spinning : *Charkha* :: O : Handloom

	L	M	N	O
A.	Silk cotton	Wool	Acrylic	Knitting
B.	Coir	Nylon	Silk	Knitting
C.	Rayon	Jute	Shahtoosh	Weaving
D.	Sisal	Silk	Cotton	Weaving

50. A government campaign was conducted in an agricultural area where sparrow population was exterminated as these birds were known to eat grains and decrease crop yield. However, in the months that followed, grain production was severely reduced leading to famines in that area.

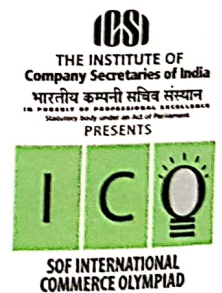
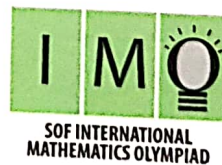


The given graph traces the population changes of one more species in that area after campaign.

Which of the following best explains this?

- A. There was overgrowth of crops due to reduced sparrow population causing the crops to compete for available resources thereby leading to crop failure.
- B. The crash in sparrow population caused the population of locusts (which sparrows prey upon) to spike, which in turn wiped out available crops in field.
- C. The increase in the population of locust is not related with the decrease in the population of sparrow.
- D. None of these

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