NSO

CLASS 7

Contents

SCIENCE OLYMPIAD FOUNDATION

14th NSO

LEVEL - 2

Year 2011-12

MENTAL ABILITY

1. If ⊘ + ♡ + ☆ = 82, ♡ + ☆ = 47, ⊘ + ♡ = 64. Then ⊘ + ☆ = ?

(A) 17 **(B)** 18 **(C)** 35 **(D)** 53

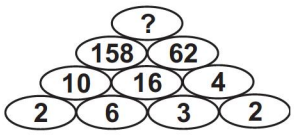
2. What are the common factors of 60 and 120?

(A) 2, 3, 4, 6, 10, 12, 15, 20, 30, 45, 60 **(B)** 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

(C) 2, 3, 4, 5, 10, 12, 15, 20, 30, 40, 60 **(D)** 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 40

3. Find the missing number in the adjoining number pattern.

(A) 9769
(B) 9794
(C) 8976
(D) 7986



4. Twenty per cent of Anuj's annual salary is equal to seventy-five per cent of Raj's annual salary. Raj's monthly salary is sixty percent of Ravi's monthly salary. If Ravi's annual salary is ₹ 1.44 lacs, what is Anuj's monthly salary?

(A) ₹ 2,70,000 **(B)** ₹ 27,000 **(C)** ₹ 3,24,000 **(D)** ₹ 5,400

5. Letters of a word given below have been jumbled up. You are required to construct the word. Each letter has been numbered and the word is followed by four options. Choose the option which gives the correct order of the letters as indicated by the numbers to form the word.

E	T	C	K	O	P
1	2	3	4	5	6

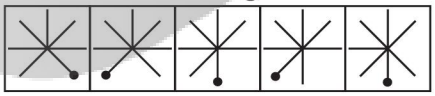
(A) 2, 1, 6, 5, 3, 4 **(B)** 3, 1, 4, 5, 6, 2 **(C)** 6, 4, 1, 2, 3, 5 **(D)** 6, 5, 3, 4, 1, 2

6. If '+' stands for '×', '–' for '÷', × for '–' and '÷' for '+', find the value of 26 + 74 – 4 × 5 ÷ 2.

(A) 220 **(B)** 376 **(C)** 478 **(D)** 488

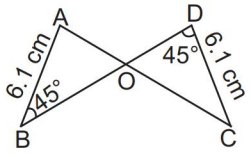
7. Select a suitable figure from the options which will continue the same series established by the five problem figures.

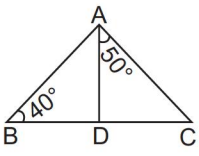
Problem Figures

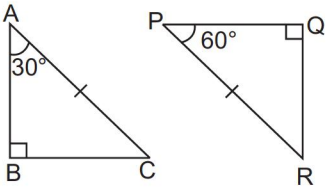


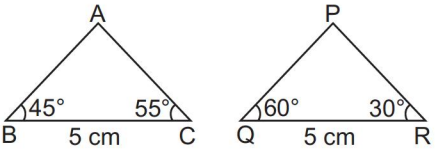
(A)  **(B)**  **(C)**  **(D)** 

8. Which of the following pairs of triangles are not congruent by ASA condition?

(A) 

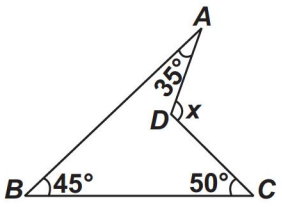
(B) 

(C) 

(D) 

9. **Find the value of x.**

(A) 120°
(B) 130°
(C) 150°
(D) 115°



10. **A hall is 36 m long and 24 m broad allowing 80 m² for doors and windows. The cost of papering the walls at ₹ 8.40 per m² is ₹ 9408. The height of the hall is _____.**

(A) 12 m **(B)** 5 m **(C)** 10 m **(D)** 8 m

11. **Observe the data given below.**

19, 25, 59, 48, 35, 31, 30, 32, 51

If 25 is replaced by 52, what will be the new median?

(A) 25 **(B)** 35 **(C)** 48 **(D)** 32

12. **Simplify** $\frac{2^3 \times 3^4 \times 4}{3 \times 32}$

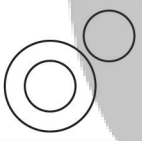
(A) 3 **(B)** 3^2 **(C)** 3^3 **(D)** 3^{-3}

13. **If $x : y = 8 : 9$, find the ratio of $(7x - 4y) : (3x + 2y)$**

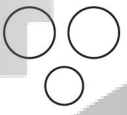
(A) 10 : 21 **(B)** 21 : 15 **(C)** 8 : 10 **(D)** 21 : 10

14. **Choose the Venn diagram which best illustrates the three given classes :**

"Yak, Zebra, Deer"

(A) 

(B) 

(C) 

(D) 

15. **At the end of a business conference all the ten people present shake hands with each other once. How many handshakes will there be altogether?**

(A) 20 **(B)** 45 **(C)** 55 **(D)** 90

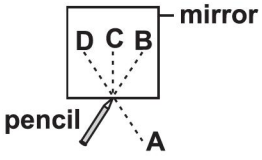
SCIENCE

16. **When the two terminals of a cell are connected directly with a wire, then _____.**

(A) More electrical energy is stored in the cell **(B)** The chemicals get used up very fast
(C) No current flows **(D)** The cell explodes

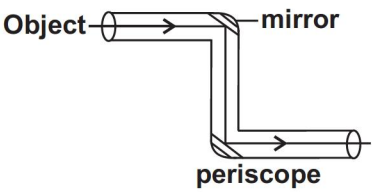
17. **In the given diagram, where will you find the image of the pencil?**

(A) A
(B) B
(C) C
(D) D



18. **Which of the following properties of light are made use of in the periscope shown here ?**

(i) **Light travels very fast.**
(ii) **Light can be reflected.**
(iii) **Light travels in a straight line.**



(A) (i) and (ii) **(B)** (i) and (iii) **(C)** (ii) and (iii) **(D)** (i), (ii) and (iii)

19. Match the two columns and select the correct option.

Column I	Column II
(a) Smallest planet	**(i)** Mars
(b) Hottest planet	**(ii)** Mercury
(c) Planet having rings	**(iii)** Uranus
(d) Planet also called red planet	**(iv)** Venus

(A) a-(ii), b-(iv), c-(iii), d-(i) **(B)** a-(i), b-(ii), c-(iv), d-(iii)
(C) a-(iii), b-(iv), c-(i), d-(ii) **(D)** a-(iv), b-(i), c-(ii), d-(iii)

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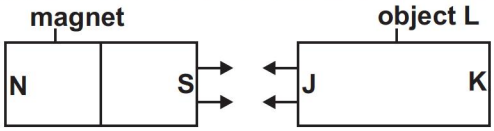
20. Rina puts a magnet near object L. The south pole of the magnet attracts both parts J and K of the object L. Which of the following statements are true ?



1. **Object L is made of steel.**
2. **Object L is made of copper.**
3. **The north pole of the magnet will attract part J of object L.**
4. **The north pole of the magnet will attract part K of object L.**

(A) 1 and 3 **(B)** 2 and 4 **(C)** 1, 3 and 4 **(D)** 2, 3 and 4

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21. Study the diagram carefully.

The diagram does not show energy conversion in an _____.

(A) Electric drill **(B)** Electric blender **(C)** Electric iron **(D)** Electric hair dryer

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22. Train M travels with a speed of 80 km/h from Hyderabad to Bangalore. Train N travels from Hyderabad to Bangalore with a speed of 75 km/h. Which of the following statements is true ?

(A) Trains M and N have different speeds and different velocities.
(B) Trains M and N have same velocity but different speeds.
(C) Trains M and N have the same velocity as they are travelling in the same direction.
(D) Trains M and N have same speed and different velocities .

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23. Which of the following is correct?

(A) A cyclone is formed by a very high pressure system with very high speed winds revolving around it.
(B) In summer the winds flow from the land towards the ocean.
(C) In winter the winds flow from the land to the ocean.
(D) The coastline of India is not vulnerable to cyclones.

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24. Read the statements carefully and mark the correct option.
Statement 1 : Specific heat capacity is the cause of formation of land and sea breeze.
Statement 2 : The specific heat of water is more than land.

(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 and statement 2 is false. **(D)** Both statements 1 and 2 are false.

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25. A compass is often used to indicate direction. Which one of the following is not true about the compass needle?

(A) It is made from steel. **(B)** It always points in the east-west direction.
(C) It must be freely suspended in order to work. **(D)** It is a magnetised object.

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26. Group of neutral substances is

(A) Common salt solution, mustard oil, oxygen, carbon dioxide
(B) Sugar solution, apple juice, oxygen, nitrogen
(C) Glucose solution, kerosene, petrol, oxygen **(D)** Salt solution, mustard oil, lime water, nitrogen

27. **Give the common names of the following.**
Sodium chloride (NaCl), Sodium hydroxide (NaOH), Sodium carbonate (Na_2CO_3), Sodium bicarbonate ($NaHCO_3$) and Potash alum.

(A) Common salt, caustic soda, washing soda, phitkari, baking soda
(B) Common salt, baking soda, caustic soda, washing soda, phitkari
(C) Common salt, washing soda, caustic soda, baking soda, phitkari
(D) Common salt, caustic soda, washing soda, baking soda, phitkari

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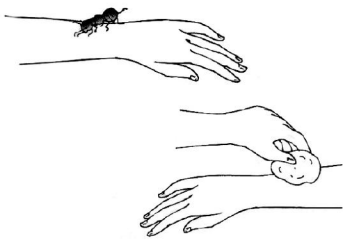
28. **Observe the given figure carefully. What conclusion could you draw regarding compound injected inside the skin, solution used for relief and the process?**



	Injected	Used for relief	Process
(A)	Lactic acid	Calamine solution	Neutralisation
(B)	Formic acid	Calamine solution	Neutralisation
(C)	Sodium hydroxide	Hydrochloric acid	Neutralisation
(D)	Baking soda	Hydrochloric acid	Acidification

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29. **A beaker of ice was left in the open for 10 minutes. Which one of the following statements is true when the ice melts?**

(A) The ice loses heat when it melts.
(B) The ice gains heat when it changes to water and steam.
(C) The ice loses heat to the surrounding and changes its state.
(D) The ice gains heat from the surrounding and changes its state.

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30. **Match Column I with Column II and select the correct option from the codes given below.**

Column I	Column II
(a) Vinegar	**(i) Neutral**
(b) Milk of magnesia	**(ii) Acidic**
(c) Sugar solution	**(iii) Indicator**
(d) Gudhal petals	**(iv) Basic**

(A) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii) **(B)** (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)
(C) (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv) **(D)** (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)

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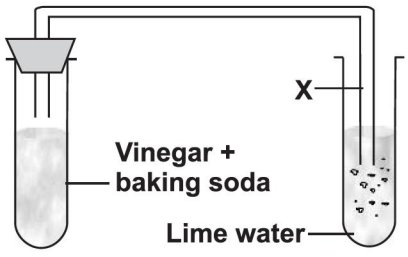
31. **Vinegar and baking soda are mixed together in a test-tube and a setup is prepared to pass the evolved gas through lime water as shown in the given figure. Lime water turns milky after passing gas X through it. Identify gas X.**



(A) O_2 **(B)** SO_2
(C) H_2 **(D)** CO_2

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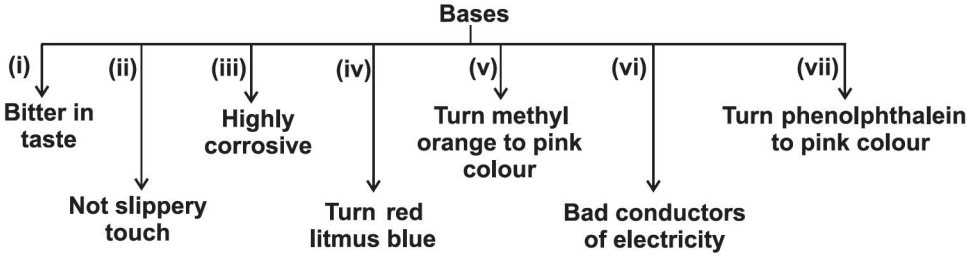
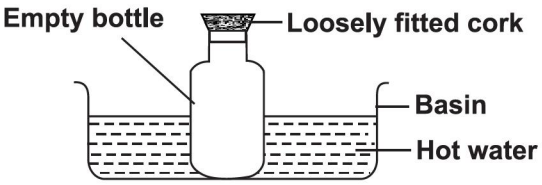
32. **Read the following chart carefully.**



Which of the following paths do not show characteristics of bases?

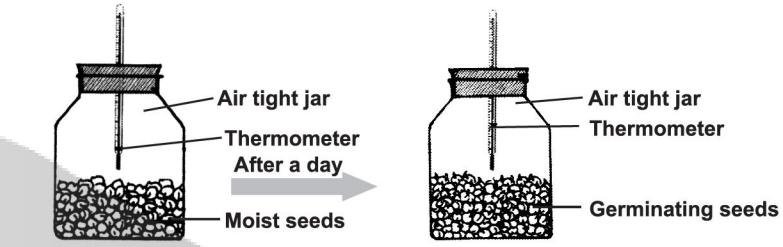
(A) (ii), (iii) and (iv) **(B)** (ii), (v) and (vi) **(C)** (ii), (v) and (vii) **(D)** (v), (vi) and (vii)

33. Neha used the given apparatus to conduct an experiment. She noticed that the cork popped out of the bottle. This shows that



(A) Water expands on heating
(B) Air expands and moves up on heating
(C) Water moves inside the bottle on heating
(D) Cork contracted on heating

34. Examine the given experiment. Why has rise in temperature occurred ?



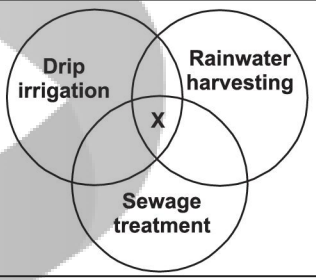
(A) Because of reproduction.
(B) Because of photosynthesis.
(C) Because of excretion.
(D) Because of respiration.

35. Which of the following characteristics of polar bear are not adaptations to cold climate ?

(i) White fur **(ii) Thick fur**
(iii) Sharp teeth and claws **(iv) Fat under the skin**
(v) Wide and large paws

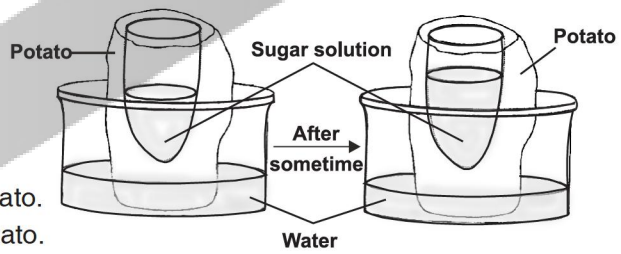
(A) (i) & (ii) **(B)** (i) & (iv) **(C)** (ii) & (iv) **(D)** (iii) & (v)

36. What is X in the given Venn diagram ?



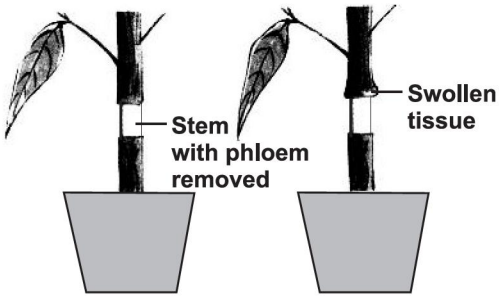
(A) Disposal of water
(B) Storage of water
(C) Conservation of water
(D) Run-off water

37. How did the water get inside the potato cavity ?



(A) Water moves from an area of more water molecules to an area of less water molecules.
(B) Water moves from an area of less water molecules to an area of more water molecules.
(C) Sugar moves outside and water moves inside the potato.
(D) Water moves outside and sugar moves inside the potato.

38. Take a plant with thick stem. Remove the phloem tissue as shown in the figure. Observe the stem after a few days. The stem shows swelling in the upper portion. This is due to



(A) Upward movement of food getting blocked
(B) Downward movement of food getting blocked
(C) Upward movement of water getting blocked
(D) Downward movement of water getting blocked

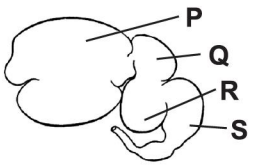
39. The given figure shows a type of vegetative plant propagation that gives rise to new plants. What is it called ?

(A) Climber
(B) Runner
(C) Tendril
(D) Bulbil

40. **In insects, exchange of gases takes place through _____.**

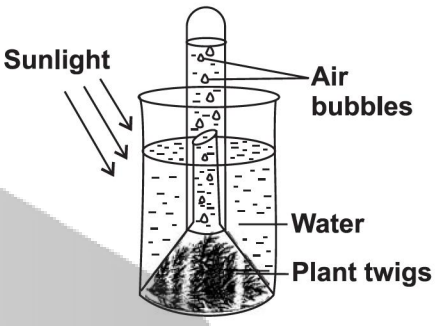
(A) Spiracles **(B)** Stomata **(C)** Bronchi **(D)** Alveoli

41. **The given figure represents the stomach of ruminants with its four chambers labelled as P, Q, R and S. Which chambers allow grazing animals like sheep, cattle etc. to efficiently digest cellulose, a common carbohydrate in plants and how ?**



(A) P, Q, S; these chambers secrete cellulase enzyme.
(B) P and Q; these chambers contain billions of bacteria that digest cellulose.
(C) R and S; these chambers contain billions of bacteria that digest cellulose.
(D) P and Q; these chambers secrete cellulase enzyme.

42. **Anusha puts some freshly cut plant twigs in a beaker filled with water. She covered the plant with a funnel and test tube as shown in the given figure and then put the setup in sunlight. After few hours, she observes that bubbles are evolving in the setup. Which of the following is correct regarding the air bubbles ?**



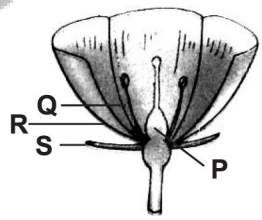
(A) Bubbles evolve as carbon dioxide is released in plant respiration.
(B) Bubbles evolve because water gets heated under sunlight.
(C) Bubbles evolve as oxygen is released in photosynthesis.
(D) Both (A) & (B)

43. **What is the basis of the given pairing ?**

Plant		Animal
• Dodder	–	Tapeworm
• Venus fly trap	–	Lizard

(A) Occurrence in the same place.
(B) Resemblance in external features.
(C) Similar food resources.
(D) Similarity in the mode of nutrition.

44. **Refer the given figure of a flower with labelled parts P, Q, R and S. Which of the following is incorrect regarding floral part and its function ?**



(A) S – Protects floral parts.
(B) P – Place of fusion of male and female gametes.
(C) Q – Produces thousands of pollen grains.
(D) R – Attracts the pollinators.

45. **Read the given statements.**

(i) **In stomach, hydrochloric acid kills _____ and helps the enzyme _____ to work.**
(ii) **_____ is the common chamber where wind pipe and food pipe open, but _____ closes the wind pipe when we swallow food.**
(iii) **_____ are used for tearing food, while _____ help in grinding food.**

Select the option that correctly fills the blanks in any two of the above statements.

(A) (i)-Parasites, Ptyalin ; (iii)-Premolars, Canines
(B) (ii)-Pharynx, Epiglottis ; (iii)-Canines, Molars
(C) (i)-Bacteria, Pepsin ; (ii)-Oesophagus, Epiglottis
(D) (i)-Parasites, Pepsin ; (iii)-Canines, Incisors

46. **Anita gets a home assignment to prepare a file of fabrics made up of different fibres. She takes a piece of fabric and burns it to identify the fibre. It burns with a smell of burning plastic. What does this show ?**

(A) Fabric is made up of cotton.
(B) Fabric is made up of an expensive material.
(C) Fabric is made up of pure wool.
(D) Fabric is made up of synthetic fibres.

47. Match Column I with Column II and select the correct option from the codes given below.

	Column I		Column II
(a)	Shearing	(i)	Cleaning fabric
(b)	Weaving	(ii)	Synthetic material
(c)	Scouring	(iii)	Angora goat
(d)	Sericulture	(iv)	Changing fibre to yarn
(e)	Acrylic	(v)	Removing fleece
(f)	Mohair	(vi)	Raising silkworms
(g)	Spinning	(vii)	Changing yarn to fabric

(A) a-(v), b-(vii), c-(i), d-(vi), e-(ii), f-(iii), g-(iv) **(B)** a-(v), b-(i), c-(iii), d-(vi), e-(ii), f-(iv), g-(vii)
(C) a-(v), b-(vii), c-(vi), d-(i), e-(ii), f-(iv), g-(iii) **(D)** a-(vii), b-(v), c-(i), d-(vi), e-(ii), f-(iii), g-(iv)

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48. Read the given statements and select the correct option.
Statement 1 : Water present in rocks expands when it freezes and breaks the rock.
Statement 2 : Temperature plays an important role in rock weathering.

(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 and statement 2 is false. **(D)** Both statements 1 and 2 are false.

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49. Identify the soil types X, Y and Z from the given table and select the correct option.

Soil types	Sand particles	Fine particles	Rate of percolation	Porosity
X	10%	80%	3.6 mL/min	Low
Y	70%	28%	15 mL/min	High
Z	42%	40%	7.2 mL/ min	Average

	X	Y	Z
(A)	Sandy soil	Loamy soil	Clayey soil
(B)	Clayey soil	Sandy soil	Loamy soil
(C)	Clayey soil	Loamy soil	Sandy soil
(D)	Sandy soil	Clayey soil	Loamy soil

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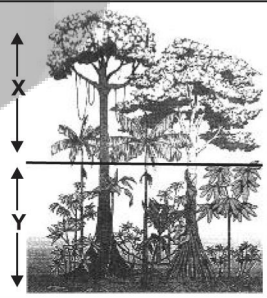
50. Refer the given figure of tropical forest. Which of the following is incorrect regarding X and Y ?



(A) X shows relatively more photosynthesis.
(B) Y receives lower amount of rainfall.
(C) Y consists of shrubs and layer of ferns, mosses and herbs.
(D) Y receives abundant sunlight.

SPACE FOR ROUGH WORK

CLASS24

SCIENCE OLYMPIAD FOUNDATION

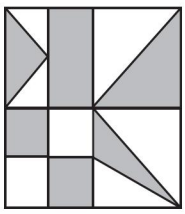
15th NSO

LEVEL - 2

Year 2012-13

MENTAL ABILITY

1. What fraction of the given figure is shaded ?



(A) $\frac{7}{16}$ (B) $\frac{1}{2}$

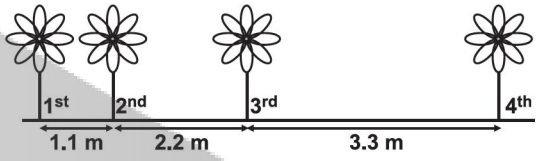
(C) $\frac{9}{16}$ (D) $\frac{17}{32}$

2. There are 80 members in a Science Club. 70% of them are boys. $\frac{9}{14}$ of the boys are primary pupils. How many primary boys are there in the Science Club?

(A) 26 (B) 36 (C) 46 (D) 56

3. Indu placed some paper flowers in a straight line as shown. How far is the 7th flower from the 1st flower ?

(A) 28.8 m
(B) 22.2 m
(C) 24 m
(D) 23.1 m

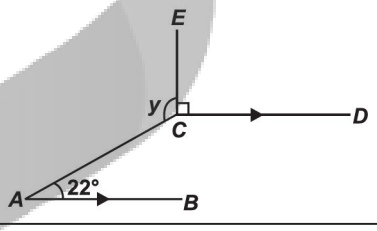


4. The ratio of the number of Mohit's stamps to Anuj's is 8 : 5. The ratio of the number of Anuj's stamps to Samit's is 2 : 3. They have 328 stamps altogether. How many more stamps does Mohit have than Samit ?

(A) 15 (B) 12 (C) 8 (D) 14

5. In the given figure (not drawn to scale), *AB* is parallel to *CD* and $\angle ECD$ is a right angle. Find $\angle y$.

(A) 111°
(B) 112°
(C) 113°
(D) 114°

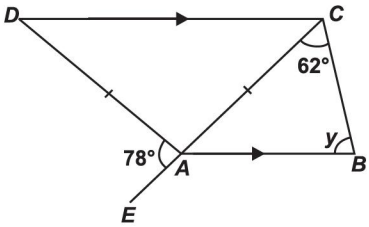


6. Find the value of $\frac{2^{n+4} - 2\ 2^n}{2\ 2^{n+3}} + 2^{-3}$.

(A) 2^{n+1} (B) $\left(\frac{9}{8} - 2^n\right)$ (C) 0 (D) 1

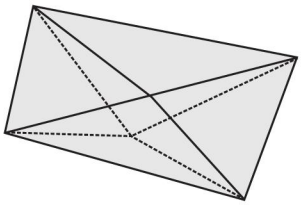
7. In the given figure (not drawn to scale), *ABCD* is a trapezium with *AB* parallel to *DC*, *AC* = *AD* and *EAC* is a straight line. Find $\angle y$.

(A) 75°
(B) 77°
(C) 78°
(D) 79°



8. How many faces does the solid have ?

(A) 8
(B) 9
(C) 12
(D) 14



9. Nikki's father is five times as old as Nikki. 8 years later, Nikki will be $\frac{1}{3}$ as old as her father. What is the present age of Nikki's father ?

(A) 32 years (B) 40 years (C) 20 years (D) 5 years

10. The given table shows the marks obtained by Sushant in two examinations.

Subject	First Term	Mid Term
English	84	82
Mathematics	90	94
Science	78	85
Hindi	76	?

The maximum marks for each subject is 100. If Sushant's average mark in First Term was 2.5 marks less than in Mid Term, how many more marks did he score for Hindi in Mid Term than in First Term ?

(A) 12 **(B)** 1 **(C)** 13 **(D)** 4

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11. Grass is to be laid in a rectangular plot 15 m long and 13 m wide leaving two triangular sections at opposite edges for two flower beds. If the flower beds are to be equal right-angle isosceles triangles with equal sides measuring 1.5 m each, find out how much would it cost to lay grass at ₹ 8 per sq. m ?

(A) ₹ 1542 **(B)** ₹ 1462 **(C)** ₹ 1264 **(D)** ₹ 1642

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12. In how much time would the simple interest on a certain sum be 0.125 times the principal at 10% per annum ?

(A) $1\frac{1}{4}$ years **(B)** $1\frac{3}{4}$ years **(C)** $2\frac{1}{4}$ years **(D)** $2\frac{3}{4}$ years

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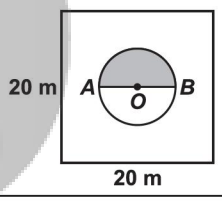
13. If *OA* = 7 cm, then find the area of the shaded part of the given figure.

(A) 90 m^2
(B) 77 m^2
(C) 77 cm^2
(D) 90 cm^2



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14. Amongst *P, Q, T, R* and *S*, each having a different height, *T* is taller than *P* and *S* but shorter than *R* and *Q*. *P* is not the shortest. Who amongst them is the tallest ?

(A) *R* **(B)** *Q* **(C)** *P* **(D)** *R* or *Q*

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15. In the following list of numerals, how many 2's are followed by 1's but not preceded by 4 ?

4 2 1 2 1 4 2 1 1 2 4 4 4 1 2 2 1 2 1 4 4 2 1 4 2 1 2 1 2 4 1 4 2 1 2 4 1 4 6

(A) 2 **(B)** 3 **(C)** 4 **(D)** 5

SCIENCE

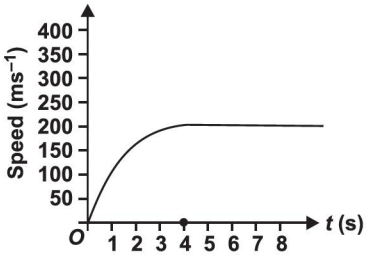
16. Beena obtains a blurred image of an object on a screen by using a concave mirror. In order to obtain a sharp image on the screen, she will have to shift the mirror _____.

(A) Towards the screen **(B)** Away from the screen
(C) Either towards or away from the screen depending upon the position of the object
(D) To a position very far away from the screen

---

17. A bus is moving on a straight road. The speed time graph for the motion of the bus is shown in figure. Find the distance travelled by the bus in 4 seconds.

(A) 100 m
(B) 200 m
(C) 300 m
(D) 400 m



18. Low atmospheric pressure exists on the earth in which of the following latitudes?

(A) At the equator only **(B)** At 30° N and S
(C) At the poles **(D)** At the equator and at 60° N and S.

19. A metal rod is shaped into a ring with a small gap. If this is heated, which of the following will not occur?

(A) The length of the rod will increase. **(B)** The gap will decrease.
(C) The gap will increase.
(D) The diameter of the ring will increase in the same ratio as the length of the rod.

20. Which one of the following statements is false?

(A) The electric current leaving the positive terminal of a battery is the same as the current returning to the negative terminal.
(B) A battery supplies the same current to any object to which it is connected.
(C) A conductor in which an electric current is flowing has an electric field in its interior.
(D) The electric current flows in a direction opposite to the motion of the electrons.

21. Read the following statements and mark the correct option.

Statement 1 : On the earth, summer occurs when the earth is closest to the sun and winter occurs, when the earth is farthest from the sun.

Statement 2 : The earth is a satellite of the sun.

(A) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement 1.
(B) Both statements 1 and 2 are correct but statement 2 is not the correct explanation of statement 1.
(C) Statement 1 is correct but statement 2 is incorrect. **(D)** Both statements 1 and 2 are incorrect.

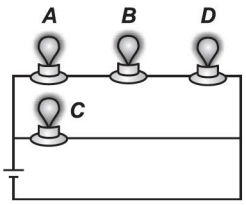
22. Why do people feel cool if they do not dry themselves after swimming in the sea?

(A) Water evaporates and causes cooling. **(B)** Water insulates them from the warm air.
(C) Water is a good conductor of heat. **(D)** Water is colder than the air.

23. A truck takes 20 s to travel the first 80 m, and another 10 s to travel a further 70 m. What is the average speed of the truck?

(A) 0.20 m s^{-1} **(B)** 2.3 m s^{-1} **(C)** 4.0 m s^{-1} **(D)** 5.0 m s^{-1}

24. Four identical light bulbs are shown in figure. What happens if bulb *A* fails, so that it cannot conduct?



(A) Both bulbs *B* and *D* will glow.
(B) Only bulb *C* will glow.
(C) Only bulb *D* will glow.
(D) Both bulbs *C* and *D* will glow.

25. When a horse pulls a cart, the force that helps the horse to move forward is the force exerted by _____.

(A) The cart on the horse **(B)** The ground on the horse
(C) The ground on the cart **(D)** The horse on the ground

26. Niranjan collected soil samples from two different fields-1 and 2 which have poor fertility. He collected the following information about the two fields.

- **Excessive use of chemical fertilisers in field-1.**
- **Soil solution of field-2 turns colour of phenolphthalein to pink.**

Suggest the soil treatment of the two fields for better crop yield.

(A) Slaked lime for both the fields **(B)** Organic matter for both the fields
(C) Slaked lime for field-1 and organic matter for field-2
(D) Organic matter for field-1 and slaked lime for field-2

27. **Study the following changes :**

(i) **Fireworks exploding** **(ii)** **Drawing copper into a wire**

(iii) **Melting butter for popcorn** **(iv)** **Expansion of metals**

(v) **Curdling of milk**

Choose the correct statements.

(A) (iii) and (v) are physical changes. **(B)** (ii), (iii) and (iv) are physical changes.

(C) (i), (ii) and (v) are chemical changes. **(D)** (iii), (iv) and (v) are chemical changes.

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28. **Which of the following are neutralisation reactions?**

1. $2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2H_2O$ **2.** $H_2SO_4 + 2NH_4OH \longrightarrow (NH_4)_2SO_4 + 2H_2O$

3. $Ca(OH)_2 + 2NH_4Cl \longrightarrow CaCl_2 + 2H_2O + 2NH_3$ **4.** $MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_2O + Cl_2$

5. $NaOH + HNO_3 \longrightarrow NaNO_3 + H_2O$

(A) 1 and 2 **(B)** 1, 2 and 5 **(C)** 3 and 4 **(D)** All of them

---

29. **Gases which are released into the air as pollutants dissolve in rain drops to form acids. Which of the following makes the rain acidic?**

1. **Sulphuric acid** **2.** **Nitric acid** **3.** **Carbonic acid** **4.** **Hydrochloric acid**

(A) 1 and 2 **(B)** 1, 2 and 3 **(C)** 2 and 4 **(D)** 1, 2 and 4

---

30. **Choose the incorrect statement among the following.**

(A) Vinegar is used to cure wasp stings because vinegar can neutralise the stings.

(B) Bacteria in our mouth change the sugar left on our teeth into bases which cause the decay of teeth.

(C) Antacids contain weak alkalis, which can neutralise the excess acid in our stomach.

(D) Baking soda is added to milk which neutralises the lactic acid in milk to prevent curdling of milk.

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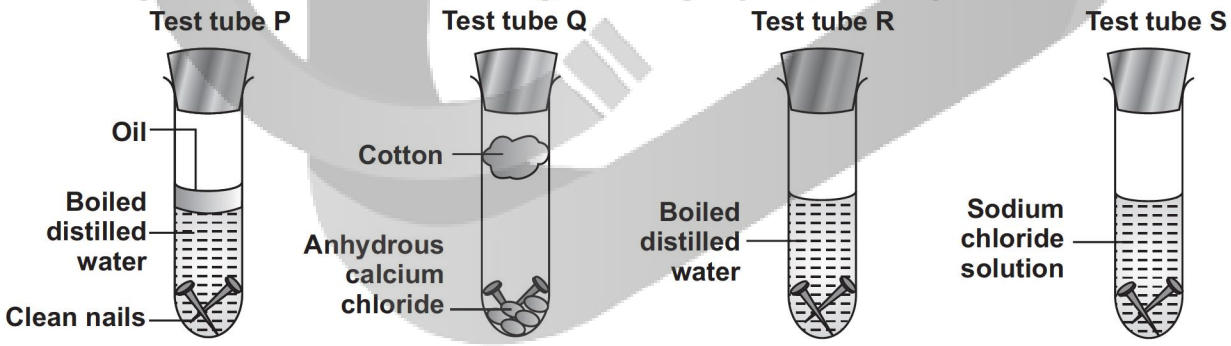
31. **To investigate the conditions for rusting, following experiment was performed.**



In which test tube, nails rusted most heavily and what inference can be drawn from it?

(A) Test tube P, water is needed for rusting.

(B) Test tube Q, air is needed for rusting.

(C) Test tube R, boiled water increases the rusting speed.

(D) Test tube S, presence of sodium chloride increases the rusting speed.

---

32. **Match the columns and mark the correct option.**

Reactions	**Identification of the product(s) formed**
(P) **Magnesium oxide + Water $\longrightarrow$**	**(I)** **Turns lime water milky**
(Q) **Vinegar + Baking soda $\longrightarrow$**	**(II)** **Forms a film of brownish substance**
(R) **Copper sulphate solution + Iron $\longrightarrow$**	**(III)** **Turns red litmus blue**
(S) **Iron + Oxygen + Water $\longrightarrow$**	**(IV)** **Solution turns green with brownish deposits**

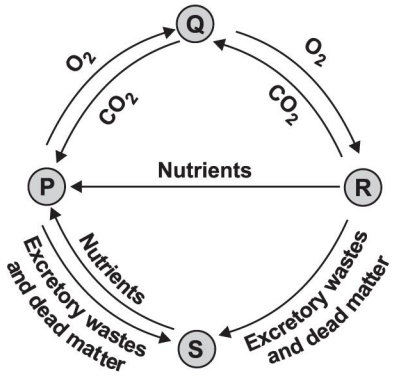
(A) (P)–(I); (Q)–(IV); (R)–(II); (S)–(III) **(B)** (P)–(III); (Q)–(I); (R)–(IV); (S)–(II)

(C) (P)–(II); (Q)–(III); (R)–(I); (S)–(IV) **(D)** (P)–(IV); (Q)–(II); (R)–(III); (S)–(I)

33. A solution P is added to another solution Q to form a salt R and water with the evolution of heat. Solution Q turns methyl orange to red and an indicator S to colourless. Identify solution P and indicator S respectively.

(A) Vinegar, Litmus solution **(B)** Curd, Phenolphthalein
(C) Spinach juice, Litmus solution **(D)** Window cleaner, Phenolphthalein

34. Refer the given diagram that shows nutritional interactions among two organisms (P and R), atmosphere (Q), and lithosphere (S). Identify the two organisms and select the correct option.

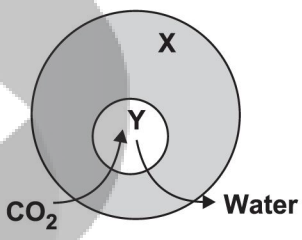


	P	R
(A)	Neem	Mistletoe
(B)	*Cuscuta*	Mango
(C)	Pitcher plant	Insects
(D)	Mushroom	Wood logs

35. Which of the following pairs possess similar mode of nutrition?

(A) Lizard - Venus flytrap **(B)** Mosquito - *Cuscuta* **(C)** Vulture - Mushroom **(D)** All of these

36. Which of the following options correctly identifies X and Y in the given Venn diagram that represents a plant structure?



(A) X - Root, Y - Root hair
(B) X - Leaf, Y - Leaf cell
(C) X - Stem, Y - Xylem
(D) X - Leaf, Y - Phloem

37. Riya's father has undergone surgical removal of gall bladder due to some complications. Now, he will not be able to digest _____.

(A) Proteins efficiently because pepsin will not be produced.
(B) Fats efficiently because bile will not be produced.
(C) Carbohydrates efficiently because HCl that activates amylase function will not be produced.
(D) None of these

38. Two organisms X and Y were kept in complete isolation in a well planted garden within two separate cages. They were regularly provided with water but not with food. Organism X flourished well but the organism Y died. What could be the most suitable explanation for this?

(A) Organism Y was a saprophyte and it cannot get dead organic matter to feed upon.
(B) Organism X was a bird parasite and could feed upon the birds living on trees.
(C) Organism Y was a carnivore and it cannot get its prey animal to feed upon.
(D) Organism X was a herbivore and could feed upon the dead organic matter present in soil.

39. Saurabh burned two different fibres X and Y in order to identify them. X smelt like burning paper while Y smelt like burning hair. Which of the following options correctly identifies the two fibres?

	X	Y
(A)	Wool	Silk
(B)	Cotton	Rayon
(C)	Cotton	Silk
(D)	Silk	Wool

40. **The given box shows some animal adaptations. Which of the following options correctly classifies these adaptations in accordance to desert and cold habitats?**

	Desert habitat	Cold habitat
(A)	(i), (ii), (iii)	(i), (ii), (iv)
(B)	(i), (iii), (iv)	(ii), (iii), (iv)
(C)	(i), (ii), (iv)	(i), (ii), (iii)
(D)	(ii), (iii), (iv)	(i), (iii), (iv)

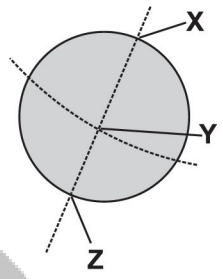
(i) Fat deposition in body
(ii) Thick, padded paws
(iii) Dense fur on body
(iv) Production of concentrated urine

41. **Which of the following is not a function of forests ?**

(A) Act as climate control factor **(B)** Prevention of global warming
(C) Flood control and desertification **(D)** None of these

42. **Given below is the conversation of three friends Ritu, Jaya and Sudhir.**

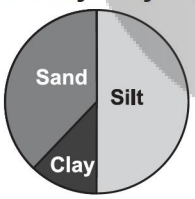
Ritu : I live at the place with longest daylight period and high average day temperature.
Jaya : I have been to an interesting place where there is 6 months of day and 6 months of night.
Sudhir : I live at the place which receives sun rays vertically.

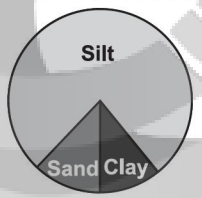


Which of the following statements is incorrect in context of the conversation?
[Refer the given figure of Earth showing positions X, Y and Z]

(A) Ritu lives at the place Y. **(B)** Jaya has been either to place X or to place Z.
(C) Sudhir lives at the place Z. **(D)** Both (B) and (C).

43. **Gaurav is participating in pottery activity in school. The composition of the soil best suited for the activity may be represented as _____.**

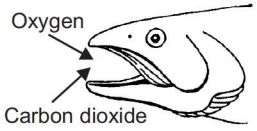
(A) 

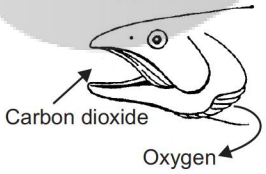
(B) 

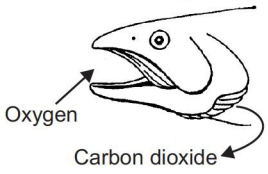
(C) 

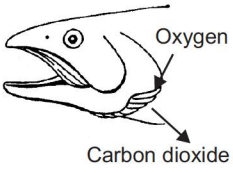
(D) 

44. **Which diagram shows the path of oxygen and carbon dioxide during respiration in a fish?**

(A) 

(B) 

(C) 

(D) 

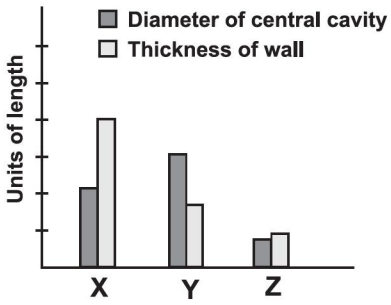
45. **During the process of inhalation in human beings _____.**

(A) Diaphragm contracts but external intercoastal muscles and lungs expand.
(B) Diaphragm expands but external intercoastal muscles and lungs contract.
(C) Diaphragm and external intercoastal muscles expand but lungs contract.
(D) Diaphragm and external intercoastal muscles contract but lungs expand.

46. **Which of the following groups contains plants which share the same kind of vegetative propagules?**

(A) Ginger, Onion, Dahlia **(B)** Dahlia, *Bryophyllum*, Sweet potato
(C) Onion, Turmeric, Ginger **(D)** Sweet potato, Dahlia, Potato

47. The given graph shows measurements of different types of blood vessels. Select the correct option regarding these vessels.



(A) Blood vessels of type X always carry oxygenated blood.

(B) Blood vessels of type Y always carry deoxygenated blood.

(C) Z represents a capillary which are very thin walled blood vessels.

(D) All of these

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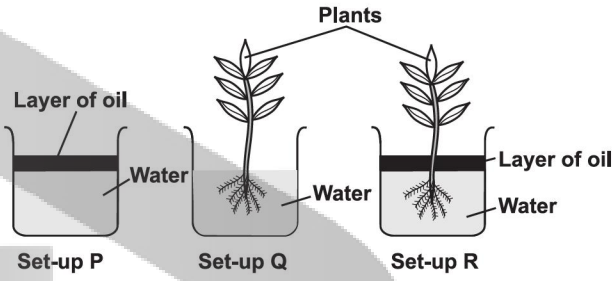
48. Megha conducted an experiment with plants and prepared three set-ups as shown in the figure. Which of the three beakers will show the maximum decrease in water level?

(A) Set-up P, because layer of oil increases evaporation.

(B) Set-up R, because it will lose water by both transpiration and evaporation.

(C) Set-up Q, because it will lose water by both transpiration and evaporation.

(D) Set-ups R and Q will show same level of decrease because both of them lose water by transpiration.



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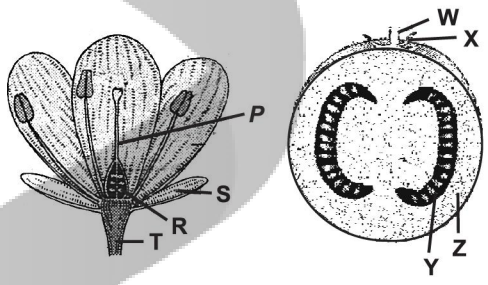
49. The given figures show a longitudinal section of a flower and a fruit. Which of the following incorrectly matches the floral part to the fruit part it develops into?

	Floral part	Fruit part
(A)	P	Z
(B)	T	W
(C)	R	Y
(D)	S	X



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

Statement 1 : Plants and animals both are essential for each other's survival.

Statement 2 : Animals complete the process of nutrient recycling thus maintain soil nutrients.

(A) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement 1.

(B) Both statements 1 and 2 are correct but statement 2 is not the correct explanation of statement 1.

(C) Statement 1 is correct but statement 2 is incorrect. **(D)** Both statements 1 and 2 are incorrect.

SPACE FOR ROUGH WORK

SCIENCE OLYMPIAD FOUNDATION

16th NSO

LEVEL - 2

Year 2013-14

MENTAL ABILITY

1. If '+' means '–', '–' means '×', '×' means '÷', and '÷' means '+', then find the value of
$14 \times 3 \div 11 - 3 + 101$?

A. $63.\overline{3}$
B. $-63.\overline{3}$
C. 63.48
D. 63.3

2. In the following question two rows of numbers are given. The resultant number in each row is to be worked out separately based on the following rules and the question below the numbers is to be answered. The operations of rows of numbers progress from left to right.

Rules:

(i) If a two-digit odd number is followed by a two-digit odd number they are to be added.
(ii) If a two-digit even number is followed by a two-digit odd number which is a perfect square, the even number is to be subtracted from the odd number.
(iii) If a three-digit number is followed by a two-digit number the first number is to be divided by the second number.
(iv) If a prime number is followed by an even number the two are to be added.
(v) If an even number is followed by another even number the two are to be multiplied.

16 8 32
132 11 X^2

If X is the resultant of the first row, what is the resultant of the second row?

A. 192
B. 128
C. 132
D. 144

3. Which of the following statements are true and which are false?

(i) An equilateral triangle has rotational symmetry of order 3 about the point of intersection of its altitudes.
(ii) A square has rotational symmetry of order 4 about a vertex.
(iii)  has reflection symmetry about a line but no rotational symmetry about a point.

	(i)	(ii)	(iii)
A.	True	False	True
B.	False	True	False
C.	False	True	True
D.	True	True	False

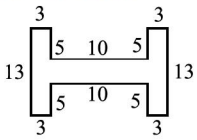
4. Simplify: $\dfrac{36^2\left(2^3 \times 24^2\right)^3 \times \left(6^2\right)\left[(-2)^4 - 2^3\right]}{27^3\left(3^2 \times 8^4\right)^2}$

A. $\dfrac{128}{27}$
B. 4096
C. $\dfrac{128}{9}$
D. $\dfrac{4096}{3}$

5. A woman is seven times as old as her son. After 5 years, she will be four times as old as her son. What are the present ages of the mother and son respectively?

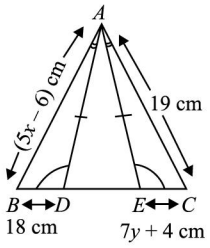
A. 35 years, 5 years
B. 42 years, 8 years
C. 38 years, 8 years
D. 32 years, 4 years

6. Find the area and the perimeter of the given figure (not drawn to scale) in which every corner is right angled and the dimensions are in centimetres.



A. 144 cm^2, 80 cm
B. 108 cm^2, 78 cm
C. 256 cm^2, 44 cm
D. 108 cm^2, 88 cm

7. Evaluate x and y in the given figure.



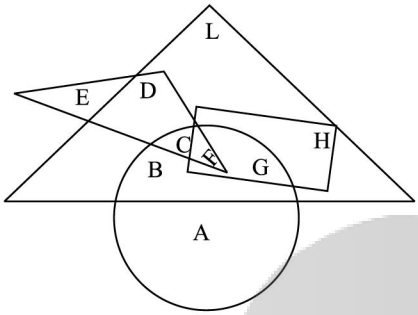
A. $x = 5, y = 2$
B. $x = 5, y = 6$
C. $x = 9, y = 3$
D. $x = 6, y = 4$

8. Find the value of

$$\frac{2\frac{2}{5} \text{ of } \left[\frac{5}{8} + \left\{1\frac{4}{7} \div \left(\frac{1}{5} + \frac{3}{7}\right)\right\} \times \frac{3}{8}\right]}{12.5 + \left[7.5 - (-3.5) + 8.25\right]}$$

A. $\dfrac{15}{127}$
B. $\dfrac{18}{127}$
C. $\dfrac{15}{129}$
D. $\dfrac{17}{127}$

9. In the following figure, the smaller triangle represents the teachers; the big triangle represents the politicians; the circle represents the non-graduates and the rectangle represents members of Panchayat. Different regions are being represented by the letters of English alphabet.



Who among the following members of Panchayat is a non-graduate as well as a teacher?

A. G
B. F
C. C
D. H

10. Find the missing character in the given figure matrix, if the matrix follows certain trend row-wise or column-wise.

7	9	21	27
4	2	36	18
9	4	54	?

A. 18
B. 24
C. 36
D. 58

11. A seller would make a profit of 12% by selling a lunch box at ₹ 392. At what price should he sell it to make a profit of 15%?

A. ₹ 402.50
B. ₹ 502.80
C. ₹ 432.70
D. ₹ 532

12. Which of the following statements is incorrect with respect to Rational Numbers?

A. A rational number can be expressed in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
B. The number 0 is neither a positive nor a negative rational number.
C. There are infinite rational numbers between two rational numbers.
D. All rational numbers are integers.

13. If a sum of money amounts to ₹ 2200 in 5 years and the interest is $\frac{3}{8}$ of the principal, find the rate of interest and the principal.

A. $5\frac{1}{2}\%$, ₹ 1800
B. $3\frac{7}{2}\%$, ₹ 1900
C. $7\frac{1}{2}\%$, ₹ 1600
D. $5\frac{3}{2}\%$, ₹ 2000

14. Find the HCF of 784, 1232 and 1960.

A. 11
B. 56
C. 63
D. 12

15. Vicky walked 15 metres towards North, took a left turn and walked 20 metres, and again took a left turn and walked 15 metres and stopped walking. Towards which direction was he facing when he stopped walking?

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

SCIENCE

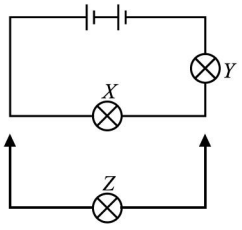
16. When water is heated from 0°C to 10°C, its volume _____.

A. Increases
B. Decreases
C. Does not change
D. First decreases and then increases.

17. Which of the following form virtual and erect image for all positions of a self luminous object?

A. Convex lens
B. Concave lens
C. Convex mirror
D. Concave mirror

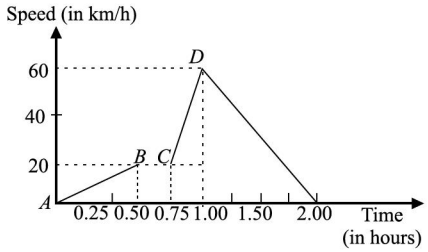
18. The diagram shows identical lamps X and Y connected in series with a battery. The lamps light with normal brightness. A third lamp Z is connected in parallel with lamp X.



What happens to the brightness of lamp Y?

A. Brighter than normal
B. Normal
C. Dimmer than normal
D. Very dim (cannot be seen).

19. A car travels from one place to another in 2 hours. Its speed-time graph during this motion is shown in figure. The maximum acceleration during this journey is _____.



A. 140 km/h^2
B. 160 km/h^2
C. 100 km/h^2
D. 120 km/h^2

20. Ten million electrons pass from point P to point Q in one micro second. The current and its direction is

A. 1.6×10^{-14} A from point P to point Q
B. 3.2×10^{-6} A from point P to point Q
C. 1.6×10^{-6} A from point Q to point P
D. 3.2×10^{-9} A from point Q to point P.

21. An athlete completes half round of a circular track of radius R, then the displacement and distance covered by the athlete are, respectively _____.

A. $2R$ and πR
B. πR and $2R$
C. R and $2\pi R$
D. $2\pi R$ and R.

22. A sphere, a cube and a thin circular plate, all of same material and same mass are heated at same high temperature, then

A. Plate will cool fastest and cube the slowest
B. Sphere will cool fastest and cube the slowest
C. Plate will cool fastest and sphere the slowest
D. Cube will cool fastest and plate the slowest.

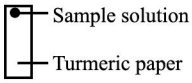
23. A drunkard is walking along a straight road. He takes 5 steps forward and 3 steps backward and so on. Each step is 1 m long and takes 1 s. There is a pit on the road 11 m away from the starting point. The drunkard will fall into the pit after

A. 21 s
B. 29 s
C. 31 s
D. 37 s.

24. A concave mirror is used to form a real image of a candle. If the upper half of the mirror is covered by a piece of paper, then

A. The image becomes dimmer
B. The image becomes brighter
C. The image remains same
D. Both A and B

25. Smita applied turmeric paste on thin stripes of a paper. After drying she put few drops of given sample solutions on these strips. What are the changes in the colour she observes?



(i) Amla juice
(ii) Lime water
(iii) Common salt solution
(iv) Baking soda solution

A. (i)-Yellow, (ii)-Red, (iii)-Yellow, (iv)-Red
B. (i)-Red, (ii)-Yellow, (iii)-Yellow, (iv)-Red
C. (i)-Red, (ii)-Red, (iii)-Yellow, (iv)-Yellow
D. (i)-Yellow, (ii)-Yellow, (iii)-Red, (iv)-Red

26. Rachit added a teaspoonful of vinegar and a pinch of baking soda in a test tube. He heard a hissing sound and saw bubbles of a gas coming out. He passed this gas through lime water. Which of the following is incorrect about his experiment?

A. Lime water turns milky.
B. The gas evolved was carbon dioxide.
C. Sodium hydrogencarbonate is formed which makes lime water milky.
D. Both B and C

27. Kriti performed the following two experiments.

I. She held a hack-saw blade with a pair of tongs and then kept the tip of the free end on the flame. She observed that the blade became red hot.

II. She dropped a shaving blade into the blue coloured copper sulphate solution. The colour of the solution changed to green.

Identify the types of changes occurring in both the experiments.

A. I - Physical change, II - Chemical change
B. I - Chemical change, II - Physical change
C. Both I and II - Physical changes
D. Both I and II - Chemical changes

28. The rain becomes acidic because W, sulphur dioxide and X dissolve in rain drops to form Y, Z and nitric acid respectively. W turns lime water milky. Identify W, X, Y and Z respectively.

A. Carbon monoxide, Nitrogen, Calcium hydroxide, Sulphur
B. Carbon monoxide, Nitrogen oxide, Carbon dioxide, Sulphuric acid
C. Carbon dioxide, Nitrogen dioxide, Carbonic acid, Sulphuric acid
D. Carbon dioxide, Nitrogen oxide, Calcium hydroxide, Sulphur.

29. Raghav wrote two statements on board.

1. Indigestion is caused by too much of acid in the stomach. Taking spinach juice will relieve the indigestion.
2. If the soil is basic, quick lime or slaked lime is added which neutralises the basicity of the soil.

Choose the correct option about the statements.

A. Statement 1 is correct but 2 is incorrect.
B. Statement 2 is correct but 1 is incorrect.
C. Both statements are incorrect.
D. Both statements are correct.

30. Which of the following is a different type of change than the others?

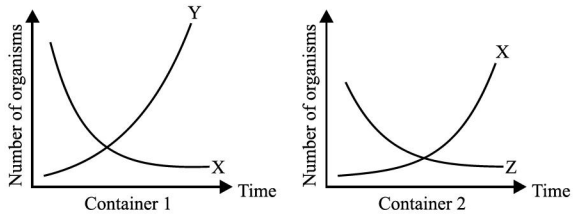
A. Nimit leaves a piece of bread in the toaster for too long. The bread becomes black and kitchen fills with smoke.
B. Madhu forgot to dry the bread knife after washing. Reddish brown spots appeared on it.
C. Renu kept few naphthalene balls in her almirah. After few days, the balls disappeared from the almirah.
D. A plant collects sunlight and prepare food by photosynthesis.

31. Among the following, choose the properties which are not physical properties.

1. Flexibility
2. Flammability
3. Solubility
4. Combustion
5. Melting point
5. Conductivity
7. Neutralisation

A. 1, 3, 5, and 6
B. 2, 4 and 7
C. 3, 4, 6 and 7
D. 3, 5 and 7

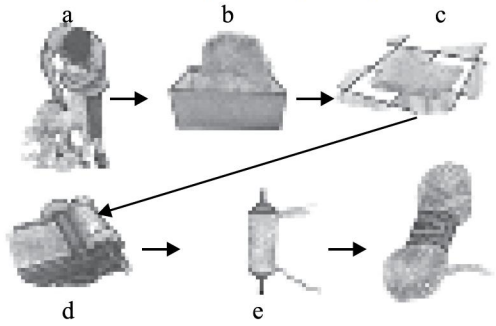
32. Tanu caught three different types of organisms, X, Y and Z, and put them into two containers. X and Y were placed in container 1 and X and Z were placed in container 2. The graphs below show the changes in the number of organisms X, Y and Z over time.



Which one of the following food chains is correct?

A. $Z \rightarrow X \rightarrow Y$
B. $X \rightarrow Y \rightarrow Z$
C. $Y \rightarrow Z \rightarrow X$
D. $X \rightarrow Z \rightarrow Y$

33. The given figure shows steps involved in the process of wool yarn making. Identify steps a, b, c, d and e and select correct option regarding them:



A. In many parts of the world, step '*a*' is done once a year. It harms the sheep and is painful.
B. Steps 'b and c' show the process of scouring, during which workers are at high risk of getting respiratory diseases.
C. Step 'd' converts wool fleece into narrow untwisted fibres called slivers.
D. Step 'e' depends on the length of the fibres. Long fibres are used for making tweeds and flannel whereas short fibres are used in making gabardines.

Megha conducted an experiment to find out the requirements for photosynthesis. She subjected the plants to different conditions as shown in the table below. Study the table and use it to answer questions 34 and 35.

Set-up	Water	Carbon dioxide	Sunlight
A	✓	✓	✓
B	×	✓	×
C	✓	✓	×
D	×	✓	✓
E	✓	×	×
F	×	×	✓
G	✓	×	✓

34. Which set-ups are used by Megha to conduct the experiment?

A. B, E and F only
B. C, D and G only
C. A, B, E and F only
D. A, C, D and G only

35. Which of the following variables should be kept constant to conduct a fair test?

(i) Type of plant
(ii) Amount of soil
(iii) Size of pot
(iv) Type of soil

A. (i) and (ii) only
B. (ii) and (iv) only
C. (i), (ii) and (ii) only
D. All of the above

36. The given table shows the relative volumes of blood flowing through different organs at rest and during exercise.

Organ	At rest	During light exercise	During heavy exercise
d	1.0	1.1	1.1
e	1.0	0.8	0.5
f	1.0	3.8	11.0
g	1.0	1.6	2.5

Identify organs d, e, f and g and select the correct option.

A. d - Kidneys, e - Heart, f - Muscles, g - Brain
B. d - Brain, e - Kidneys, f - Muscles, g - Heart
C. d - Heart, e - Muscles, f - Kidneys, g - Brain
D. d - Brain, e - Kidneys, f - Heart, g - Muscles

37. A thick outer ring is removed from the trunk of a tree. Which of the following is likely to be observed after several days?

A. 
B. 
C. 
D. 

38. The given diagrams show the cross-section of two different flowers.


a b

Which statements about both flowers is/are true?

(a) Both flowers can grow into fruits.
(b) Pollination can take place in both flowers.
(c) Both flowers have male and female parts.

A. a only
B. a and b
C. b and c
D. a and c

39. Select the mismatch from the following options.

A. *Sundew* – symbiotic
B. *Cuscuta* – Parasitic plant
C. *Nepenthes* – insectivorous plant
D. None of these

40. The breaking of rocks into smaller pieces over thousands of years is called weathering. What are the agents and factors that cause weathering of rocks?

A. Wind and water
B. Large variation in day and night temperatures
C. Living things
D. All of these

41. Which one of the following special characteristics of animals does not help them to survive?

A. Camels have long eyelashes to prevent sand from entering their eyes.
B. Rhinoceroses keep their bodies cool by wallowing in mud.
C. Desert foxes have large ears to help them lose heat easily.
D. Kangaroo rats store fats in their humps which can be changed into water.

42. Shivam is measuring percolation rate of water through three different soils. He cuts off the top and bottom of a mineral water bottle to get a hollow plastic pipe and places the pipe in each soil sample so that it is 2-3 cm deep in the soil. He then pours 250 mL of water into the pipe and measures the time taken for the water to percolate completely into the soil. He calculated the percolation rates of soil samples as given below:

Soil Samples	Percolation Rate
S_1	15.5 mL/min
S_2	7.3 mL/min
S_3	1.4 mL/min

Which among the given soil samples is the most suitable for growing paddy crop and lentils respectively?

A. S_3 and S_1
B. S_1 and S_2
C. S_3 and S_2
D. S_2 and S_3

43. Read the following statements regarding waste-water treatment plant with one or two blanks. Select the option that correctly completes any two statements.

(i) _____ process allows settling of sand in the chambers.
(ii) The solid waste called _____settles down and lighter waste called _____ floats on the surface.
(iii) Secondary treatment involves use of_____.
(iv) _____ and _____ are used in tertiary treatment.

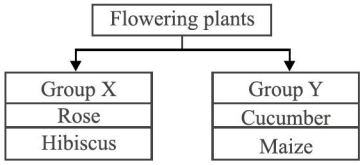
A. (ii) sluge, scum;
(iii) chemicals
B. (iii) grit removal;
(iv) chlorine, UV rays
C. (ii) scum, sludge;
(iii) bacteria
D. (i) screening;
(iv) aerobic, anaerobic bacteria

44. Most life in a forest exists vertically in trees. The vertical part of a forest is divided into four layers as given below. Match their respective features and select the correct option.

	Column I		Column II
(a)	Overstorey	(i)	Termites, bacteria, earthworms and fungi
(b)	Canopy	(ii)	It receives the most sunlight
(c)	Understorey	(iii)	Humidity is very high
(d)	Forest floor	(iv)	The leaves of the trees have 'drip tips'

A. a - (i), b - (iii), c - (iv), d - (ii)
B. a - (ii), b - (iv), c - (i), d - (iii)
C. a - (iv), b - (ii), c - (i), d - (iii)
D. a - (ii), b - (iv), c - (iii), d - (i)

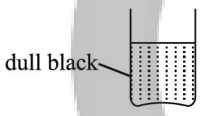
45. Study at the given classification chart. How are the following plants grouped?

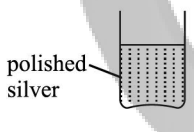


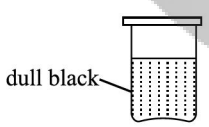
	Group X	Group Y
A.	Flowers with both male and female parts	The male and female parts are on separate flowers
B.	Plants with flowers	Plants without flowers
C.	Plants without seeds	Plants with seeds
D.	Reproduction from underground stems	Reproduction from seeds

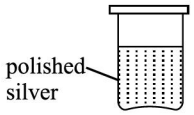
ACHIEVERS SECTION

46. The diagram shows four similar cans. Each can contains the same volume of water initially at 80°C. After five minutes, which can will contain the coolest water?

A. 

B. 

C. 

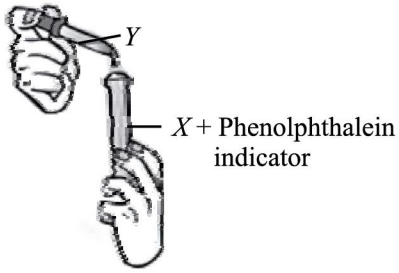
D. 

47. Naina was given two test solutions *X* and *Y*.

X : Turns China rose indicator to dark pink.

Y : Found in wasp's sting.

She performed an experiment using the two solutions as shown in the figure.

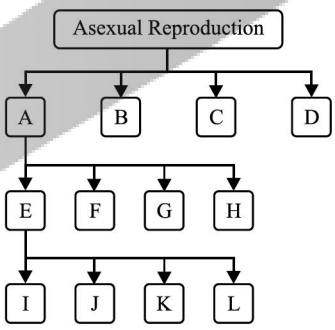


Fill in the blanks using the above information.

The colour of solution *X* + Phenolphthalein is __*p*__. When solution *Y* is added drop by drop with stirring, the __*q*__ colour first appears. If one more drop of solution *X* is added, the solution becomes __*r*__.

	p	*q*	*r*
A.	Pink,	Pink,	Colourless
B.	Magenta,	Pink,	Colourless
C.	Pink,	Colourless,	Magenta
D.	Colourless,	Pink,	Colourless

48.



Study the given classification chart of types of asexual reproduction and select the correct option regarding it.

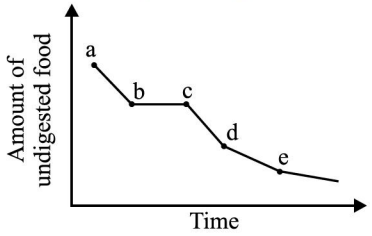
A. Vegetative propagation is a type of asexual reproduction in which the stems, roots, leaves and buds give rise to new plants. Vegetative propagation should be placed in box 'A'.
B. Root is vegetative part of a plant through which runner, tuber, rhizome and bulb develop. It should be placed in box 'E'.
C. Budding gives rise to runner, tuber, rhizome and bulb. It should be placed in box 'E'.
D. None of these

49. Read the given passage with a mistake and select the option that corrects it.

During the process of breathing (inhalation), the diaphragm muscles contract and be comes dome shaped. At the same time, intercostal muscles contract to pull the ribs upwards. This increases the volume of the chest cavity. Subsequently the volume of lungs increases. As the air pressure in the lungs decreases, air moves into the lungs through the air passage.

A. The diaphragm muscles contract and become flat.
B. This decreases the volume of the chest cavity.
C. As the air pressure in the lungs increases, air moves into the lungs through the air passage.
D. At the same time, intercostal muscles contract to pull the ribs downwards.

50. The given graph shows the amount of undigested food in the human digestive system over time.



(i) Which part of the digestive system does point b to point c represent?
(ii) Which component of food is broken from point a to point b?

A. (i) - Stomach, (ii) - Protein
B. (i) - Oesophagus, (ii) - Carbohydrate
C. (i) - Oesophagus, (ii) - Fat
D. (i) - Small intestine, (ii) - Glucose

SPACE FOR ROUGH WORK

SCIENCE OLYMPIAD FOUNDATION

18th NSO

LEVEL - 2

Year 2015-16

SCIENCE

1. Which of the following are virtual images?

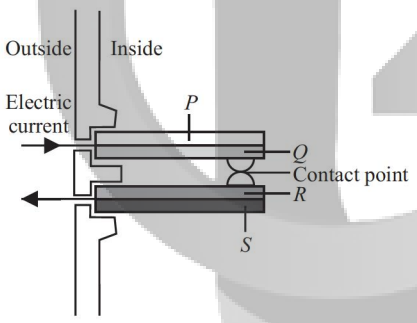
(i) The image formed by an image projector.
(ii) The image formed by a plane mirror.
(iii) The image formed by rear-view mirrors in automobiles.

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

2. Fill in the blanks by choosing an appropriate option. When an electric current is passed through a bulb, the (i) gets so heated that it glows. The element of electric heater is made up of (ii). Wires used in electric fuses break when large electric current is passed through them due to (iii) effect of electric current.

	(i)	(ii)	(iii)
A.	Element	Tungsten	Heating
B.	Element	Chromium	Magnetic
C.	Filament	Tungsten	Magnetic
D.	Filament	Chromium	Heating

3. An electric kiln has a device in it to prevent the kiln from getting too hot. The metals in the bimetallic strips expand at different rates and bend when heated. The contact points move apart and electric current stops flowing.



This device works when, _____.

A. Q expands more than R, and P expands more than S
B. R expands more than S, and Q expands more than P
C. P expands more than Q, and R expands more than S
D. P expands more than R, and S expands more than Q

4. Karan is going to school with his father by car. He decides to note the readings on the odometer of the car after every five minutes till he reaches the school.

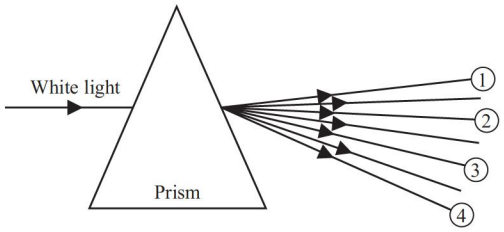
The given table shows the odometer readings of his journey.

Time (am)	7:30	7:35	7:40	7:45	7:50
Odometer reading (km)	36593	36596	36599	36602	36605

If he left for school at 7:30 am, then how far has he travelled till 7:46 am?

A. 8.4 km B. 9.0 km
C. 9.6 km D. 12.0 km

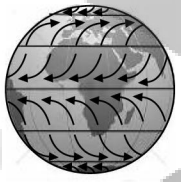
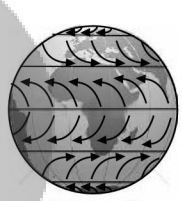
5. The given diagram shows the splitting of white light into its seven component colours when white light is passed through the prism.

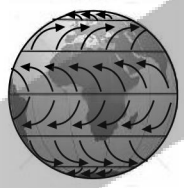
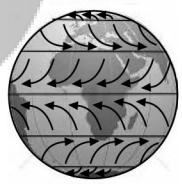


Which of the following options correctly lists the colours of the marked rays?

	1	2	3	4
A.	Violet	Blue	Yellow	Red
B.	Violet	Orange	Green	Red
C.	Red	Yellow	Blue	Violet
D.	Red	Green	Orange	Violet

6. Which of the following diagrams shows the correct wind flow pattern because of uneven heating of the earth?

A.  B. 

C.  D. 

7. Train P travels with a speed of 80 km h^{-1} from Hyderabad to Bangalore. Another train Q travels from Hyderabad to Bangalore with a speed of 75 km h^{-1}. Which of the following statements is true?

A. Trains P and Q have different speeds and different velocities.
B. Trains P and Q have same velocity but different speeds.
C. Trains P and Q have the same velocity as they are travelling in the same direction.
D. Trains P and Q have same speed but different velocities.

8. Isha obtains a blurred image of an object on a screen by using a concave mirror. In order to obtain a sharp image on the screen, she will have to shift the mirror _____.

A. Towards the screen
B. Slightly away from the screen
C. Either towards or away from the screen depending upon the position of the object
D. To a position very far away from the screen

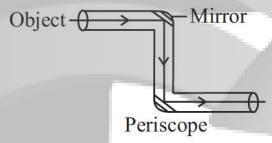
9. Rihan takes an empty half litre plastic bisleri bottle. He opens the lid and fixes his mouth on the opening in such a way that there is no gap between the opening and his mouth. He observes that the bottle crushes inwards when he sucks some air out of the bottle. Which of the following statements is the reason for Rihan's observation?

A. Air pressure inside the bottle increases.
B. Air pressure outside the bottle increases.
C. Air pressure inside the bottle decreases.
D. Air pressure outside the bottle decreases.

10. Which of the following properties of light are made use of in the periscope shown here ?

(i) Light travels very fast.
(ii) Light can be reflected.
(iii) Light travels in a straight line.

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



11. Which of the following statements is/are correct?

(i) Longer line in the symbol for a cell represents its negative terminal.
(ii) The combination of two or more batteries is called a cell.
(iii) Fuse wire is made up of alloys which has high melting point.
(iv) Electromagnet loses its magnetism when the current flowing through it is switched off.

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

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

	Column I		Column II
P.	1 solar day	1.	1000000 microseconds
Q.	1 second	2.	3650 days
R.	1 millenium	3.	8760 hours
S.	1 decade	4.	1440 minutes
T.	1 year	5.	1000 years

A. P - 1, Q - 4, R - 5, S - 3, T - 2
B. P - 1, Q - 3, R - 2, S - 5, T - 4
C. P - 4, Q - 1, R - 5, S - 2, T - 3
D. P - 4, Q - 2, R - 3, S - 5, T - 1

13. Which of the following statements is true?

A. Sea breeze happens during night time when the sea is cooler than the land.
B. Sea breeze happens during day time when the land is cooler than the sea.
C. Land breeze happens during night time when the land is cooler than the sea.
D. Land breeze happens during day time when the sea is cooler than the land.

14. Why do people feel cool if they do not dry themselves after swimming in the sea?

A. Water evaporates and causes cooling.
B. Water insulates them from the warm air.
C. Water is a good conductor of heat.
D. Water is colder than the air.

15. Ruchika conducted an experiment to test the nature of four different samples. She noted down her observations in the given table.

Sample	Effect on		
	Turmeric solution	China rose indicator	Methyl orange indicator
P	Yellow	Dark pink	Red
Q	Red	Green	Yellow
R	Yellow	Dark pink	Red
S	Yellow	Light pink	Orange

Which of the following conclusions can be drawn from this experiment?

A. *P* and *R* are basic, *Q* is acidic and *S* is neutral in nature.
B. *P* is acidic, *Q* is basic, *R* and *S* are neutral in nature.
C. *P* and *R* are acidic, *Q* is basic and *S* is neutral in nature.
D. *P* is neutral, *Q* and *R* are basic and *S* is acidic in nature.

16. Which of the following are chemical changes?

I. $CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + CO_2 + H_2O$
II. $H_2O_{(l)} \rightarrow H_2O_{(g)}$
III. $MgO + H_2O \rightarrow Mg(OH)_2$
IV. $CO_{2(s)} \rightarrow CO_{2(g)}$
V. $Fe + O_2 + H_2O \rightarrow Fe_2O_3 \cdot xH_2O$

A. I, III and V only
B. III, IV and V only
C. II and IV only
D. All of these

17. Landowner of a village has decided to use one of his fields which had factories for several years for the production of crops. With which of the following substances does he need to treat his field for a long time to fulfill his purpose?

A. Organic matter
B. Quick lime
C. Slaked lime
D. Both B and C

18. Which of the following statements is/are incorrect?

I. Stainless steel does not rust.
II. Breaking down of ozone layer is a physical change.
III. Large crystals of pure copper sulphate are formed from its solution by the process called galvanisation.
IV. Photosynthesis and digestion are chemical changes.

A. I, II and IV only
B. II and III only
C. III only
D. None of these

19. The rain containing excess of acids is called an acid rain. Acid rain can cause damage to buildings, historical monuments, plants and animals. Where do these acids come from?

A. Acids like carbonic acid, sulphuric acid and nitric acid are already present in the rain.
B. Rain drops become acidic by combining with acids present in air.
C. Acids present in rain drops become active on coming in contact with atmosphere.
D. Air pollutants like CO_2, SO_2, NO_2 dissolve in rain drops to form acids.

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

Statement 1 : When an ant bites, it injects formic acid into the skin.

Statement 2 : The effect of the acid can be neutralised by rubbing moist baking soda.

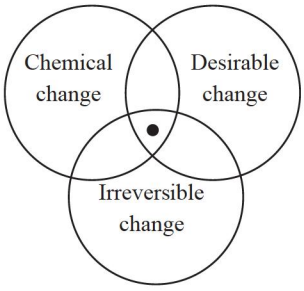
A. Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
B. Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
C. Statement 1 is true but statement 2 is false.
D. Both statements 1 and 2 are false.

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

Column I	Column II
(p) Depositing a layer of zinc on iron	(i) Indigestion
(q) Too much of acid in the stomach causes	(ii) Neutralisation
(r) Both oxygen and water are essential for	(iii) Rusting
(s) Formation of salt and water with evolution of heat	(iv) Galvanisation

A. (p) - (iii), (q) - (ii), (r) - (iv), (s) - (i)
B. (p) - (iv), (q) - (i), (r) - (iii), (s) - (ii)
C. (p) - (iv), (q) - (ii), (r) - (iii), (s) - (i)
D. (p) - (iii), (q) - (i), (r) - (iv), (s) - (ii)

22. In the given Venn diagram, centre point (•) represents



A. Beating aluminium to make aluminium foil
B. Rusting of a bicycle
C. Formation of manure from leaves
D. Making lamonade.

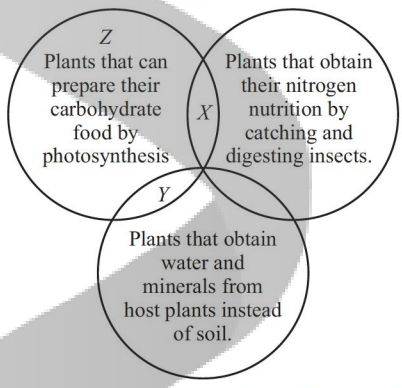
23. Read the following statements.

P. Red blood cells of mammals are __(i)__ and contain red pigment __(ii)__.
Q. __(iii)__ is the largest heart chamber.
R. __(iv)__ in plants helps to transport water and dissolved minerals from the roots throughout the plant by creating a suction pull.
S. __(v)__ and vena cava contain __(vi)__ blood.

Select the option that correctly fills up the blanks in any three of the given statements.

A. (i)–Biconvex, (iv)–Diffusion, (v)–Pulmonary vein
B. (ii)–Haemoglobin, (iii)–Left ventricle, (vi)–Deoxygenated
C. (i)–Biconcave, (iii)–Right ventricle, (iv)–Transpiration
D. (ii)–Haemocyanin, (iv)–Transpiration, (v)–Pulmonary vein

24. Study the given Venn diagram.



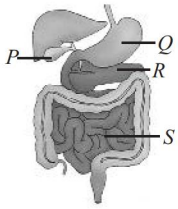
Select the correct option regarding plants *X*, *Y* and *Z*.

A. Plant *X* generally grows in nitrogen deficient soil.
B. Plant *Y* can be categorised as a total stem parasite.
C. Plant *Z* could be rose plant or sundew plant.
D. Plant *Y* could be *Rafflesia* or Mistletoe.

25. Atul carried out an activity to calculate the moisture content of a soil sample. He took 150 gms of a soil, put it on the newspaper and dried it in the sun for two days. He then weighed it. Weight of dried soil came out to be 120 gms. Calculate the percentage of moisture in the given soil sample and select the correct option.

A. 10 B. 15
C. 30 D. 20

26. Refer to the given figure in which some organs are labelled as *P*, *Q*, *R* and *S*. Which of the following could be true for the labelled parts in a patient who is diagnosed with an unusual sickness wherein he is unable to digest any fat present in his food?



A. The cells of the wall lining of *Q* are not able to secrete HCl which activates fat digesting enzymes.
B. Duct of *P* is blocked due to which bile cannot enter small intestine.
C. *R* is unable to manufacture bile.
D. Microvilli are absent in *S*.

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

	Column I		Column II
(a)	Climate	(i)	Day to day conditions of atmosphere at a place.
(b)	Camouflage	(ii)	Instrument used to measure humidity.
(c)	Hygrometer	(iii)	Seasonal movement of complete population of animal from one area to another.
(d)	Migration	(iv)	Average weather conditions at a particular place over a long period of time.
(e)	Weather	(v)	Protects against predators and helps to catch prey.

A. (a)–(iv), (b)–(v), (c)–(ii), (d)–(iii), (e)–(i)
B. (a)–(ii), (b)–(iii), (c)–(iv), (d)–(v), (e)–(i)
C. (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv), (e)–(v)
D. (a)–(iii), (b)–(i), (c)–(v), (d)–(iv), (e)–(ii)

28. The given box shows some adaptations shown by different animals. Which of the following options correctly classifies these adaptations in accordance to desert region and polar region?

(i) Long legs, tails and very large ears.
(ii) Short legs, tails and small ears.
(iii) Production of concentrated urine .
(iv) Presence of leathery lips.

	Desert region	Polar region
A.	(i)	(ii), (iii), (iv)
B.	(i), (iv)	(ii), (iii)
C.	(i), (iii), (iv)	(ii)
D.	(ii), (iii)	(i), (iv)

29. Preeti burnt a fibre *X*. She found that *X* is self-extinguishing and leaves a dull black bead which crushes easily to powder.

Which of the following could be fibre *X*?

A. Wool B. Silk
C. Nylon D. Both A and B

30. Which of the following statements is/are incorrect?

(i) The forest floor in a tropical forest is dark, so some plants grow high up on tree branches to get nearer to light.
(ii) The understorey of a forest is a tangle of shrubs, young trees, palms etc., that can grow in the shade of tall trees.
(iii) Body of polar bear is covered with two thick layers of fur but subcutaneous fat is absent.
(iv) Branches of fir trees allow snow to slip off before it becomes too heavy to break the branches.

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

31. Which of the following statements is not true?

A. Presence of a thick layer of fur helps the lion-tailed macaque to survive in extreme cold conditions of polar regions.
B. Elephants have large and highly vascular ears which help them in thermoregulation.
C. Red-eyed frogs easily escape from their predators by startling them with ghost images created due to their shockingly bright colours.
D. Camels have long eyelashes which are useful for keeping blowing sand out of their eyes.

32. Select the incorrect statement regarding silk.

A. Silk is a natural protein fibre.
B. Silk has a high tensile strength.
C. Silk becomes brittle with age and prolonged exposure to sunlight.
D. Silk fabric was first developed in ancient Europe.

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

Statement 1 : Decomposers act as natural recyclers and serve a very useful purpose of maintaining the balance of nutrients in the soil.

Statement 2 : When an organism dies, decomposers break down the materials of its dead body into nutrient substances it was made up of, and return them to the soil from which they originally came.

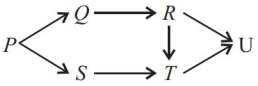
A. Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
B. Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
C. Statement 1 is true but statement 2 is false.
D. Both statements 1 and 2 are false.

34. Given below are four groups of plants where different plants have been categorised on the basis of their natural methods of vegetative propagation. Each group has one odd member. Identify the odd ones and select the correct option regarding these.

I. *Dahlia*, sweet potato, garlic, *Tapioca*
II. *Begonia*, *Kalanchoe*, *Bryophyllum*, *Bougainvillea*
III. Ginger, turmeric, banana, *Tapioca*
IV. Lawn grass, water hyacinth, *Colocasia*, strawberry

A. In group I *Dahlia* is wrongly placed and should be included in group III.
B. In group II *Bougainvillea* is correctly placed but *Kalanchoe* should be replaced with water lettuce.
C. In group III *Tapioca* is wrongly placed and should be included in group I.
D. In group IV *Colocasia* is correctly placed whereas strawberry should be replaced by potato.

35. Refer to the given food web.



What will happen if all *T* organisms are removed from the given food web?

A. The population of *R* and *S* will increase.
B. The population of *Q* will decrease.
C. The population of *R* will increase but population of *S* will decrease.
D. Both A and B

36. Study the following table and select the correct option regarding *P*, *Q*, *R* and *S*.

S. No.	Living Organism	Respiratory Structure
(i)	*P*	Spiracles
(ii)	*Q*	Skin
(iii)	*R*	Stomata
(iv)	Dolphin	*S*

A. Organism *P* can also respire through its buccopharyngeal cavity.
B. Organism *Q* could be a frog or an earthworm.
C. Organism *R* can be *Hydrilla* or *Vallisneria*.
D. Respiratory structure *S* is also found in scoliodon and whale.

37. Read the following statements.

I. *Khadins* are traditional rainwater harvesting systems of agriculture in Rajasthan.
II. *Kulhs* are water harvesting structures found in Himachal Pradesh whereas *surangams* are water harvesting structures found in Madhya Pradesh.
III. Rainwater harvesting deteriorates the quality of groundwater.
IV. About 97.4% of the total water on earth is in seas and oceans.

Select the correct option regarding this.

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

38. Read the given passage with a mistake and select the option that corrects it.

During the process of exhalation, the diaphragm muscles relax and diaphragm becomes dome shaped. At the same time, ribs move upwards and outwards. This decreases the volume of the chest cavity. Subsequently, the volume of lungs decreases. As the air pressure in the lungs increases, air moves out of the lungs through the air passage.

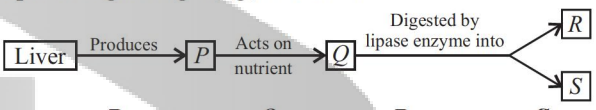
A. The diaphragm muscles contract and diaphragm becomes flat.
B. At the same time, ribs move downwards and inwards.
C. This increases the volume of the chest cavity.
D. As the air pressure in the lungs decreases, air moves out of the lungs through the air passage.

39. Manita conducted an experiment wherein she took a flowering plant and covered all its flowers with a plastic bag for two weeks. She noticed that during the two weeks' duration the fruits started to develop from the flowers on the plant.

Which of the following could not be the reason for development of fruits?

A. The flowers were already pollinated before Manita enclosed them in the plastic bag.
B. The flowers are bisexual.
C. The anthers and stigmas of the flowers mature at about the same time.
D. The flowers contain only the male reproductive organs.

40. Refer to the given flow chart and select the correct option regarding *P*, *Q*, *R* and *S*.

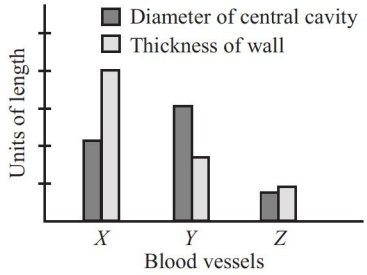


	P	*Q*	*R*	*S*
A.	Digestive juice	Proteins	Amino acids	Peptides
B.	Bile	Fats	Fatty acids	Glycerol
C.	Hydrochloric acid	Carbohydrates	Glucose	Amino acids
D.	Digestive juice	Roughage	Peptides	Glycerol

41. *X* is an occupational disease associated with wool industry whereas *Y* is an occupational disease associated with silk industry. Identify *X* and *Y* and select the incorrect option regarding these.

A. *X* could be sorter's disease caused by bacterium *Bacillus anthracis*.
B. *Y* could be a skin disease caused due to dipping of hands in boiling water during boiling of cocoon.
C. Both *X* and *Y* could be respiratory diseases like asthma caused due to inhalation of dust or fine wool fibres and vapours arising from boiling cocoons respectively.
D. None of these

42. The given graph shows measurements of different types of blood vessels (*X*, *Y* and *Z*). Select the incorrect option regarding these.



A. Blood vessels of type *Y* have valves.
B. Blood vessels of type *X* carry blood away from the heart.
C. Blood vessels of type *Z* connect an *X* to a *Y*.
D. Blood vessels of type *X* are superficially placed and blood vessels of type *Y* are deep seated in the body.

43. Some pieces of French fries are mashed and placed in three Petri dishes. In Petri dish (i), water is added and mixed thoroughly with the fries. In Petri dish (ii), saliva is added and mixed thoroughly with the fries. Nothing is done to the fries in Petri dish (iii). After a few hours, a few drops of iodine are added to each of the Petri dishes. In which Petri dish will the iodine remain brown?

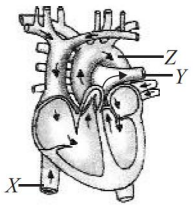
A. (ii) only B. Both (i) and (ii)
C. (iii) only D. Both (ii) and (iii)

44. In which of the following groups of animals the excretion is in the form of a semi-solid, white coloured compound?

A. Fish, dog, monkey and birds
B. Sponges, lizard, snake and frog
C. Lizard, cockroach, snake and birds
D. Monkey, man, cow and dog

45. The given figure is of human heart with its parts labelled as *X*, *Y* and *Z*. Which of the following correctly ranks the blood pressure in *X*, *Y* and *Z* from the lowest to the highest?

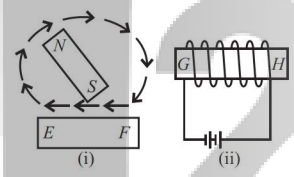
	Lowest → Highest		
A.	*X*	*Y*	*Z*
B.	*Y*	*X*	*Z*
C.	*Z*	*X*	*Y*
D	*Z*	*Y*	*X*



ACHIEVERS SECTION

46. Observe the given figures carefully.

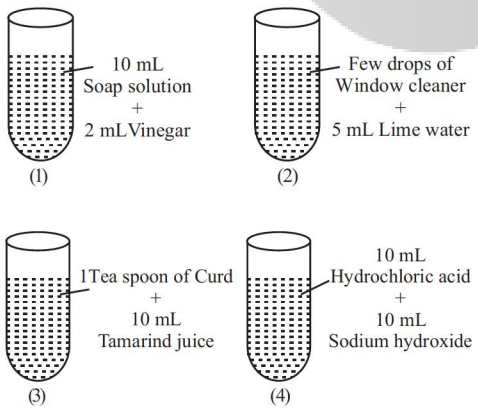
Figure (i) shows an iron bar being stroked by a bar magnet and figure (ii) shows an iron bar which is inserted into a solenoid.



State the polarities at *E*, *F*, *G* and *H*.

	E	***F***	***G***	***H***
A.	North	South	North	South
B.	North	South	South	North
C.	South	North	North	South
D.	South	North	South	North

47. A science teacher has arranged the following sets of test tubes as shown in the given figure :



She asked the students to fill in the blanks by choosing an appropriate option.

Turmeric solution turns red in test tubes (*p*) and (*q*). China rose indicator turns magenta in test tube (*r*). The colour of methyl orange indicator does not change in test tube (*s*).

	(p)	***(q)***	***(r)***	***(s)***
A.	2	3	4	1
B.	1	3	2	4
C.	3	4	1	2
D.	1	2	3	4

48. Read the given passage where some of the words have been italicised.

Pure wool has the natural ability to undergo biodegradation. Due to its *low* water and nitrogen content, wool naturally resists fire. When wool is heated, it *melts* and gives smell of *charred meat*. Wool is obtained from sheep, goat, camel, yak, rabbit etc. *Angora wool* is obtained from Angora goat whereas *mohair* is obtained from Angora rabbit. Cashmere is a fine, strong, light and soft wool obtained from *yak*.

Select the incorrect statement regarding this.

A. *Low* should be replaced with *high*.
B. *Melts* should be replaced by *burns* whereas *charred meat* should be replaced with *burning hair*.
C. Positions of *Angora wool* and *mohair* should be interchanged.
D. *Yak* should be replaced with *camel*.

49. Refer to the given dichotomous key and select the incorrect option regarding *P*, *Q*, *R*, *S* and *T*.

I (a) : It is a natural fibre. - Go to II
(b) : It is a man-made fibre made of cellulose. - *P*
II (a) : Source organism is harmed in fibre obtaining process. - Go to III
(b) : Source organism is not harmed in fibre obtaining process. - Go to IV

III (a) : The fibre is made up of protein fibroin and sericin. - [Q]

(b) : The fibre is obtained from stem of plant. - [R]

IV (a) : The fibre is obtained from fruits of plant. - [S]

(b) : The fibre is made up of keratin protein. - [T]

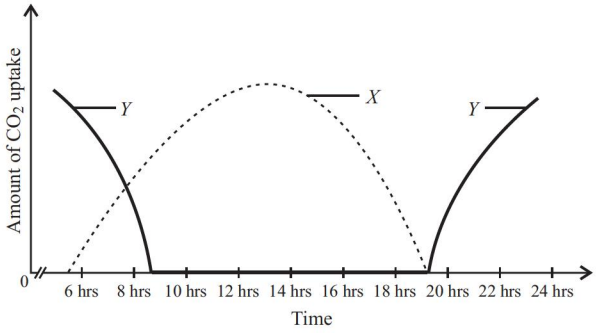
A. Fibre *Q* is obtained from the non-feeding stage of an insect.

B. Fibre *P* does not melt on heating.

C. Fibre *R* can be used in winter clothing while fibre *S* can be used in making water-proof items.

D. Fibre *T* can be obtained from Angora goat and has been nicknamed as diamond fibre due to its high luster and sheen.

50. The given graph shows rate of CO_2 uptake over 24 hours by two potted plants *X* and *Y* kept in direct sunlight with all similar conditions *viz.* same sized pots with equal amount of soil and manure, adequate moisture and air.



Select the best possible option regarding *X* and *Y*.

A. Plant *X* is actively photosynthesising between 20 hrs to 24 hrs.

B. Plant *Y* shows stomatal closure between 10 hrs to 18 hrs.

C. Plant *X* shows maximum transpiration between 12 to 14 hrs.

D. Both B and C

SPACE FOR ROUGH WORK

SCIENCE OLYMPIAD FOUNDATION

19th NSO

LEVEL - 2

Year 2016-17

SCIENCE

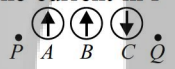
1. Refer to the given columns.

	Column-I		Column-II
(a)	Electric circuit	(i)	It is a coil of insulated copper wire wrapped around an iron nail.
(b)	Electromagnet	(ii)	It is a combination of two or more batteries.
(c)	Electric switch	(iii)	It is an arrangement consisting of source of electricity, connectors and utilizers.
(d)	Electric cell	(iv)	It is used in an electric circuit to make or break the circuit.

Which of the following pairs shows an incorrect match?

A. (a) – (iii) B. (b) – (i)
C. (c) – (iv) D. (d) – (ii)

2. Two wires P and Q are carrying electric currents either into or out of the page. A, B and C are plotting compasses placed in between P and Q as shown in figure. Which of the following options about the direction and amount of the current in P and Q is correct?



	Direction	Amount
A.	Same	Larger in P than in Q
B.	Same	Smaller in P than in Q
C.	Different	Larger in P than in Q
D.	Different	Smaller in P than in Q

3. Two containers X and Y are filled with equal amount of hot water and the temperature of the water in the containers is measured with a thermometer some time later. It is observed that container X has a much lower temperature than container Y. Which of the following are the possible reasons?
(i) Container X is black and container Y is silver.
(ii) Container X has a lid and container Y is not covered.
(iii) Container X is made of steel and container Y is made of clay.

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

4. Read the given statements and select the correct option.
Statement 1 : Concave mirrors are used in torches and car headlights.
Statement 2 : Concave mirrors converge the light of the bulbs of torches and car headlights to form a beam of light.

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 but statement 2 is not the correct explanation of statement 1.
C. Statement 1 is true but statement 2 is false.
D. Statement 1 is false but statement 2 is true.

5. Match the column I with column II and select the correct option

	Column-I		Column-II
(a)	Odometer	(i)	1 millennium
(b)	Month	(ii)	m/s
(c)	10 centuries	(iii)	100 years
(d)	Speed	(iv)	Distance travelled in km
(e)	10 decades	(v)	One new moon to the next

	a	b	c	d	e
A.	(v)	(i)	(ii)	(iii)	(iv)
B.	(iv)	(v)	(i)	(ii)	(iii)
C.	(ii)	(iii)	(iv)	(v)	(i)
D.	(ii)	(v)	(iii)	(iv)	(i)

6. Which of the following statements are incorrect about wind currents over Indian land?
(i) Uneven heating of land and water generates winds from northwest land in summer.
(ii) In winter, winds from southwest direction carry lots of water from the Indian ocean.
(iii) The west coast of India is more vulnerable to cyclonic storms.
(iv) Tornadoes are not very frequent in India.

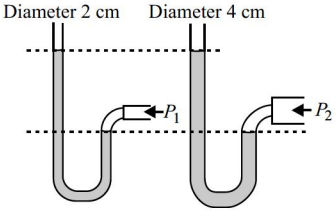
A. (i), (ii) and (iii) only
B. (ii), (iii) and (iv) only
C. (i) and (iv) only
D. (iii) and (iv) only

7. Which of the following statements is not correct in case of an electric fuse?
A. Fuses are inserted in electric circuits of all buildings.
B. There is a maximum limit of the current which can safely flow through the electric circuits.
C. There is a minimum limit of the current which can safely flow in the electric circuits.
D. If a proper fuse is inserted in a circuit it will blow off if current exceeds the safe limit.

8. Mercury melts at –39°C and boils at 357°C. Alcohol melts at –115°C and boils at 78°C. At which temperature are both substances in liquid state?

A. –49°C B. –15°C
C. 100°C D. 360°C

9. Air at pressure P_1 is injected to a manometer with a tube size of 2 cm diameter and air at pressure P_2 is injected to another manometer with a tube size of 4 cm diameter as shown in the figure.



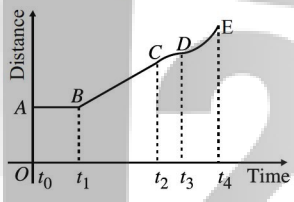
Which of the following options about P_1 and P_2 is true?

A. $P_1 = P_2$ B. $2P_1 = P_2$
C. $4P_1 = P_2$ D. $P_1 = 4P_2$

10. An iron disc at 50°C is put in a vessel full of water at 50°C. The heat will
A. Flow from iron disc to water
B. Flow from water to iron disc
C. Not flow from iron disc to water or vice versa
D. None of these.

11. A block of wood is floating on water at 0°C, with a certain volume V above water level. The temperature of water is slowly raised from 0°C. How will the volume V change with rise of temperature?
A. V will not change.
B. V will always increase.
C. V will decrease till 4°C and then increase.
D. V will increase till 4°C and then decrease.

12. Distance – time graph of an object is shown in the figure. Object moves with constant speed in a time interval from



A. t_3 to t_4
B. t_2 to t_3
C. t_1 to t_2
D. t_0 to t_1

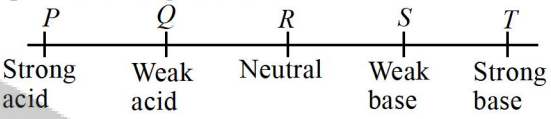
13. Given are the similarities between Hurricanes and tornadoes. Which one of the following is not correct?
A. Both are caused by instability in atmospheric conditions.
B. Both have the potential to cause destruction.
C. Both have the diameter of hundreds of kilometers.
D. None of these.

14. Which of the following statements is correct?
A. Quick lime or slaked lime is added to soil to neutralise the base present in it.
B. Ant sting injects acetic acid into the skin hence, baking soda is used as a remedy.
C. All bases are alkalies but all alkalies are not bases.
D. The factory wastes are treated with calcium hydroxide to neutralise acids before the wastewater is disposed off.

15. Different types of changes are listed as :
P – Physical, reversible
Q – Physical, irreversible
R – Chemical, irreversible
S – Both physical and chemical
Some common changes around us are
(i) Decomposition of old leaves
(ii) Burning of a candle
(iii) Shredding of paper
(iv) Melting of an ice cream

Which of the following represents the correct match for the given changes?
A. P - (iii), Q - (ii), R - (i), S - (iv)
B. P - (iv), Q - (iii), R - (i), S - (ii)
C. P - (iv), Q - (iii), R - (ii), S - (i)
D. P - (i), Q - (ii), R - (iii), S - (iv)

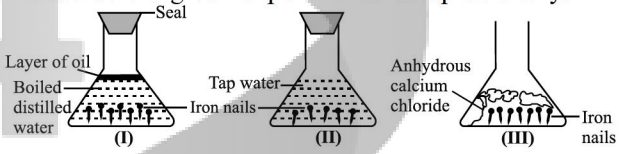
16. Ms. Poornima, a science teacher listed some common substances on the blackboard as follows :
(i) Vinegar (ii) Salt solution (iii) Toothpaste (iv) Milk of magnesia (v) Nitric acid (vi) Window cleaner (vii) Sulphuric acid (viii) Caustic soda
She asked the students to place them at appropriate places in the given scale.



Which of the following represents the correct match of given substances with the scale?

	P	Q	R	S	T
A.	(v)	(vii), (i)	(ii), (iv)	(viii), (vi)	(iii)
B.	(viii)	(iii)	(ii), (iv)	(i), (v)	(vi),(vii)
C.	(v), (vii)	(i)	(ii)	(iii), (iv),(vi)	(viii)
D.	(vii)	(i), (v)	(ii), (iv)	(iii), (vi)	(viii)

17. Observe the given experimental setup carefully.



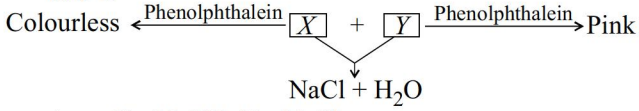
Which of the following statements is/are correct?
1. The nails in flask I will rust because both water and oxygen are available.
2. Nails in flask II will not rust because tap water contains impurities.
3. Nails in flask III will not rust because both oxygen and water are not available.

A. 2 only B. 1 and 3 only
C. 3 only D. None of these

18. Fill in the blanks by choosing the correct option. Turmeric is one of the most commonly used spices in our kitchen. It leaves a yellow stain on white clothes. On rubbing with soap which is *p* in nature, the yellow stain changes to *q* colour. Now, if we pour some *r* containing *s* over this stain, it again becomes yellow in colour due to *t* .

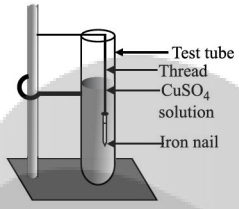
	p	q	r	s	t
A.	Alkaline	Red	Lemon juice	Acetic acid	Formation of water
B.	Acidic	Green	Lime water	Sodium hydroxide	Neutralisation reaction
C.	Neutral	Dark pink	Lime water	Potassium hydroxide	Formation of water
D.	Alkaline	Red	Lemon juice	Citric acid	Neutralisation reaction

19. Study the given flowchart carefully and identify *X* and *Y*.



A. *X* = NaOH, *Y* = NaCl
B. *X* = HCl, *Y* = NaOH
C. *X* = NaOH, *Y* = HCl
D. *X* = HCl, *Y* = H_2O

20. A science teacher has set up an apparatus as shown in the figure :

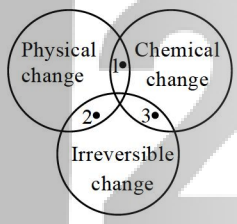


Which of the following observations are incorrect?

I. A chemical change takes place.
II. Colour of solution changes from brown to green.
III. Brown deposit is observed at the bottom of the test tube.
IV. Blue deposit is observed on the iron nail.

A. I and III only B. I, II and III only
C. II, III and IV only D. All of these

21. Observe the given Venn diagram carefully and identify the processes represented by points 1, 2 and 3.



	1	2	3
A.	Burning of fossil fuel	Boiling potatoes	Baking a cake
B.	Lighting a kerosene stove	Breaking of an egg shell	Photosynthesis
C.	Burning of paper	Rusting of iron	Spoilage of food
D.	Burning of LPG gas in kitchen	Crystallisation of copper sulphate	Browning of cut slices of apple

22. Match the given columns and select the correct option from the codes given below.

Column-I	Column-II	Column-III
1. Copper sulphate	(i) Reacts with sulphur	(a) Rust
2. Iron	(ii) Turns red litmus blue	(b) Zinc sulphate is formed
3. Carbon	(iii) Reacts with zinc	(c) Basic in nature
4. Magnesium hydroxide	(iv) Reacts with oxygen and water	(d) Endothermic reaction

A. 1-(iii),(c); 2-(iv),(a); 3-(ii),(b); 4-(i),(d)
B. 1-(ii),(d); 2-(i),(c); 3-(iii),(b); 4-(iv),(a)
C. 1-(iii),(b); 2-(iv),(a); 3-(i),(d); 4-(ii),(c)
D. 1-(iv),(b); 2-(ii),(c); 3-(i),(d); 4-(iii),(a)

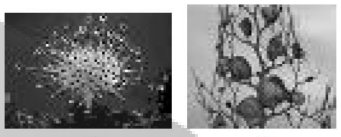
23. Anaerobic bacteria digest animal wastes and produce biogas (change *X*). The biogas is burnt as fuel (change *Y*). Choose the correct statement.

A. Change *X* is a chemical change and *Y* is a physical change.
B. Change *Y* is a chemical change and *X* is a physical change.
C. Both *X* and *Y* are chemical changes.
D. Both *X* and *Y* are physical changes.

24. Which of the following can be used as antacids to reduce acidity in stomach?

A. Sodium carbonate and magnesium hydroxide
B. Magnesium hydroxide and sodium hydroxide
C. Sodium bicarbonate and calcium hydroxide
D. Sodium bicarbonate and magnesium hydroxide

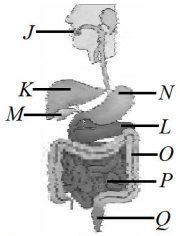
25. Refer to the given figures and select the correct option regarding them.



P *Q*

A. Plant *P* is an insectivorous plant that grows in nitrogen deficient soil while plant *Q* is a symbiotic plant, which fixes atmospheric nitrogen.
B. Plant *P* can make its own food but it depends on host plant for minerals and water.
C. Plant *Q* cannot photosynthesise hence it absorbs the food prepared by host plant and harms it.
D. Both plants *P* and *Q* are insectivorous plants but plant *P* has glandular tentacles with mucilage at ends whereas plant *Q* has bladders to catch insect.

26. Refer to the given diagram and identify the correct statements.

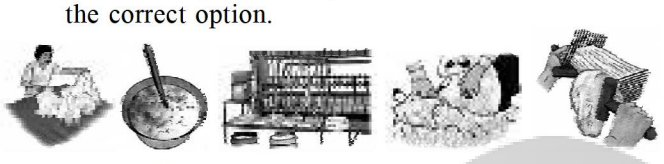


(i) *J* produces saliva which contains enzyme amylase that breaks down cellulose and starch into simple sugars.
(ii) Digestive juices secreted by *N* contain enzyme which breakdown the proteins into simple substances. *N* also secretes HCl, which kills harmful microorganisms present in food.
(iii) *K* is the largest gland in the body and its secretion helps in digestion of fats.
(iv) *M* bears finger like projections called villi and it stores digestive juice secreted by liver.
(v) *P* helps in absorption of food and transports digested food to different organs through blood capillaries.
(vi) *Q* is small structure at junction of small and large intestine which stores faecal matter until egestion.
(vii) Digestive juices of *L* help in digestion of proteins, carbohydrates and fats.

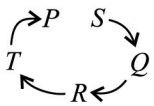
(viii) *O* absorbs water and minerals from the chyme.

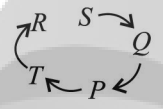
A. (ii), (iii), (v), (vii) and (viii) only
B. (i), (iii), (iv), (vi) and (viii) only
C. (ii), (iv), (v) and (vi) only
D. (i), (ii), (v), (vi) and (viii) only

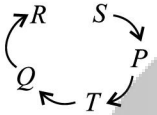
27. Shown below are few steps involved in processing of wool. Arrange these steps in correct order and select the correct option.

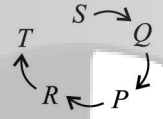


P *Q* *R* *S* *T*

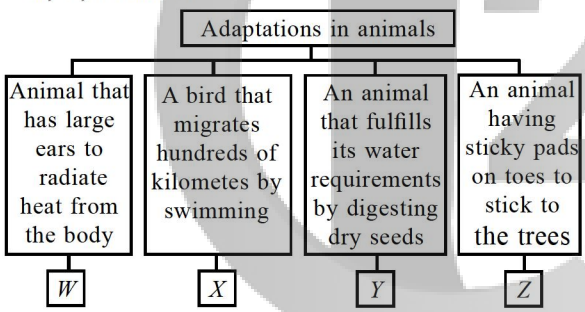
A. 

B. 

C. 

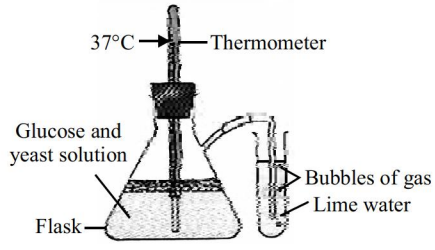
D. 

28. Read the given flow chart and identify the animals, *W*, *X*, *Y* and *Z*.



	W	*X*	*Y*	*Z*
A.	Asian elephant	Penguin	Kangaroo rat	Red-eyed frog
B.	Polar bear	Siberian crane	Camel	Toucan
C.	Fennec	Arctic tern	Giant panda	Orangutan
D.	Jaguar	Swallow	Ground squirrel	Sloth

29. Refer to the given figure and read the statements that follows.

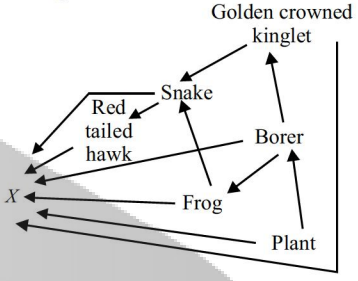


(i) The given setup demonstrates aerobic respiration by yeast.
(ii) Contents of flask smell like alcohol.
(iii) Lime water turns milky due to release of CO_2.
(iv) The glucose present in flask is being converted into lactic acid and CO_2.

Which of the above given statements are true (T) or false (F)?

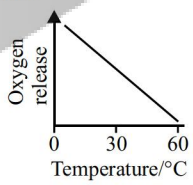
	(i)	(ii)	(iii)	(iv)
A.	F	T	T	F
B.	F	T	F	T
C.	T	F	T	T
D.	T	F	F	T

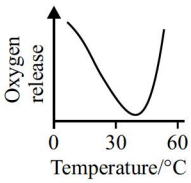
30. Refer to the given food web and select the correct option regarding it.

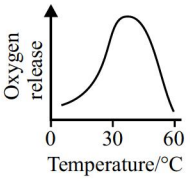


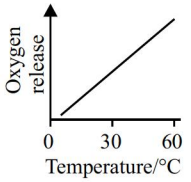
A. *X* in the given food web is the tertiary consumer.
B. Snake is the tertiary consumer in this food web.
C. Golden crowned kinglet has maximum concentration of DDT, that was sprayed on plant.
D. Removal of *X* would cause population of other organisms in the food web to increase.

31. Which graph shows the effect of temperature on the rate of photosynthesis of the aquatic plants such as *Elodea*?

A. 

B. 

C. 

D. 

32. Which of the following is not a behavioural adaptation?

A. A hognose snake plays dead when it feels threatened.
B. A Siberian crane migrates from West Siberia to India to escape extreme cold.
C. Western swamp turtle aestivates to escape excessive hot condition.
D. Leaf insect mimics/resembles a green or a dry leaf to escape its predators.

33. Read the given paragraph.
Teeth present in our mouth break food into smaller pieces. Each tooth is covered with hardest substance in the body called *enamel*. Incisors are *pointed* teeth, used for *grinding* food into smaller pieces. Canines are *chisel-shaped* teeth, used for *piercing and tearing* food. Premolars have flattened surface and there are *6* premolars in each jaw. Molars are used to grind food. Each jaw contains *4* molars.
Few words have been italicised in the given paragraph. Select the correct option regarding them.
A. *Enamel* should be replaced by *Dentine*.
B. The positions of *pointed* and *chisel-shaped* should be interchanged.
C. *6* should be replaced by *2* and *4* should be replaced by *8*.
D. *Grinding* should not be replaced as it is correctly mentioned while *piercing and tearing* should be replaced by *biting and cutting*.

34. Which of the following statements are correct?
(i) Some animals help us in keeping our environment clean. They consume dead animals and dispose them off. They are called scavengers.
(ii) Quinine, a forest product obtained from the bark of *Cinchona* tree, is widely used to treat typhoid.
(iii) Van Mahotsava is a festival of cutting down trees.
(iv) International Day of forests is celebrated on 21st March every year.
A. (i) and (iv) only B. (ii) and (iii) only
C. (i) and (ii) only D. (iii) and (iv) only

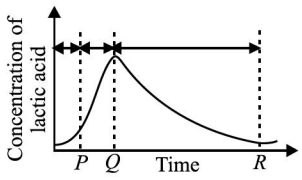
35. Match the following columns and select the correct option.

	Column I	Column II
P.	Exhalation	1. Diaphragm moves down
Q.	Inhalation	2. Diaphragm moves upwards
		3. Increase in intrapulmonary pressure
		4. Ribs move upward and outward
		5. Decrease in intrapulmonary pressure
		6. Ribs move downward and inward.

A. P – 1, 3, 6; Q – 2, 5, 4 B. P – 2, 3, 6; Q – 1, 5, 4
C. P – 2, 3, 5; Q – 1, 4, 6 D. P – 1, 4, 6; Q – 2, 3, 5

36. *X* is a wind pollinated plant whereas *Y* is an insect pollinated plant.
Which of the following cites the correct difference between plants *X* and *Y*?
A. Plant *X* has sticky small and compact stigmas while plant *Y* has long, exposed and feathery stigmas.
B. Plant *X* bears small inconspicuous flowers in dense clusters near the ends of the branches, while flowers of plant *Y* are big, brightly coloured and scented.
C. Flowers of plant *X* produce nectar and have big petals whereas nectar and odour are absent in flowers of plant *Y*.
D. Plant *X* is always self pollinated while plant *Y* shows cross pollination.

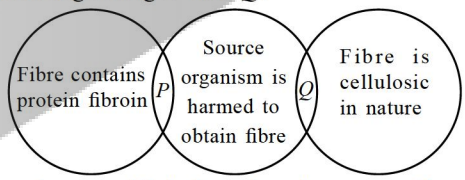
Direction (Q. 37 and 38) : The given graph shows the concentration of lactic acid in the muscles of a runner plotted against time after the start of a 400 m dash.



37. At which point on the graph has the runner most likely completed the race?
A. *P* B. *Q*
C. *R* D. Cannot be predicted

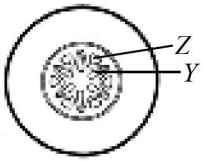
38. Based on the graph, which of the following statements is true?
A. In the absence of physical exertion, there is no lactic acid in the body.
B. The concentration of lactic acid increases in the muscles during strenous exercise due to temporary deficiency of oxygen.
C. The production of lactic acid can be more rapid than its removal.
D. Both B and C

39. Refer to the given Venn diagram and select the correct option regarding *P* and *Q*.



A. Angora, Mohair and cashmere are few varieties of *P* obtained from different mammals.
B. *P* and *Q* when burnt give the smell of burning hair and charred meat respectively.
C. Fabric made of *P* can be used in winter clothing whereas fabric made of *Q* is waterproof hence can be used for making umbrellas or raincoats.
D. Reeling is involved in processing of *P* whereas fibre *Q* is obtained by retting.

40. Refer to the given figure and select the correct option regarding *Y* and *Z*.

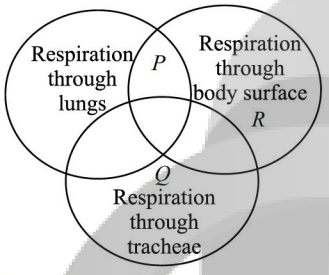


A. *Y* provides carbohydrates that are transported by *Z*.
B. *Y* transports water and mineral while *Z* transports carbohydrates.
C. If it is section of stem of plant provided with carbon dioxide (with radioactive carbon), then part *Y* will appear dark coloured in autoradiograph.

D. *Y* is living tissue whereas *Z* is lignified dead tissue.

41. How is bacteria usually used in sewage treatment?
A. Bacteria is used to speed up digestion of waste into harmless soluble substances.
B. Bacteria is used to remove pathogens in sludge before the latter is released into water bodies.
C. Bacteria is used to help heavier waste to settle for removal in sedimentation tanks.
D. Bacteria is used to sterilise sludge to ensure safe discharge into rivers and lakes.

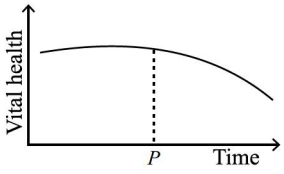
42. Refer to the given Venn diagram and select the incorrect option.



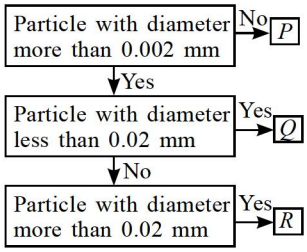
A. *P* - Frog, *Q* - Earthworm
B. *Q* - Cockroach, *R* - *Amoeba*
C. *R* - Earthworm, *Q* - Cockroach
D. *P* - Frog, *Q* - Grasshopper

43. An animal *X* enters inside another animal *Y*. Animal *X* gets food from the animal *Y*. Animal *Y*'s health over time is represented in the given graph. *P* is the time when the two animals came in contact. What is the mode of nutrition of animal *X* ?

A. Autotrophic
B. Heterotrophic
C. Parasitic
D. Saprotrophic



44. Refer to the given flow chart and identify *P*, *Q* and *R*.



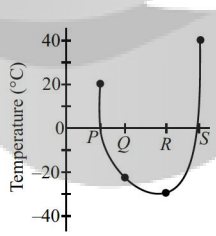
	P	*Q*	*R*
A.	Clay	Sand	Silt
B.	Silt	Sand	Clay
C.	Clay	Silt	Sand
D.	Silt	Clay	Sand

45. Which of the following statements is/are true (T) or false (F) regarding nutrition in organisms?
(i) Photosynthesis also occurs in leaves having colour other than green.
(ii) The process of photosynthesis first produces a simple carbohydrate called glucose which then gets converted into a complex carbohydrate called starch.
(iii) *Cuscuta* is a yellow-coloured plant but it can synthesise its own food by photosynthesis.
(iv) In symbiotic association, *Rhizobium* bacteria derive their nutrition from fungus.

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

ACHIEVERS SECTION

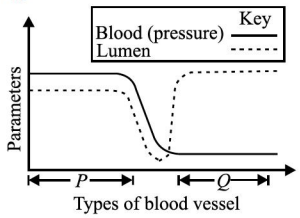
46. The given graph shows comparative account of temperature range in four habitats (*P*, *Q*, *R* and *S*). Which of the following can be inferred from the given graph?



(i) Animals inhabiting *P* may show starling colouration and arboreal adaptations.
(ii) Animals inhabiting *Q* have thick lips and leathery skin.
(iii) Plants present in *S* may have thick fleshy photosynthetic stems and leaves modified into spines.
(iv) Animals inhabiting *S* possess thick layer of subcutaneous fat and have very small body appendages as compared to animals inhabiting *Q* and *R*.
(v) Plants like Spruce, *Acacia* and *Opuntia* are commonly found in habitat *P*.
(vi) Animals found in *R* may show hibernation or seasonal migration.

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

47. Refer to the given graph and select the correct option regarding it.



A. *P* carries only oxygenated blood to heart whereas *Q* carries only deoxygenated blood to heart.
B. Valves are present in *P* to prevent backflow of blood.
C. *P* always carries blood away from the heart whereas *Q* always carries blood towards the heart.
D. *P* is usually superficially placed whereas *Q* is usually deep seated.

48. Refer to the given dichotomous key and identify *P*, *Q*, *R*, *S* and *T*.

I. (a) Propagates vegetatively by natural methods. - Go to II
   (b) Propagates vegetatively by artificial methods. - Go to IV

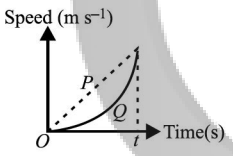
II. (a) New plant develops from stem of parent plant. - Go to III
   (b) Roots of parent plant gives rise to new plant. - *P*

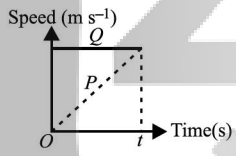
III. (a) Short underground stem covered with fleshy scale leaves. - *Q*
   (b) Modified underground stems (bearing buds) which store food and become swollen. - *R*

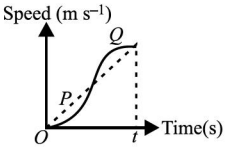
IV. (a) Roots develop from young branch bent towards the ground and covered with soil. - *S*
   (b) It involves placing of stem cutting of one plant over cut stem (having extensive roots) of other plant and tying them. - *T*

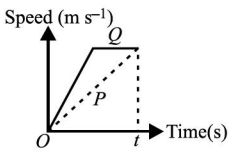
A. *P* could be potato whereas *R* could be garlic.
B. *T* could be coriander whereas *S* could be spinach.
C. *P* could be beetroot whereas *Q* could be turnip.
D. *Q* could be onion whereas *S* could be strawberry.

49. In a 200 m race, two competitors *P* and *Q* reached the finishing line at the same time. Which of the following graphs shows that both the competitors reached the finishing line at time *t*?

A. 

B. 

C. 

D. 

50. Shreya took five solutions labelled as *P*, *Q*, *R*, *S* and *T*. She tested them with different indicators and recorded her observations in the given table :

Solution	Methyl orange	Phenol - phthalein	China rose
P	Red	Colourless	Magenta
Q	Orange	Colourless	Light pink
R	Orange	Colourless	Light pink
S	Yellow	Pink	Green
T	Red	Colourless	Magenta

Study the given table carefully and fill in the blanks by choosing an appropriate option.

Solution *P* is __(i)__, *S* is __(ii)__ and solution __(iii)__ will show no change in colour with turmeric indicator. Shreya tested __(iv)__ acidic solution(s) in total and solutions __(v)__ can be used for neutralisation reaction.

	(i)	(ii)	(iii)	(iv)	(v)
A.	Sugar solution	Soap solution	*Q*	1	*P* and *S*
B.	Sour milk	Antacid	*T*	1	*R* and *S*
C.	Soap solution	Soda water	*P*	2	*P* and *S*
D.	Vinegar	Baking soda	*T*	2	*S* and *T*

SPACE FOR ROUGH WORK

CLASS24

ANSWER KEYS

14th NSO

1.	(D)	**2.**	(B)	**3.**	(B)	**4.**	(B)	**5.**	(D)	**6.**	(C)	**7.**	(D)
8.	(D)	**9.**	(B)	**10.**	(C)	**11.**	(B)	**12.**	(C)	**13.**	(A)	**14.**	(C)
15.	(B)	**16.**	(B)	**17.**	(C)	**18.**	(C)	**19.**	(A)	**20.**	(C)	**21.**	(C)
22.	(A)	**23.**	(B)	**24.**	(B)	**25.**	(B)	**26.**	(C)	**27.**	(D)	**28.**	(B)
29.	(D)	**30.**	(B)	**31.**	(D)	**32.**	(B)	**33.**	(B)	**34.**	(D)	**35.**	(D)
36.	(C)	**37.**	(A)	**38.**	(B)	**39.**	(B)	**40.**	(A)	**41.**	(B)	**42.**	(C)
43.	(D)	**44.**	(C)	**45.**	(B)	**46.**	(D)	**47.**	(A)	**48.**	(A)	**49.**	(B)
50.	(D)												

15th NSO

1.	(B)	**2.**	(B)	**3.**	(D)	**4.**	(C)	**5.**	(B)	**6.**	(D)	**7.**	(D)
8.	(A)	**9.**	(B)	**10.**	(B)	**11.**	(A)	**12.**	(A)	**13.**	(C)	**14.**	(D)
15.	(C)	**16.**	(C)	**17.**	(B)	**18.**	(A)	**19.**	(C)	**20.**	(B)	**21.**	(B)
22.	(A)	**23.**	(D)	**24.**	(B)	**25.**	(B)	**26.**	(C)	**27.**	(B)	**28.**	(B)
29.	(B)	**30.**	(B)	**31.**	(D)	**32.**	(B)	**33.**	(D)	**34.**	(C)	**35.**	(D)
36.	(B)	**37.**	(D)	**38.**	(C)	**39.**	(C)	**40.**	(C)	**41.**	(C)	**42.**	(C)
43.	(D)	**44.**	(C)	**45.**	(D)	**46.**	(C)	**47.**	(D)	**48.**	(C)	**49.**	(A)
50.	(C)												

16th NSO

1.	(B)	**2.**	(A)	**3.**	(A)	**4.**	(D)	**5.**	(A)	**6.**	(B)	**7.**	(A)
8.	(A)	**9.**	(B)	**10.**	(B)	**11.**	(A)	**12.**	(D)	**13.**	(C)	**14.**	(B)
15.	(A)	**16.**	(D)	**17.**	(C)	**18.**	(A)	**19.**	(B)	**20.**	(C)	**21.**	(A)
22.	(C)	**23.**	(B)	**24.**	(C)	**25.**	(A)	**26.**	(C)	**27.**	(A)	**28.**	(C)
29.	(C)	**30.**	(C)	**31.**	(B)	**32.**	(A)	**33.**	(C)	**34.**	(D)	**35.**	(D)
36.	(B)	**37.**	(B)	**38.**	(B)	**39.**	(A)	**40.**	(D)	**41.**	(D)	**42.**	(C)
43.	(C)	**44.**	(D)	**45.**	(A)	**46.**	(B)	**47.**	(D)	**48.**	(A)	**49.**	(A)
50.	(B)												

17th NSO-Level 2 was an online exam. Hence, paper cannot be included in the booklet.

18th NSO

1.	(B)	**9.**	(C)	**17.**	(D)	**25.**	(D)	**33.**	(A)	**41.**	(D)	**49.**	(C)
2.	(D)	**10.**	(C)	**18.**	(B)	**26.**	(B)	**34.**	(C)	**42.**	(D)	**50.**	(D)
3.	(B)	**11.**	(A)	**19.**	(D)	**27.**	(A)	**35.**	(D)	**43.**	(A)		
4.	(C)	**12.**	(C)	**20.**	(B)	**28.**	(C)	**36.**	(B)	**44.**	(C)		
5.	(C)	**13.**	(C)	**21.**	(B)	**29.**	(D)	**37.**	(C)	**45.**	(A)		
6.	(A)	**14.**	(A)	**22.**	(C)	**30.**	(D)	**38.**	(B)	**46.**	(A)		
7.	(A)	**15.**	(C)	**23.**	(B)	**31.**	(A)	**39.**	(D)	**47.**	(D)		
8.	(C)	**16.**	(A)	**24.**	(A)	**32.**	(D)	**40.**	(B)	**48.**	(D)		

CLASS24

19th NSO

1.	(D)	**2.**	(A)	**3.**	(B)	**4.**	(C)	**5.**	(B)	**6.**	(A)	**7.**	(C)
8.	(B)	**9.**	(A)	**10.**	(C)	**11.**	(D)	**12.**	(C)	**13.**	(C)	**14.**	(D)
15.	(B)	**16.**	(C)	**17.**	(D)	**18.**	(D)	**19.**	(B)	**20.**	(C)	**21.**	(B)
22.	(C)	**23.**	(C)	**24.**	(D)	**25.**	(D)	**26.**	(A)	**27.**	(B)	**28.**	(A)
29.	(A)	**30.**	(B)	**31.**	(C)	**32.**	(D)	**33.**	(B)	**34.**	(A)	**35.**	(B)
36.	(B)	**37.**	(B)	**38.**	(D)	**39.**	(D)	**40.**	(B)	**41.**	(A)	**42.**	(A)
43.	(C)	**44.**	(C)	**45.**	(D)	**46.**	(A)	**47.**	(C)	**48.**	(D)	**49.**	(C)
50.	(D)												

CLASS 7

LEVEL 2

QUESTION PAPER SET B

Techfest IIT Bombay

NSO

SOF NATIONAL SCIENCE OLYMPIAD 2018-19

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** and **Roll No.** clearly on the **OMR Sheet** and do not forget to sign it.
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 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.

16. ● Ⓑ Ⓒ Ⓓ

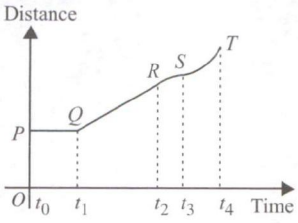
8. Rough work should be done in the blank space provided in this booklet.
9. Please fill in your personal details in the space provided on this page before attempting the paper.
10. **RETURN THE OMR SHEET AND QUESTION PAPER TO THE INVIGILATOR AT THE END OF THE EXAM.**

SOF
SCIENCE OLYMPIAD FOUNDATION
Inspiring Young Minds Through Knowledge Olympiads

Name:.....

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

1. Distance-time graph of an object is shown in the figure. Object is at rest in a time interval from



A. t_3 to t_4
B. t_2 to t_3
C. t_1 to t_2
D. t_0 to t_1

2. An aluminium ball at 70°C is put in a vessel of hot water at 60°C. The heat will
A. Flow from the ball to water
B. Flow from water to the ball
C. Not flow from the ball to water or vice versa
D. None of these.

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

	Column I		Column II
P.	Electric circuit	(i)	It is a coil of insulated copper wire wrapped around an iron nail.
Q.	Electromagnet	(ii)	It is a combination of two or more cells.
R.	Electric switch	(iii)	It is an arrangement consisting of source of electricity, connectors and utilizers.
S.	Battery	(iv)	It is used in an electric circuit to make or break the circuit.

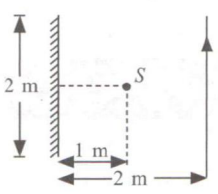
A. P-(i), Q-(ii), R-(iv), S-(iii)
B. P-(iii), Q-(i), R-(iv), S-(ii)
C. P-(i), Q-(iii), R-(ii), S-(iv)
D. P-(iii), Q-(iv), R-(i), S-(ii)

4. Rohan is going to school with his father by car. He decides to note the readings on the odometer of the car after every five minutes till he reaches the school. The given table shows the odometer readings of his journey.

Time (am)	7:30	7:35	7:40	7:45	7:50
Odometer reading (km)	36593	36596	36599	36602	36605

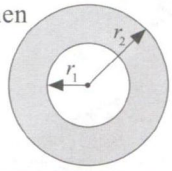
If he left for school at 7:30 am, then find the average speed of the car.
A. 5 m/s B. 6 m/s
C. 10 m/s D. 15 m/s

5. A point source of light S, placed at a distance 1 m in front of the centre of a plane mirror of width 2 m, hangs vertically on a wall. Rahul walks in front of the mirror along a line parallel to the mirror at a distance 2 m from it as shown in the figure. The greatest distance over which he can see the image of the light source in the mirror is



A. 5 m B. 9 m C. 12 m D. 6 m

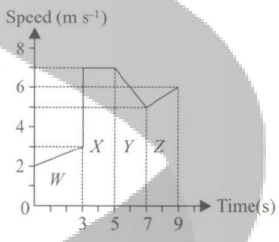
6. At room temperature the internal and external radii of a metal ring are r_1 and r_2 as shown in the figure. When the ring is heated at 100°C, then



A. r_1 decreases and r_2 decreases
B. r_1 decreases and r_2 increases
C. r_1 increases and r_2 decreases
D. r_1 increases and r_2 increases.

7. The lengths of the mercury thread in a thermometer immersed in pure melting ice and in pure boiling water are 8 cm and 24 cm respectively. What is the temperature of a liquid if the length of mercury thread is 16 cm in the liquid?
A. 50 K B. 273 K C. 323 K D. 373 K

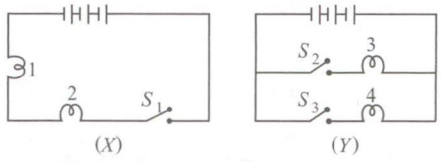
8. The speed-time graph of a moving ball is shown in the figure.



Which segment of the graph shows the greatest average speed of the ball?
A. W B. X C. Y D. Z

9. Which of the following statements is/are false?
(i) Two thin woollen sweaters are warmer than a thick woollen sweater.
(ii) It saves fuel if we cook food in a vessel which is blackened at the bottom and polished from the sides.
(iii) The cable wires between two poles are left loose, because in summers the wires may not break on expanding.
A. (i) and (iii) only B. (ii) and (iii) only
C. (iii) only D. (i) only

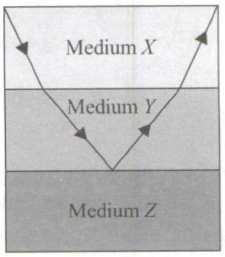
10. Observe the given circuit diagrams (X and Y) and identify the correct statement.



(X) (Y)

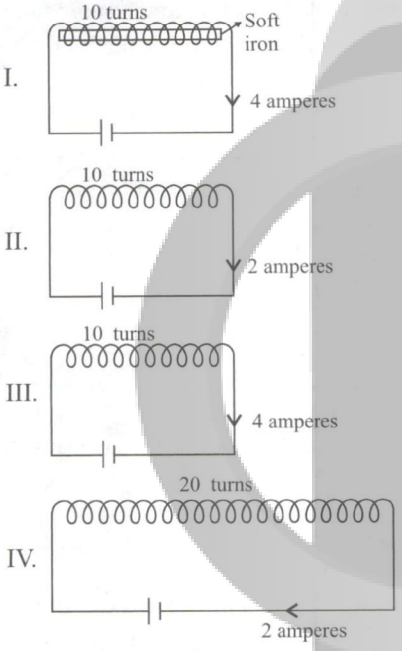
A. Circuit Y is a series circuit.
B. Bulb 2 in circuit X will glow, even when the bulb 1 is fused and switch S_1 is closed.
C. In circuit Y, bulb 3 will glow only if switch S_2 is closed.
D. Both circuits, X and Y are parallel circuits.

11. A light ray travels from medium X to medium Z as shown. Which of the following is true regarding the refractive index of media?



A. Medium X > Medium Y > Medium Z
B. Medium X > Medium Z > Medium Y
C. Medium Z > Medium X > Medium Y
D. Medium Z > Medium Y > Medium X

12. There are four electromagnets as shown in the figure.



Which one of following options is correct regarding strength of electromagnets?

A. I = II < III < IV
B. I > II > III = IV
C. I < II < III = IV
D. None of these

13. Which of the following statements is/are true?
I. Dark coloured cloths are preferred during night.
II. Sea breeze blows during day time.
III. There is a kink in a digital thermometer and kink contains mercury.
IV. The hotness of an object is determined by its temperature.

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

14. Read the given statements and state (T) for true and (F) for false ones.
I. A compound can be broken down into its constituent elements by chemical methods.
II. A compound always contains the same elements combined together chemically in a fixed ratio.
III. A compound retains the properties of its constituent elements.
IV. When two or more elements or compounds are brought together, they always react chemically.
V. Tap water is a compound.

	I	II	III	IV	V
A.	(F)	(T)	(T)	(F)	(F)
B.	(T)	(T)	(F)	(F)	(F)
C.	(F)	(F)	(F)	(T)	(T)
D.	(T)	(F)	(T)	(F)	(T)

15. Arushi, a class 7 student tested the nature of some common substances with the help of acid-base indicators and noted down her observations in the given table.

Substance	Phenol-phthalein indicator	China rose indicator	Methyl orange indicator
P	Colourless	Dark pink	Red
Q	Pink	Green	Yellow
R	Colourless	Pink	Orange
S	Colourless	Dark pink	Red

Substances P, Q, R and S could be respectively
A. Tamarind juice, window cleaner, soap solution and lime water
B. Soap solution, spinach juice, sugar solution and lemon juice
C. Spinach juice, soap solution, sugar solution and lemon juice
D. Window cleaner, tamarind juice, sugar solution and soap solution.

16. Three salt solutions are given as:
X : Potassium sulphate solution
Y : Sodium carbonate solution
Z : Ammonium sulphate solution
Which of the following statements is incorrect regarding these salt solutions?
A. X will have same effect on red litmus paper as the common salt solution.
B. Y will have same effect on turmeric paper as the milk of magnesia.
C. Ammonium sulphate will have same effect on blue litmus paper as the lemon juice.
D. None of these

17. Observe the given figures carefully.

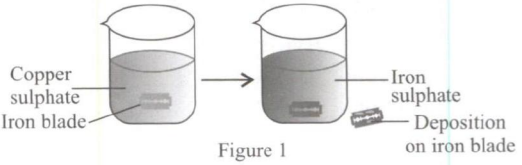


Figure 1

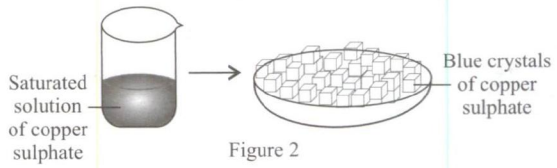


Figure 2

Which of the following statements is incorrect regarding the processes shown in figure 1 and 2?

A. A new substance is formed in both the processes.
B. Iron blade undergoes rusting and a green deposition is formed on it.
C. Process in figure 1 is reversible while that in figure 2 is irreversible.
D. All of these

18. Match the columns and select the correct option from the given codes.

Column-I (Common name)		Column-II (Chemical name)	Column-III (Use)
1. Calamine	(i)	Calcium oxide	(a) Ant sting remedy
2. Quick lime	(ii)	Sodium bicarbonate	(b) White washing
3. Slaked lime	(iii)	Zinc carbonate	(c) Indigestion remedy
4. Baking soda	(iv)	Calcium hydroxide	(d) Wasp sting remedy
5. Vinegar	(v)	Acetic acid	(e) To reduce soil acidity

A. 1-(ii)-(c); 2-(iv)-(d); 3-(i)-(a); 4-(iii)-(b); 5-(v)-(e)
B. 1-(iii)-(a); 2-(i)-(e); 3-(iv)-(b); 4-(ii)-(c); 5-(v)-(d)
C. 1-(iii)-(c); 2-(iii)-(a); 3-(iv)-(b); 4-(v)-(e); 5-(i)-(d)
D. 1-(iv)-(e); 2-(iii)-(d); 3-(v)-(c); 4-(i)-(a); 5-(ii)-(b)

19. A few changes are listed in the box.

(i) Burning of a candle	(ii) Burning of LPG in kitchen
(iii) Burning of a kerosene wick stove	
(iv) Burning of biogas	(v) Burning of paper
(vi) Burning of fire crackers	
(vii) Burning of magnesium ribbon	

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

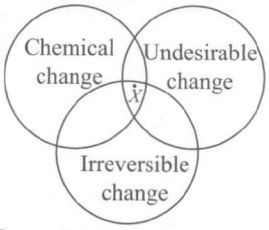
All the changes listed in the box are __(p)__ in nature. Changes __(q)__ are pure chemical changes while changes __(r)__ are both physical and chemical changes.

	p	*q*	*r*
A.	Endothermic	(ii), (iv)	(i), (iii), (v), (vi), (vii)
B.	Exothermic	(i), (iii), (v), (vi), (vii)	(ii), (iv)
C.	Endothermic	(iii), (v), (vii)	(i), (ii), (iv), (vi)
D.	Exothermic	(iv), (v), (vi), (vii)	(i), (ii), (iii)

20. Select the incorrect match.

A. Potassium hydroxide - Alkaline batteries
B. Magnesium hydroxide - Antiperspirants
C. Calcium hydroxide - Fungicide
D. None of these

21. Study the given Venn diagram.



Centre point *X* represents

A. Heating an iron rod to red hot
B. Expansion of an iron rim on heating
C. Rusting of the iron gate on exposure to moist air
D. Contraction of railway tracks in winters.

22. A few substances are listed in the box.

(i) Sulphuric acid	(ii) Sodium bicarbonate
(iii) Sodium hydroxide	(iv) Ammonium hydroxide
(v) Sodium sulphate	(vi) Ammonium sulphate
(vii) Sodium chloride	(viii) Formic acid
(ix) Tartaric acid	(x) Nitric acid

Now, read the given passage and select the correct option.

Substances __(p)__ are strong mineral acids while substances __(q)__ are weak organic acids. Aqueous solutions of substances __(r)__ will turn China rose indicator green while substances __(s)__ will have no effect on China rose indicator.

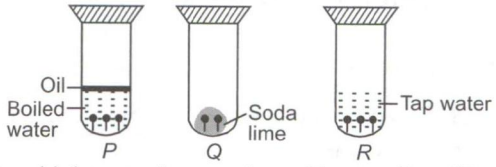
	(p)	*(q)*	*(r)*	*(s)*
A.	(i), (x)	(viii), (ix)	(ii), (iii), (iv)	(v), (vii)
B.	(i), (iii)	(v), (vii)	(ii), (viii), (x)	(iv), (vi), (ix)
C.	(ii), (v)	(iii), (vii), (ix)	(i), (vi)	(iv), (viii), (x)
D.	(i), (iii)	(viii), (ix), (x)	(ii), (v), (vii)	(iv), (vi)

23. Select the correct statement(s).

I. Turmeric paper can be used to distinguish between an acidic and a neutral material.
II. Hydrochloric acid burns the skin and sodium hydroxide is harsh on skin but the product formed by neutralisation reaction between two is edible.
III. When sulphuric acid is mixed with lime water, sodium sulphate is formed which is a neutral salt.
IV. Reaction between an acid and a base always results in the formation of a neutral salt.
V. Aqua regia contains hydrochloric acid and nitric acid in the ratio 3:1.

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

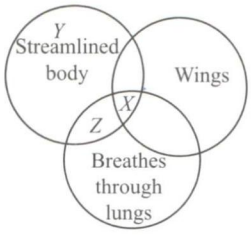
24. Observe the given experimental set-up carefully.



In which test tubes rusting of iron nails will not take place?

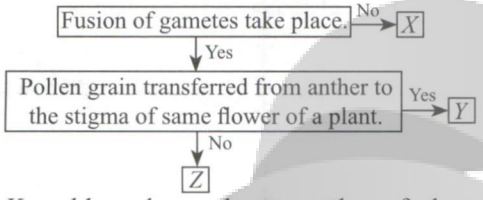
A. *P* and *Q* only
B. *Q* and *R* only
C. *P* and *R* only
D. *P*, *Q* and *R*

25. Refer to the given Venn diagram and select the correct statement regarding animals *X*, *Y* and *Z*.



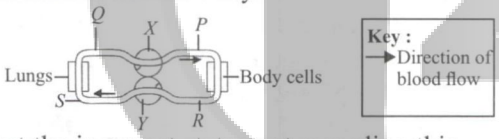
A. *X* could possess feathers whereas *Y* could possess scales.
B. *Y* could be oviparous organism whereas *Z* could be viviparous organism.
C. Both *X* and *Z* could regulate their body temperature.
D. All of these

26. Refer to the given flow chart regarding reproduction in plants and select the correct statement regarding *X*, *Y* and *Z*.



A. *X* could produce a large number of plants in a shorter time.
B. In castor and maize plants both processes *Y* and *Z* can prevent fertilisation.
C. Assured seed set is possible even in absence of pollinator in process *Y*.
D. Both A and C

27. The given figure represents the pattern of blood circulation in human body.



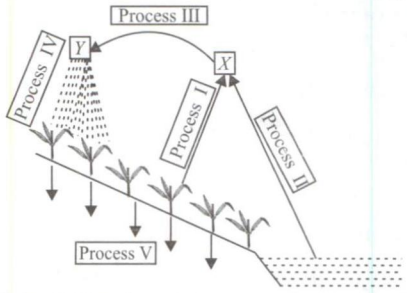
Select the incorrect statement regarding this.
A. *Q* and *P* carry oxygenated blood whereas *R* and *S* carry deoxygenated blood.
B. *Y* represents right side of the heart, *i.e.*, right atrium and right ventricle.
C. *P* and *S* carry oxygenated blood whereas *Q* and *R* carry deoxygenated blood.
D. *X* represents left side of the heart, *i.e.*, left atrium and left ventricle.

28. Refer to the given table and select the correct statement regarding *P*, *Q* and *R*.

Characteristics	Plants		
	P	*Q*	*R*
It grows in nitrogen deficient soil	✓	×	×
It is leafless and rootless	×	✓	×
It prepares its carbohydrates through photosynthesis	✓	×	✓

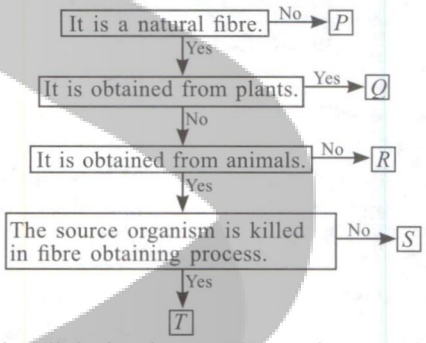
A. Plant *P* possesses special root like structures called haustoria for absorption of nitrogen from atmospheric air.
B. Plant *Q* catches and digests insects and shows completely heterotrophic mode of nutrition.
C. *R* could be *Nepenthes* or *Rafflesia*.
D. *P* could be *Dionaea* whereas *Q* could be *Cuscuta*.

29. Refer to the given figure.



Which of the following statements is correct regarding the process shown in the figure?
A. Process I prevents loss of water from plants whereas process III is involved in dew formation.
B. The physical states of water at *X* and *Y* are liquid and gas, respectively.
C. Process II speeds up in windy condition.
D. Deforestation will decelerate process V and accelerate process IV.

30. Refer to the given flow chart and select the incorrect statements regarding *P*, *Q*, *R*, *S* and *T*.



(i) *Q* is cellulosic whereas *S* is proteinaceous in nature.
(ii) *S* could be obtained from a viviparous animal whereas *T* could be obtained from an oviparous animal with four stages in its life cycle.
(iii) *P* and *S* are non-biodegradable fibres.
(iv) *P* and *R* are petroleum based fibres.
(v) Organisms providing *S* generally inhabit desert lands whereas those providing *Q* generally inhabit polar regions.

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

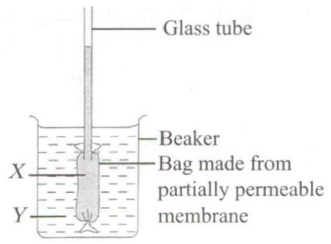
31. Refer to the given list of fruits/seeds.

(i) *Dandelion*	(ii) *Acer*	(iii) *Xanthium*
(iv) *Urena*	(v) Coconut	(vi) *Hiptage*
(vii) Lotus	(viii) Balsam	(ix) Castor
(x) Peach		

Select the option which correctly matches these fruits/seeds with their dispersal agents, wind (*P*), water (*Q*), animal (*R*) and explosion (*S*).

	P	*Q*	*R*	*S*
A.	(i), (ix), (v)	(vii), (viii)	(iii), (iv), (x)	(ii), (vi)
B.	(i), (ii), (ix)	(v), (vii)	(iii), (iv), (x)	(vi), (viii)
C.	(i), (iii), (viii)	(v), (vii)	(ii), (iv), (x)	(vi), (ix)
D.	(i), (ii), (vi)	(v), (vii)	(iii), (iv), (x)	(viii), (ix)

32. The given diagram shows an experimental set-up to study osmosis.



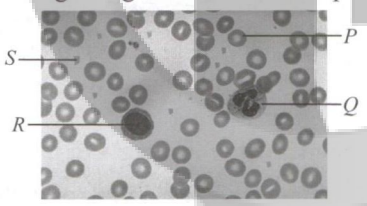
Which of the following combinations of liquids would cause liquid *X* to rise to the highest level in the glass tube after three hours?

	Liquid *X*	Liquid *Y*
A.	Concentrated sucrose solution	Dilute sucrose solution
B.	Concentrated sucrose solution	Water
C.	Dilute sucrose solution	Concentrated sucrose solution
D.	Water	Concentrated sucrose solution

33. When a person breathes in, what happens to the diaphragm and to the rib cage?

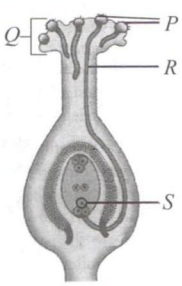
	Diaphragm	Rib cage
A.	Becomes flatten	Moves downwards and inwards
B.	Becomes flatten	Moves outwards and upwards
C.	Becomes more curved	Moves downwards and inwards
D.	Becomes more curved	Moves outwards and upwards

34. Refer to the given picture of blood smear and select the correct option regarding different blood corpuscles (*P*-*S*).



A. Blood cell *Q* plays a major role in transport of gases within the body.
B. A person who is unable to produce blood cell *S* bleeds continuously even from a minor injury.
C. Blood cell *P* produces antibodies in response to a pathogenic infection in the body.
D. Blood cell *R* contains a red pigment called haemoglobin that shows affinity for oxygen.

35. Study the given figure and select the incorrect statement regarding *P* – *S*.

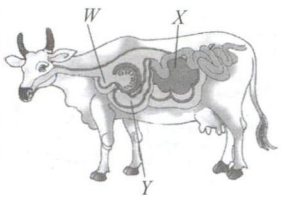


A. *P* form inside the anther and possess a tough protective coat that prevents them from drying up.
B. *Q* is the part of pistil that receives pollen grains from anthers.
C. *R* carries male gametes to the ovule present in ovary.
D. *S* fuses with male gamete and forms endosperm after fertilisation.

36. Soil erosion can be prevented by

A. Afforestation B. Deforestation
C. Overgrazing by animals D. Both A and B.

37. Identify *W*, *X* and *Y* in the given figure and select the correct option regarding them.



A. *Y* is the chamber where partially chewed food is stored temporarily.
B. *W* is the chamber which is often referred to as true stomach which leads to small intestine.
C. *X* is the chamber where anaerobic bacteria helps in the digestion of cellulose.
D. *X* is the chamber where protein is digested with the help of enzymes.

38. The given statements correspond to which of the following layers of forest?

(i) It is the thickest layer and much of the sunlight and rain is stopped by the thick foliage.
(ii) The trees may be as high as 100 feet.
(iii) The animals found in this layer include birds, monkeys, sloths, lizards, etc.

A. Emergent layer B. Understorey
C. Canopy D. Forest floor

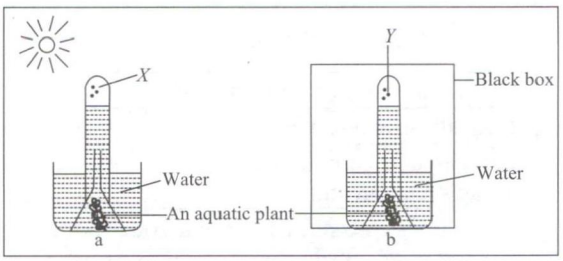
39. Select the correct statement(s) regarding the soil types *X*, *Y* and *Z*.

Soil type	Feature
X	– It contains very small quantity of silt and clay and cannot hold much water.
Y	– It is poorly aerated but can hold much water.
Z	– It is high in humus content and has a very good water holding capacity.

(i) *X* represents sandy soil and is not much suitable for plant growth.
(ii) *Y* type of soil is best suited for plant growth.
(iii) *Z* represents clayey soil and is not suitable for plant growth.

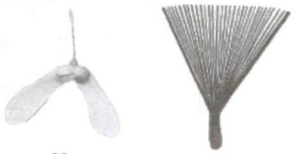
A. (i) and (iii) only B. (i) only
C. (ii) and (iii) only D. (i), (ii) and (iii)

40. Refer to the given experimental set-ups a and b and select the incorrect option regarding gases *X* and *Y*.



A. *Y* could be a gas that causes global warming.
B. *X* could be a gas that is fixed to form carbohydrate by plants during photosynthesis.
C. *Y* could be a gas that is used in fire extinguishers.
D. *X* could be a gas that supports burning.

41. Refer to the given figures *X* and *Y*.



X *Y*

How are *X* and *Y* adapted for their dispersal in the surroundings?

	X	*Y*
A.	Fleshy and sweet to attract animals	Hair-like structure to stick onto bodies of animals
B.	Wing-like structure to enable it to float on water	Hook-like structure to stick onto fur of animals
C.	Air trapped within its structure to enable it to float on water	Hair-like structure to enable it to float on water
D.	Wing-like structure to get blown off with the wind	Hair-like structure to get blown off with the wind

42. Following are the different steps carried out in a waste water treatment plant. These steps are arranged in a random fashion. Select the option that arranges these steps in the correct sequence.

(i) Wastewater is passed into sedimentation tank.
(ii) Sludge is decomposed by anaerobic bacteria.
(iii) Wastewater is passed through bar screens.
(iv) Wastewater is passed to grit and sand removal tank.
(v) Solids settle at the bottom and floatable materials are removed by skimmer.
(vi) Aeration of water takes place.
(vii) Disinfection of water by adding chlorine.

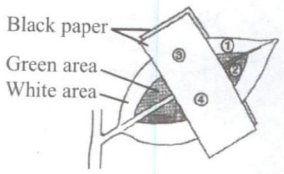
A. (iii) → (i) → (iv) → (v) → (ii) → (vi) → (vii)
B. (iii) → (iv) → (i) → (v) → (ii) → (vi) → (vii)
C. (iv) → (vi) → (v) → (iii) → (ii) → (i) → (vii)
D. (iv) → (v) → (vii) → (ii) → (vi) → (i) → (iii)

43. Select the incorrect match.

(i) Mohair – Angora rabbit
(ii) Merino – Vicuna
(iii) Angora wool – Angora goat
(iv) Cashmere – Kashmiri goat

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

44. The diagram shows a destarched, variegated leaf, partly covered by black paper. The plant is placed in bright light for several hours.



Four discs were then cut from the leaf in the positions (1-4) as shown in the figure and were tested for starch. Which disc contains starch?

A. 1 only B. 1 and 2 only
C. 2 only D. 3 and 4 only

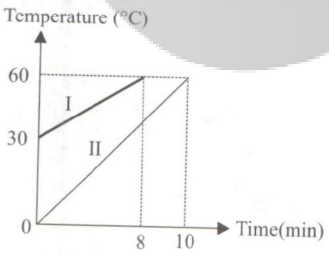
45. Read the following statements carefully and select the option which correctly identifies true (T) and false (F) ones.

(i) The seasonal movement of the complete population of animals from one area to another is termed migration.
(ii) Heavy and solid bones help penguins to swim through water at a speed up to 15 miles per hour.
(iii) Toucans have four clawed toes in each leg, two in front and two at the back.
(iv) Most rainforests lie between the Tropic of Cancer and the Tropic of Capricorn, that is why they are often called as tropical rainforests.

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

ACHIEVERS SECTION

46. Two different liquids of equal masses are heated by identical heaters. The temperature-time graphs for them are shown here.



Which of the following statements is true?

A. The heat supplied to both the liquids is same.
B. The temperature of liquid I increases more than that of liquid II over the same time interval.
C. The temperature of liquid II increases more than that of liquid I over the same interval of time.
D. None of these.

47. A few solutions were tested with different indicators and results were recorded in the given table.

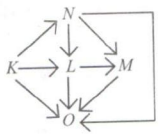
Solution	Methyl orange	Phenol-phthalein	China rose
W	Yellow	Pink	Green
X	Orange	Colourless	Pink
Y	Yellow	Pink	Green
Z	Red	Colourless	Magenta

Study the table carefully and fill in the blanks by selecting an appropriate option.

Solutions __(i)__ have pH greater than 7 while solution __(ii)__ has pH equal to 7. When solutions __(iii)__ and __(iv)__ are mixed in right amount, heat energy is __(v)__ and a solution similar in nature to solution __(vi)__ is formed.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
A.	*X*, *Y*	*W*	*Z*	*X*	Evolved	*Y*
B.	*W*, *Y*	*X*	*Y*	*Z*	Absorbed	*X*
C.	*W*, *Y*	*X*	*Y*	*Z*	Evolved	*X*
D.	*X*, *Y*	*X*	*Y*	*Z*	Absorbed	*Y*

48. Refer to the given food web and select the incorrect statement regarding it.



(i) *N* could be a herbivore whereas *L* could be an omnivore.
(ii) Stability of this food web will be affected if entire population of organism *L* is removed from the community.
(iii) *K* is a saprophyte which plays an important role in recycling of nutrients.
(iv) There are eight interconnected food chains in the given food web.
(v) *N* serves as secondary as well as tertiary consumer in the given food web.

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

49. Refer to the given dichotomous key and select the correct option regarding *P*, *Q*, *R*, *S* and *T*.

I. (a) It is a method of asexual reproduction in plants. - Go to II
(b) It is a method of asexual reproduction in animals. - Go to IV
II. (a) Vegetative propagation by leaves – *P*
(b) Vegetative propagation by stems – Go to III
III. (a) Vegetative propagation by rhizomes – *Q*
(b) Vegetative propagation by bulbs – *R*
IV. (a) Reproduction through binary fission – *S*
(b) Reproduction through budding – *T*

A. *P* – Potato, *Q* – Turmeric, *R* – *Bryophyllum*, *S* – *Plasmodium*, *T* – *Hydra*
B. *P* – *Begonia*, *Q* – Turmeric, *R* – Garlic, *S* – *Amoeba*, *T* – *Hydra*
C. *P* – *Colocasia*, *Q* – Mint, *R* – Potato, *S* – *Paramecium*, *T* – *Euglena*
D. *P* – Strawberry, *Q* – *Chlamydomonas*, *R* – Onion, *S* – *Paramecium*, *T* – *Spirogyra*

50. Digestive juices were collected from three different regions of the alimentary canal. Drops of these juices were added to wells made in an agar of starch as shown in the given figure.

After an hour, the wells were rinsed with distilled water and flooded with iodine solution. The results are given in the table.

Well	1	2	3
Colour of iodine solution	Blue-black	Yellow - brown	Yellow - brown

Which of the following correctly identifies the regions of the alimentary canal from which the three digestive juices were obtained?

A. Well 1 represents region that contains an enzyme pepsin that causes the breakdown of proteins into simple substances.
B. Well 2 could represent region that contains an enzyme called salivary amylase.
C. Well 3 could represent region that is the longest portion of alimentary canal and receives bile juice from liver and pancreatic juice from pancreas.
D. All of these

SPACE FOR ROUGH WORK

CLASS24

CLASS - VII | **2018-19**

NSO (LEVEL-II) **ANSWER KEY**

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	4	1	2	3	4	4	3	3	3	3	1	4	3	2	3	4	4	2		4
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	3	1	2	1	4	4	3	4	3	4	4	2	2	2	4	1	3	3	2	2
Que.	41	42	43	44	45	46	47	48	49	50										
Ans.	4	2	1	3	3	3	3	2	2	4										