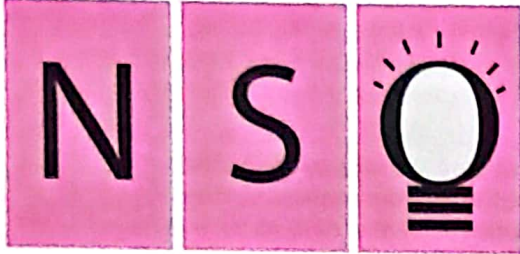




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**SOF NATIONAL SCIENCE
OLYMPIAD 2024-25**

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CLASS **9**

SET-B

Total Questions : 50 | Time : 1 hr.

Guidelines for the Candidate

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

16. ☒ A ☐ B ☐ C ☐ D

Name:.....

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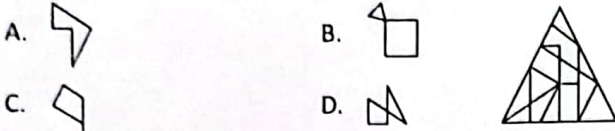
8
Olympiads

LOGICAL REASONING

1. In a joint family, T is the brother of H and husband of W. N is the sister of K and K is the son of W. S is the mother of T and wife of E. Which of the following options is definitely correct?

A. S is the maternal grandmother of N.
 B. H is the brother-in-law of W.
 C. K is the niece of H.
 D. E is the father-in-law of W.

2. Select a figure from the options which is not exactly embedded in the given figure as one of its parts.

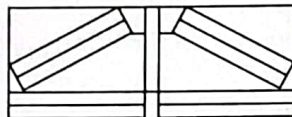


3. A bus travels 6 km towards East, then it turns right and travels 20 km. It then turns left and travels 6 km. It then turns left again and travels 10 km. Finally, it turns right and travels 8 km. How far and in which direction is the bus now from the starting point?

A. $10\sqrt{5}$ km, South-East B. $5\sqrt{10}$ km, North-West
 C. $10\sqrt{5}$ km, North-West D. $5\sqrt{10}$ km, South-East

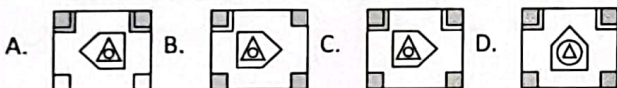
4. Find the number of rectangles formed in the given figure.

A. 17
 B. 18
 C. 19
 D. More than 19



5. Select a figure from the options which will continue the same series as established by the Problem Figures.

Problem Figures



6. In a meeting, six doctors P, Q, R, S, T and U are sitting in two rows (three in each row) facing North and South. P sits facing North at one end of the row. Q sits in the middle of the row facing North and is exactly

opposite to T. R sits immediate left of T. U sits second to the left of P. Who among the following is sitting exactly opposite to S if the doctors in both the rows are facing each other?

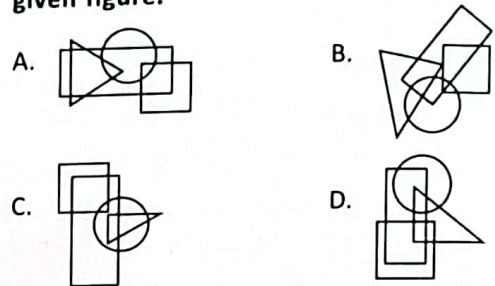
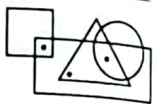
A. R B. U C. P D. T

7. Find the missing number, if a certain rule is followed either row-wise or column-wise.

A. 7
 B. 6
 C. 9
 D. 8

H	D	M	5
R	T	K	?
V	Y	Q	8

8. Select a figure from the options which does not satisfy the same conditions of placement of the dots as in the given figure.

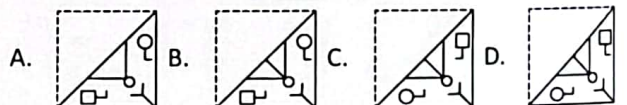
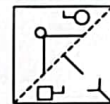


9. How many such digits are there in the given arrangement, each of which is immediately preceded by a vowel and immediately followed by a consonant?

H 5 U 7 4 A 2 K O 6 R V E 3 I U 4 J 9 Q M 8 E 2

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

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



SCIENCE

11. Richa and Aditi race up a hill. Aditi weighs twice as much as Richa and takes twice as long as Richa to reach the top. Which one of the following statements correctly represents work done and power comparison of both the girls?

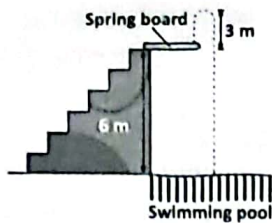
A. Aditi does more work and deliver less power as compared to Richa.
 B. Aditi does less work and deliver same power as compared to Richa.

C. Aditi does more work and deliver more power as compared to Richa.
 D. Aditi does more work and deliver same power as compared to Richa.

12. A man of mass 55 kg climbs up a flight of steps to reach the spring board. The spring board is 6 m above the water surface in a swimming pool as shown in the given figure. He jumps up into the air, 3 m above the spring board, before falling into water

in the swimming pool. If the average resisting force exerted by water on the man is 1500 N, then the maximum depth of the man in water will be

- A. 2.1 m B. 3.2 m
C. 4.2 m D. 5.6 m



13. Anita has a large container of water inside which there is an air bubble of radius R . The refractive index of water is 1.33. At what distance from the air bubble should a point object be placed so as to form a real image at the same distance from the bubble?

- A. $2R$ B. R
C. $4R$
D. The air bubble cannot form a real image of a real object.

14. A man is going to the basement using a lift. A spring balance is attached to the ceiling of the lift. He hangs his bag on this spring balance which reads 50 N when the lift is stationary. When the lift starts moving downwards with an acceleration of 5 m/s^2 , what will be the new reading of the spring balance?

- A. 24.5 N B. 20 N C. 48.2 N D. 30 N

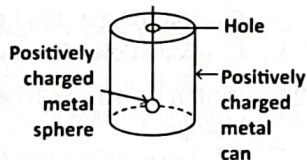
15. A car is moving on a horizontal road towards East. Which of the following statement(s) is/are correct about frictional force acting on the car by the road? (Neglect the effect of air)

- (i) It will act towards East if the vehicle is accelerating.
(ii) It will be zero if the vehicle is moving with a uniform velocity.

(iii) It must act towards West.

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

16. A light positively charged metal sphere is suspended by an insulating thread inside a positively charged metal can as shown in the given figure.

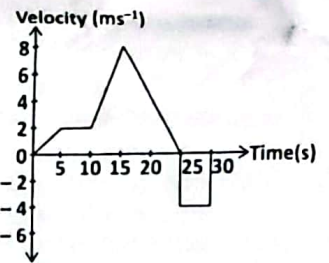


Read the given statements and select the option which correctly identifies them as true (T) and false (F) ones.

- (i) The metal sphere may still be suspended even if the thread is cut.
(ii) The metal can will become negatively charged if the metal can is earthed.
(iii) The metal sphere will move to one side of the can if the metal can is earthed.
(iv) The metal sphere will remain positively charged if the metal can is earthed.

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

17. Refer to the given graph and fill in the blanks by selecting an appropriate option.



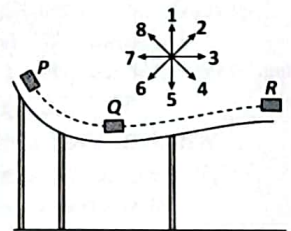
The displacement of the particle from its initial position at the end of 15 s and 30 s is (i) and (ii) respectively. The average velocity of the particle between 15 s and 25 s and between 0 s and 30 s is (iii) and (iv) respectively.

- | | (i) | (ii) | (iii) | (iv) |
|----|------|-------|---------------------|---------------------|
| A. | 40 m | 60 m | 4 ms^{-1} | 2 ms^{-1} |
| B. | 40 m | 100 m | 2 ms^{-1} | 4 ms^{-1} |
| C. | 20 m | 60 m | 4 ms^{-1} | 4 ms^{-1} |
| D. | 20 m | 100 m | 2 ms^{-1} | 2 ms^{-1} |

18. A car is moving at a constant speed of 80 km/h along a straight road which heads towards a large vertical wall of a building and makes a turn by the side of the wall. A bird flying at a constant speed of 200 km/h starts from the wall towards the car at an instant when the car is 40 km away, flies until it reaches the glass pane of the car and returns to the wall at the same speed. It continues to fly between the car and the wall until car reaches the wall. What is the total distance the bird has travelled during this period?

- A. 50 km B. 100 km C. 200 km D. 180 km

19. A block is sliding along a frictionless ramp in vertical plane as shown in the given figure. Here, 1 to 8 numbered arrows are used to represent the directions of acceleration of the block at different instants of time.



The position P represents the instant when the block starts sliding on the curve path, position Q represents the lowest position of the curved path and position R represents the instant when the block is just outside the curved path.

Based on the given paragraph fill in the blanks by selecting an appropriate option.

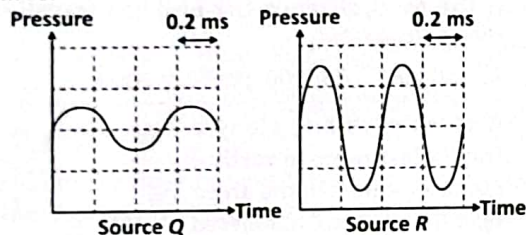
The direction of acceleration of the block, when it is at position P is best represented by arrow (i). Similarly, the direction of acceleration of the block when it is at position Q is best represented by arrow (ii). Now, after leaving the ramp, the direction of acceleration of the block when it is at position R is best represented by arrow (iii).

- | | (i) | (ii) | (iii) |
|----|-----|------|-------|
| A. | 3 | 5 | 7 |
| B. | 4 | 1 | 5 |
| C. | 6 | 3 | 1 |
| D. | 8 | 5 | 2 |

20. Which of the following statement(s) is/are correct?
- (i) A person listening to the sound of a speaker emitting at a frequency 260 Hz which is decreasing uniformly at a rate of 6 Hz per second will not be audible to him after 30 s.
- (ii) The period of a sound wave of wavelength 0.85 m will be $2.5 \mu\text{s}$. (Take, speed of sound in air = 330 m/s)
- A. (i) only B. (ii) only
C. Both (i) and (ii) D. Neither (i) nor (ii)

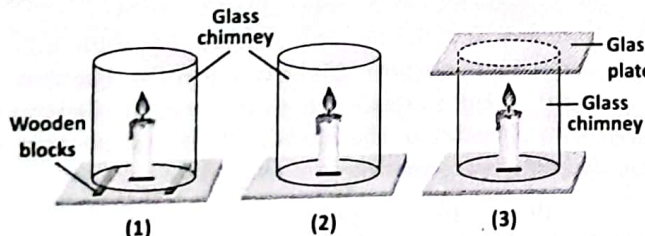
21. Consider the following statements about hydrostatic pressure.
- (i) In a liquid, points at different depths may be at the same pressure.
- (ii) In different liquids, points at different depths can be at the same pressure.
- (iii) In a liquid, points at different depths can never be at the same pressure.
- (iv) In different liquids, points at the same depth can never be at same pressure.
- How many of the above statement(s) is/are correct?
- A. Only one B. Only two
C. Only three D. All four

22. The air pressure variation with time for sound waves from two sources Q and R are depicted in the given figures.



- Which of the following statements are incorrect?
- (i) Source Q has a higher pitch as compared to that of source R.
- (ii) The loudness of source R is greater than that of source Q.
- (iii) The wavelength of the sound produced by source Q is 176 cm.
- (iv) The velocity of sound is independent of the medium of its propagation.
- A. (i) and (iv) only B. (i), (iii) and (iv) only
C. (iii) and (iv) only D. (i), (ii) and (iii) only

23. Observe the given figures carefully.



- Which of the following statements is/are correct?
- (i) After some time flame goes off in candle (1) as oxygen is not available.
- (ii) In candle (2), flame flickers and produces smoke.

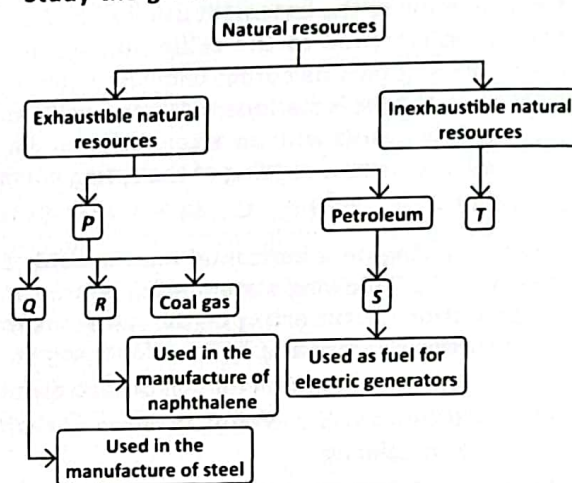
- (iii) Candle (3) burns freely due to presence of oxygen.
- A. (i) and (iii) only B. (ii) only
C. (i) only D. (ii) and (iii) only

24. A few compounds and their respective chemical formulae are listed in the following table :

S. No.	Compound	Chemical formula
1.	Calcium hydroxide	CaOH
2.	Sodium chloride	NaCl
3.	Aluminium oxide	Al ₃ O ₂
4.	Magnesium chloride	MgCl ₂
5.	Hydrogen sulphide	HS

- Which of the given formulae are incorrect?
- A. 1, 3 and 5 only B. 2 and 4 only
C. 2, 3 and 4 only D. 3 and 5 only

25. Study the given classification chart carefully.



P, Q, R, S and T are respectively

- A. Coke, Coal, Coal tar, Diesel, Air
B. Coal, Coke, Coal tar, Petrol, Natural gas
C. Natural gas, Coal tar, Coke, Petrol, Minerals
D. Coal, Coke, Coal tar, Diesel, Sunlight.

26. Which of the following are physical irreversible changes?

- (i) Formation of slaked lime from quick lime
(ii) Burning of candle
(iii) Plucking of leaves
(iv) Breaking of glass tumbler
(v) Direct conversion of solid to gas

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

27. Calorific values of few fuels T, U, V, W and X are in the order $V < W < U < T < X$.

T, U, V, W and X could be respectively

- A. LPG, Biogas, Wood, Coal, Hydrogen
B. Biogas, Wood, Coal, LPG, Hydrogen
C. Wood, Coal, Biogas, Hydrogen, LPG
D. Wood, Coal, LPG, Biogas, Hydrogen.

28. Element X has five electrons in its M shell and element Y has two electrons in its M shell.

Which of the following statements are correct regarding elements X and Y?

- (i) Valency of X is 5 while valency of Y is 4.
 - (ii) X and Y can form a compound of the type X_3Y_2 .
 - (iii) Mass number of X is 31 while mass number of Y is 24.
 - (iv) O^{2-} ion has same number of electrons as Y^{2+} ion.
- A. (i) and (ii) only B. (iii) and (iv) only
C. (i), (iii) and (iv) only D. (ii) and (iv) only

29. Read the following statements carefully and identify P and Q.

P : Tough, porous and black, almost pure form of carbon, used in the manufacture of steel.

Q : Constituent of petroleum, used for road surfacing.

- A. P – Coal gas, Q – Coal tar
- B. P – Coke, Q – Coal tar
- C. P – Coke, Q – Bitumen
- D. P – Coal gas, Q – Bitumen

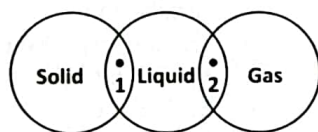
30. Read the following statements carefully and select the option which correctly identifies them as true (T) and false (F) ones.

- (i) Greater the humidity in air, higher is the rate of evaporation.
- (ii) Particles in steam, that is, water vapour at 373 K have more energy than water at the same temperature.
- (iii) The rate of diffusion decreases with increase in temperature due to decrease in the kinetic energy of particles.
- (iv) Dry ice is directly converted to carbon dioxide gas by increasing the pressure.

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

31. Study the given Venn diagram carefully. For point 1, liquid is the dispersion medium and for point 2, liquid is the dispersed phase. Which of the following colloidal systems correctly represent points 1 and 2 respectively?

- A. Face cream, Automobile exhaust
- B. Mist, Mud
- C. Mud, Smoke
- D. Milk of magnesia, Clouds



32. Which of the following options is correct?

- A. Formula unit mass of $MgSO_4 = 130$ u
- B. Formula unit mass of $CaO = 64$ u
- C. Formula unit mass of $CaCO_3 = 100$ u
- D. Formula unit mass of $Na_2O = 55$ u

33. Refer to the given relationship and select the option that correctly identifies X.

Parthenium : Butachlor :: Weevil : X

- A. Malathion B. MCPA
- C. 2, 4 – D D. Atrazine

34. Which of the following options correctly shows the characteristics of the xylem vessel and red blood cell?

	Xylem vessel		Red blood cell	
	Nucleus	Cytoplasm	Nucleus	Cytoplasm
A.	✓	✓	✓	✓
B.	x	✓	✓	x
C.	x	x	x	x
D.	x	x	x	✓

35. Identify the agricultural implement shown in the given figure and select the correct statement regarding it.



- A. It is used for removing weeds and for ploughing the soil.
- B. It is used for sowing seeds at equal distances and proper depth.
- C. It is used to level the soil after ploughing and is also used in uniform distribution of water.
- D. All of these

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

Column I	Column II
(a) Suspended particulate matter	(i) Itai-Itai disease
(b) Heat	(ii) Non-biodegradable soil pollutant
(c) Cadmium	(iii) Minamata disease
(d) Plastic	(iv) Air pollutant
(e) Mercury	(v) Physical water pollutant

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

37. Which of the following options contains only macronutrients required by plants?

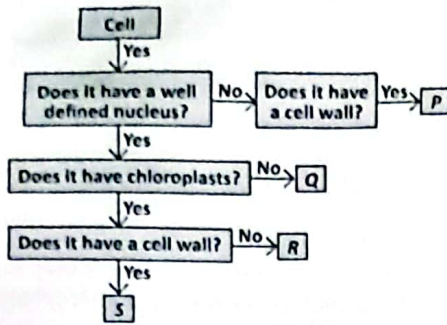
- A. Nitrogen, Carbon, Manganese, Iron
- B. Hydrogen, Sulphur, Molybdenum, Zinc
- C. Potassium, Calcium, Magnesium, Phosphorus
- D. Carbon, Oxygen, Chlorine, Copper

38. Identify organisms X, Y and Z shown in the given figures and select the correct statement regarding them.



- A. Organisms X and Y have cellular structure while organism Z does not have a cellular structure.
- B. Organisms X and Y are autotrophic in nature while organism Z is parasitic in nature.
- C. Organisms X and Y are unicellular eukaryotes while organism Z is a unicellular prokaryote.
- D. Organism Y reproduces by asexual methods only while organisms X and Z reproduce by both asexual and sexual methods.

39. Identify P, Q, R and S in the given flow chart and select the correct statement regarding them.



- (i) Q can be an animal cell.
 (ii) R can be a plant like organism e.g., *Penicillium*.
 (iii) P can be archaebacteria or cyanobacteria.
 (iv) S can absorb light energy for photosynthesis.
- A. (i) and (ii) only B. (ii) and (iv) only
 C. (i), (iii) and (iv) only D. (i), (ii), (iii) and (iv)

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

Column I (Animal)	Column II (IUCN Red list category)
P. Red panda	(i) Extinct species
Q. Steller's sea cow	(ii) Critically endangered species
R. Snow leopard	(iii) Endangered species
S. Sumatran orangutan	(iv) Vulnerable species

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

41. Select the option that identifies the incorrect set of differences between meristematic tissue and permanent tissue from the given table.

	Meristematic tissue	Permanent tissue
(i)	It is a simple tissue.	It may be simple or complex.
(ii)	Its cells are spherical and isodiametric.	Its cells have variable shapes and sizes.
(iii)	Intercellular spaces are often present.	Intercellular spaces are generally absent.
(iv)	Cells have thin cell wall.	Cells have thin or thick cell wall.
(v)	Vacuole is single, large and central.	Vacuoles are small or absent.

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

42. Refer to the given table and select the option that correctly identifies X, Y and Z.

Disease	Causal organism
Salmonellosis	X
Y	Virus
Aspergillosis	Z

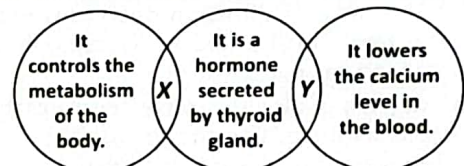
X	Y	Z
A. Virus	Ringworm	Fungus
B. Fungus	Tuberculosis	Bacteria
C. Bacteria	Rinderpest	Fungus
D. Virus	Bird flu	Bacteria

43. Which of the following processes/activities involve the release of carbon dioxide into the atmosphere?

- (i) Animal and plant respiration
 (ii) Photosynthesis
 (iii) Decomposition of dead plants and animals
 (iv) Burning of fossil fuels

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

44. Refer to the given Venn diagram. Identify X and Y and select the correct statement regarding them.



- A. Deficiency of X causes goitre in the body.
 B. Y is secreted by the parafollicular cells of the thyroid gland.
 C. Both X and Y help to regulate the sugar level in the blood.
 D. Both A and B

45. Which of the following statements is correct?

- A. Fish like salmon, rohu, etc., exhibit internal fertilisation.
 B. Vas deferens helps to transfer the semen with sperms into the female body.
 C. Each gamete contains only one sex chromosome.
 D. The process of expulsion of unfertilised egg from the uterus is called implantation.

ACHIEVERS SECTION

46. Identify the cell organelles P and Q shown in the given figures and select the incorrect statements regarding them.



- (i) P was discovered by Camillo Golgi, while Q was discovered by Palade.
 (ii) P helps in modification, sorting, packaging and transportation of secretory vesicles, while Q destroys any foreign material which enters the cell.
 (iii) P is present in all eukaryotic cells except mature mammalian RBCs, while Q is present in all aerobic eukaryotic cells except mammalian RBCs.

(iv) *P* stores the reserve food in the form of starch grains, lipids or proteins, while *Q* stores water and other substances.

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

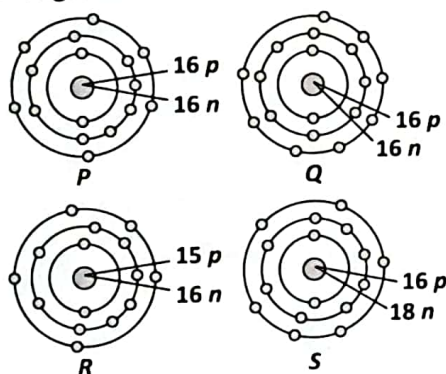
47. Read the given paragraphs where few words have been italicised and select the correct statement regarding them.

The process of growing two or more crops simultaneously on the same piece of land in no definite pattern is called *intercropping*. The different crops to be grown together are chosen so that they do not have common pests and *similar* requirements of water and nutrients. Both the crops should have *different* root patterns.

The process of growing two or more crops simultaneously in the same piece of land in definite pattern is called *mixed cropping*. The crops are arranged in *alternate* rows. It ensures *minimum* utilisation of nutrients.

- A. *Intercropping* and *mixed cropping* should be interchanged as they are incorrectly mentioned.
B. *Similar* and *different* should be interchanged.
C. *Different* should be replaced with *same* as it is mentioned incorrectly.
D. *Alternate* and *minimum* should not be replaced as they are correctly mentioned.

48. The atomic structures of *P*, *Q*, *R* and *S* are shown in the given figures.

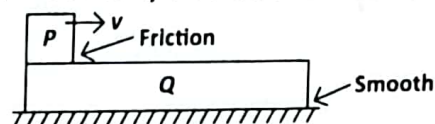


Select the incorrect statements from the following.

- (i) *P* and *S* are isotopes of each other and therefore they will have different chemical properties.
(ii) *P* and *R* are isobars.
(iii) *S* is an isotope of *R*.
(iv) *Q* is an anion of *P*.

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

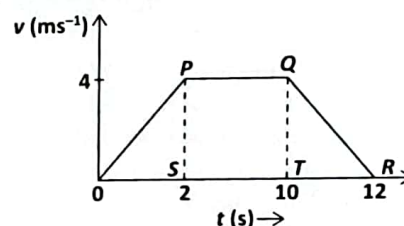
49. A block *P* is kept on a larger block *Q*. Both are initially at rest. Friction exists between the blocks but there is no friction between *Q* and floor. An impulse gives block *P* a velocity *v* as shown in the given figure.



For a certain displacement of block *P*, match column I with column II and select the correct option from the given codes.

Column I	Column II
(p) Work done by friction on <i>Q</i>	(i) Positive
(q) Work done by friction on <i>P</i>	(ii) Negative
(r) Net work done by friction on <i>P</i> and <i>Q</i>	(iii) Zero
(s) Work done by friction on <i>Q</i> in the frame of <i>P</i>	
A. (p)-(i), (q)-(ii), (r)-(iii), (s)-(iii)	
B. (p)-(ii), (q)-(i), (r)-(iii), (s)-(ii)	
C. (p)-(i), (q)-(ii), (r)-(ii), (s)-(ii)	
D. (p)-(ii), (q)-(i), (r)-(ii), (s)-(iii)	

50. A lift is in motion in upward direction. The total mass of the lift and passenger is 1000 kg. The variation in the speed of the lift is depicted in the given graph.



Now, match column I with column II and select the correct option from the given codes.

(Take $g = 9.8 \text{ m/s}^2$)

Column I	Column II
(p) Tension in the rope pulling the lift at $t = 11 \text{ s}$	(i) 40 SI unit
(q) Height upto which the lift takes the passenger	(ii) 0 SI unit
(r) Average acceleration of the lift during course of entire motion	(iii) 9800 SI unit
(s) Tension in the rope pulling the lift at $t = 6 \text{ s}$	(iv) 7800 SI unit
	(v) 3.3 SI unit
A. (p)-(iv), (q)-(i), (r)-(v), (s)-(iii)	
B. (p)-(iii), (q)-(ii), (r)-(i), (s)-(iv)	
C. (p)-(iii), (q)-(v), (r)-(ii), (s)-(iv)	
D. (p)-(iv), (q)-(i), (r)-(ii), (s)-(iii)	

SPACE FOR ROUGH WORK

SOF-TECHFEST IIT BOMBAY INNOVATION CHALLENGE

Introduction

Techfest is Asia's Largest Science and Technology Festival and the Annual Science and Technology Festival of IIT Bombay. With the sole motto of nurturing young talent and promoting innovative thinking among school students, Techfest is conducting an Innovation Challenge in association with the Science Olympiad Foundation for school students across India. It is a platform for young visionaries and problem solvers to showcase their creativity, ingenuity, and technical prowess.

Guidelines:

- Appearing in the Innovation Challenge is not compulsory. In case you wish, please visit www.techfest.org/innovationchallenge. No registration fee is to be paid.
- To participate, read the following problem statement and email the answer at ic.iitbombay@sofworld.org.
- Answers should be submitted as per the following schedule:

NSO Set-A 18 th October	NSO Set-B 12 th November	NSO Set-C 3 rd December
By 27 th October	By 22 nd November	By 8 th December

PROBLEM STATEMENT

Green Innovation: Technological Breakthroughs for a Sustainable Tomorrow

As the world faces increasing environmental and societal challenges, the combination of sustainability and Artificial Intelligence (AI) offers powerful solutions. Below are three distinct ways we can approach these challenges. Select one to explore how technology can help create a more sustainable world:

- **Sustainable Plastic Waste Management** - How can we develop innovative and eco-friendly ways to manage plastic waste without reducing the use of plastic in our daily lives?
- **AI's Role in the Modern World** - Why is AI essential in today's world? How can AI help prevent crimes, enhance security, and make a positive impact on society?
- **AI and Sustainability: Building a Greener Future** - How can AI and sustainability be combined to create innovative solutions that reduce environmental harm and promote long-term eco-friendly practices?

Choose ANY ONE of the above topics and answer in the following format :

Title - Write the title of the chosen topic.

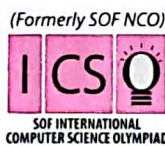
Problems - Identify the environmental, social, or industrial challenges related to your chosen topic and explain the need for sustainable or AI-powered solutions (100-150 words).

Solutions - Propose innovative ideas to address these challenges, using either sustainability, AI, or a combination of both (150-200 words).

Conclusion - Justify your solutions concerning their implementation and impact (in about 50-100 words).

Rewards:

- Each participant will be awarded a Certificate of Participation from SOF-Techfest, IIT Bombay.
- Top 20 students will be invited to Techfest 2024-25 with an accompanying adult from 17th to 19th December, 2024 with travel and accommodation provided by Techfest, IIT Bombay.
- Winners will be awarded trophies, gifts, certificates, and a visit to IIT Bombay's new Research Park, also they may get a visit to ISRO's Vikram Sarabhai Space Centre, Thiruvananthapuram.



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