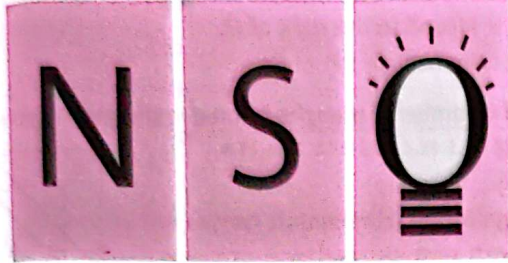




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SOF NATIONAL SCIENCE
OLYMPIAD 2025-26

QUESTION
PAPER SET

C

CLASS

9

Total Questions : 50

Time : 1 hr.

Guidelines for the Candidate

- You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
- 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.
- 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 1 mark each.
- All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
- There is only ONE correct answer. Choose only ONE option for an answer.
- 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. 16. ● (B) (C) (D)
- Rough work should be done in the blank space provided in the booklet.
- Return the OMR Sheet to the invigilator at the end of the exam.
- Please fill in your personal details in the space provided before attempting the paper.
- Participate in SOF-Techfest IIT Bombay Innovation Challenge. Open for class 8, 9 and 10. For details and to participate, please turn to last page.**



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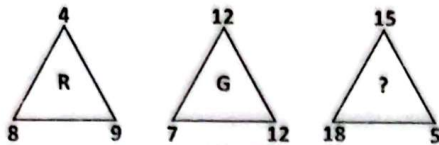
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LOGICAL REASONING

1. Find the missing letter, if same rule is followed in all the three figures.

- A. F
B. J
C. L
D. M



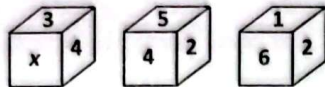
2. Select the correct mirror image of the given combination of letters and symbols.

- A. %7#M@J%
B. %7#W@J%
C. %7#W@J%
D. %7#M@J%



3. Three different positions of a dice are given below. Which of the following numbers will come in the place of x?

- A. 2 B. 6
C. 5 D. 1



4. A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an input and steps of rearrangement.

Input : 49 face 78 32 small cold 14 well

Step I : 78 well 49 face 32 small cold 14

Step II : 78 well 49 small face 32 cold 14

Step III : 78 well 49 small 32 face cold 14

Step IV : 78 well 49 small 32 face 14 cold

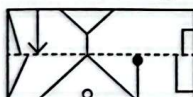
Step IV is the last step of the given input.

As per the rule followed in the above steps, find the input, if step III is given.

Step III : 94 voice 63 sky 41 hide calm 36

- A. 41 hide voice 94 63 calm sky 36
B. 36 voice hide 41 94 sky calm 63
C. voice 41 hide 94 calm 63 36 sky
D. Can't be determined

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



- A. B.
C. D.

During a school picnic, eight students J, K, L, M, N, O, P and Q are sitting in a circle facing the centre not necessarily in the same order. J is sitting fourth to the

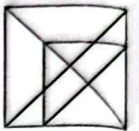
right of M, who is immediate left of K. N is third to the left of P, who is fourth to the left of Q. L is sitting second to the right of N.

Based on above information, which of the following statements is definitely true?

- A. K is sitting between M and P.
B. J is third to the left of N.
C. K is second to the right of O.
D. Q is immediate left of L.

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

- A. 18
B. 19
C. 20
D. More than 20



8. There is a certain relationship between the pair of numbers on the either side of ::. Identify the relationship of the given pair and find the missing number.

367 : 256 :: 584 : ?

- A. 385 B. 280 C. 171 D. 289

9. Select a figure from the options in which the given figure is exactly embedded as one of its parts.



- A. B.
C. D.

10. The following letters are coded as follows :

Letters	S	F	O	Y	E	R	M	P
Codes	θ	*	\$	©	α	+	@	÷

While coding the given word, following conditions are also to be observed.

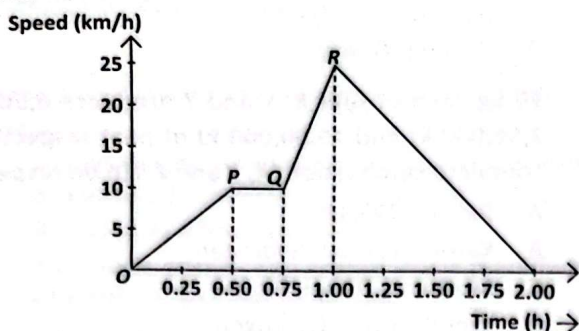
Conditions :

- (i) If the first letter is a consonant and the last letter is a vowel, then both are to be coded as >.
(ii) If the first as well as the last letter is a vowel, then their codes are to be interchanged.
(iii) If the second and the second last letter is a consonant, then they are to be coded as =.

Find the code for MYSORE.

- A. > © θ \$ + > B. @ © θ \$ + α
C. @ = θ \$ = α D. > = θ \$ = >

11. A train moves from one station to another in total two hours. Its speed-time graph during the motion is given here.



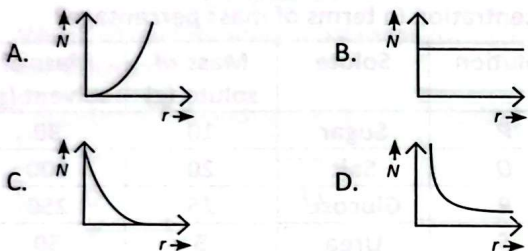
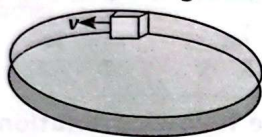
Identify the correct statement(s) regarding this graph.

- (i) The distance covered by a train from P to Q is 5.5 km.
 (ii) Maximum acceleration of the train is from O to P.
 (iii) Speed does not vary from P to Q.
- A. (i) and (iii) only B. (i) only
 C. (iii) only D. (i), (ii) and (iii)

12. The ratio of the distance travelled by a freely falling body in the 1st, 2nd, 3rd and 4th second is

- A. 1 : 2 : 3 : 4 B. 1 : 4 : 9 : 16
 C. 1 : 3 : 5 : 7 D. 1 : 1 : 1 : 1

13. A smooth circular groove has a smooth vertical wall as shown in given figure. A block of mass m moves against the wall with a constant speed v . Which of the following curves best represents the relation between the normal reaction on the block by the wall (N) and distance from the centre of groove (r)?

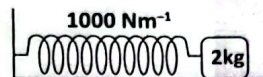


14. Consider the following statements and select the option that correctly identifies them as true (T) or false (F) ones.

- (i) Acceleration due to gravity is a constant quantity.
 (ii) Law of periods is given as $T \propto r^{2/3}$.
 (iii) A body will float when density of body is less than the density of water.

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

15. A spring-block system is placed on a smooth horizontal surface as shown in figure. Now, the block is pushed towards left so that the spring compresses by 10 cm and then the block is released from rest. Determine the velocity of block when the spring acquires its natural length.



- A. $\sqrt{6}$ m/s B. $\sqrt{2}$ m/s
 C. $\sqrt{5}$ m/s D. $\sqrt{7}$ m/s

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

Statement 1 : A vibrating tuning fork sounds louder when its stem is pressed against a desk.

Statement 2 : When a sound wave reaches the boundary of another denser medium, then a part of the wave is never reflected.

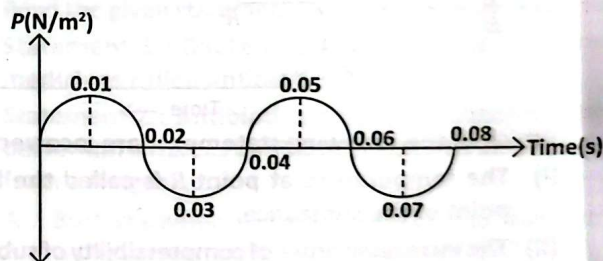
- A. Both statement 1 and statement 2 are true and statement 2 is the correct explanation of statement 1.
 B. Both statement 1 and statement 2 are true but statement 2 is not the correct explanation of statement 1.
 C. Statement 1 is true but statement 2 is false.
 D. Both statements 1 and 2 are false.

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

- (i) Intensity of sound depends upon the sensitivity of ear.
 (ii) Sound wave is transverse and longitudinal wave.
 (iii) Density increases during compression.
 (iv) Speed of sound increases with increase in pressure.

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

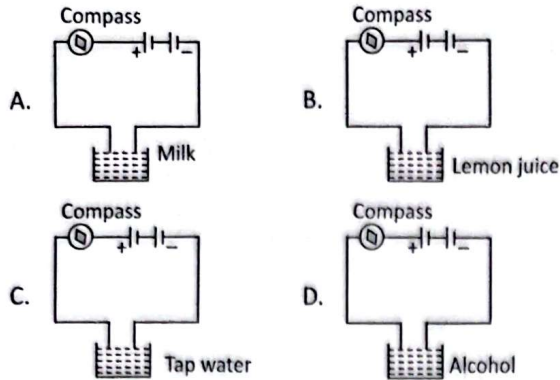
18. The pressure variation of the air around a vibrating string is recorded as shown in the given pressure-time graph.



If speed of sound in air is 320 m/s, then the wavelength of sound produced by the vibrating string is

- A. 11.8 m B. 12.8 m
 C. 10 m D. 12 m

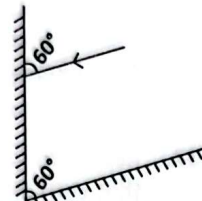
19. In which of the following arrangements will the compass needle not show deflection?



20. Which of the given statements are correct?

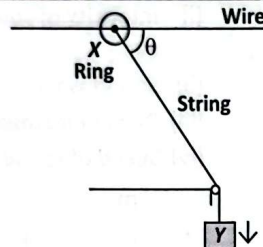
- (i) Mercalli scale is non-linear scale.
 (ii) Earthquake with intensity 7 in Richter scale is approximately 1000 times more energetic than intensity 5 in Richter scale.
 (iii) Unlike charges attract each other.
 (iv) Epicentre lies at the Earth's surface.
- A. (i), (ii) and (iv) only B. (i), (iii) and (iv) only
 C. (ii), (iii) and (iv) only D. (i), (ii) and (iii) only

21. Two mirrors are placed at 60° to each other. A ray of light is incident on first mirror as shown in the given figure. Find the angle of reflection of the reflected ray from the second mirror.



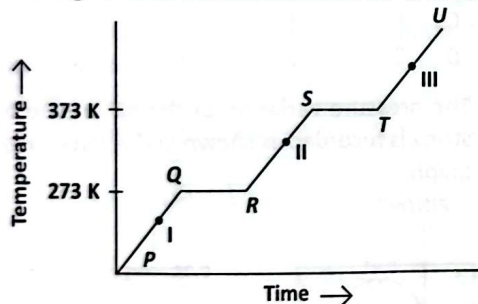
- A. 30° B. 45° C. 60° D. 120°

22. What is the velocity of ring X (can slide on smooth wire) when velocity of Y is 5 m/s and angle between wire and string is 30° ?



- A. 1.5 m/s B. 4.3 m/s
 C. 5 m/s D. 6.5 m/s

23. The heating curve of a solid substance 'M' is shown as:



- Which of the following statements are incorrect?

- (I) The temperature at point R is called the boiling point of the substance.
 (II) The increasing order of compressibility of substance M in points I, II and III is $I < II < III$.
 (III) Along ST, the substance exists both in liquid and gaseous states, while along TU, it exists in liquid state.

- (IV) Substance 'M' exists both in liquid and gaseous states along PQ.

- (V) RS represents latent heat of fusion.

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

24. 10 kg each of fuel X, Y and Z produces 4,50,000 kJ, 2,50,000 kJ and 15,00,000 kJ of heat respectively on complete combustion. X, Y and Z can be respectively

- A. Petrol, CNG, LPG
 B. Kerosene, Coal, Hydrogen
 C. Methane, Diesel, Biogas
 D. Wood, Petrol, Hydrogen

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

- (I) Alloys are heterogeneous mixtures while air is a homogeneous mixture.
 (II) A colloid is unstable while a suspension is quite stable.
 (III) The solubility of gases in liquids increases on increasing temperature whereas that of solids in liquids decreases on increasing temperature.
 (IV) Both fog and smoke are aerosol. Fog has a liquid dispersed phase while smoke has a solid dispersed phase.

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

26. Which of the following solutions have the same concentration in terms of mass percentage?

Solution	Solute	Mass of solute (g)	Mass of solvent (g)
P	Sugar	10	90
Q	Salt	20	100
R	Glucose	25	250
S	Urea	5	50

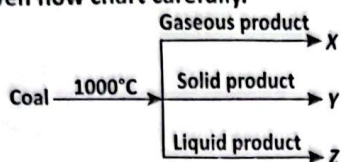
- A. P and Q B. R and S
 C. P and S D. Q and R

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

Column I (Compound)	Column II (Ratio by mass of elements)
(P) Sulphuric acid	(i) 6 : 1 : 8
(Q) Glucose	(ii) 12 : 3 : 8
(R) Potassium hydroxide	(iii) 1 : 16 : 32
(S) Ethanol	(iv) 39 : 16 : 1

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

28. Study the given flow chart carefully.



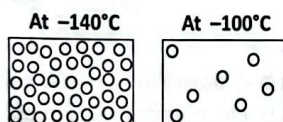
Now, select the correct statement(s) regarding X, Y and Z.

- I. Z is an almost pure form of carbon and is used as a reducing agent in the extraction of metals.
 II. X is used as a fuel in industries.
 III. Y is tough, porous and is used in the manufacture of producer gas and water gas.
- A. II and III only B. II only
 C. III only D. I and III only

29. Which of the following statements is/are correct regarding fractional distillation of petroleum?

- I. In refining of petroleum, components with very high boiling points are obtained at the bottom of the fractionating column.
 II. Bitumen, which is condensed at the bottom, is used as solvent for dry cleaning.
 III. Petrol and diesel are obtained from fractional distillation of petroleum.
 IV. The lubricating oil has higher boiling point than kerosene and lower boiling point than diesel oil.
- A. I only B. I and III only
 C. II and III only D. I, II and IV only

30. The molecular arrangement of a substance at the same pressure but at two different temperatures is depicted in the diagrams:

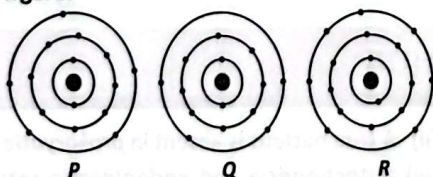


Which of the following substances correctly represents the diagrams?

Substance	Melting point (°C)	Boiling point (°C)
P	-186	-97
Q	-134	-162
R	-166	-103
S	-117	-85

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

31. The distribution of electrons in the outermost shells of atoms of three elements P, Q and R are shown in the given figure.



The formulae of compounds that can be formed by P and Q with R are respectively

- A. PR_3 and QR_3 B. P_2R and QR_2
 C. PR_3 and QR_4 D. P_2R and QR_3

32. Identify the incorrect matches.

- I. Rusting of iron – Slow combustion
 II. Non-luminous zone of flame – Complete combustion
 III. Luminous zone of flame – No combustion
 IV. Burning of LPG – Spontaneous combustion
- A. I and II only B. III and IV only
 C. II and III only D. II, III and IV only

33. Which of the following is not a function of lysosomal enzymes?

- A. They facilitate entry of sperm into the ovum during fertilisation.
 B. They assist in the metamorphosis of a tadpole into a frog.
 C. They breakdown worn-out and damaged cell organelles.
 D. They help to maintain the osmotic pressure in a cell.

34. Select the odd one out among the following fertilisers based on the soil nutrient deficiency they help to overcome.

- A. Urea B. Muriate of potash
 C. Ammonium nitrate D. Ammonium sulphate

35. Read the given statements and select the option that correctly identifies any two among P, Q, R and S.

- (i) P is characterised by growth of facial hair and development of low pitched voice in boys.
 (ii) The sleep hormone is released by Q.
 (iii) R is a disease which is spread by unsafe sexual contact.
 (iv) Babies born through S are called test tube babies.
- A. P–Puberty, Q–Thyroid gland
 B. R–Goitre, S–Cloning
 C. P–Puberty, Q–Parathyroid gland
 D. R–Syphilis, S–IVF

36. Select the incorrect match regarding different zones of a biosphere reserve.

- A. Natural zone – Limited human activity is allowed
 B. Core zone – No human activity is permitted
 C. Manipulation zone – Several human activities are permitted
 D. Buffer zone – Limited human activity is allowed

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

Statement 1 : Bacteria and fungi are used to make medicines called antibiotics.

Statement 2 : Antibiotic penicillin is obtained from a bacterium whereas antibiotic streptomycin is obtained from a fungus.

- 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.

38. Read the given paragraph.

A plant cell when placed in a (i) solution, swells up but it does not burst due to presence of (ii) while an animal cell when placed in (i) solution, will eventually (iii). An animal cell when placed in a (iv) solution shows exosmosis and loses shape while a plant cell when placed in (iv) solution shows (v).

Now, select the option that correctly fills the above given blanks.

- | | | | | | |
|----|------------|-----------|--------|------------|-------------|
| | (i) | (ii) | (iii) | (iv) | (v) |
| A. | Hypotonic | Cell wall | Burst | Hypertonic | Plasmolysis |
| B. | Hypertonic | Cell wall | Shrink | Hypotonic | Endosmosis |
| C. | Hypertonic | Vacuole | Burst | Hypotonic | Plasmolysis |
| D. | Hypotonic | Vacuole | Shrink | Hypotonic | Endosmosis |

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

- (i) White leghorn and Rhode Island Red are cross poultry breeds.
 (ii) Fish culture is sometimes integrated with rice cultivation so that fish are grown in the water accumulated in the paddy fields.
 (iii) Rohu and grass carp are surface feeders.
 (iv) Sahiwal and Red Sindhi are milch breeds of cow.

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

40. Which of the following statements are incorrect regarding meristematic tissues?

- (i) They are differentiated cells which do not possess the power of division.
 (ii) They are compactly arranged without intercellular spaces.
 (iii) They are multinucleated with dense cytoplasm.
 (iv) They contain either few small vacuoles or vacuoles are absent.

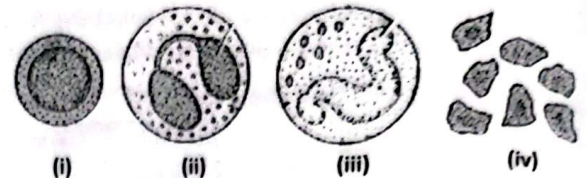
- | | |
|-----------------------|-----------------------|
| A. (i) and (ii) only | B. (i) and (iii) only |
| C. (ii) and (iv) only | D. None of these |

41. Refer to the given relationship shown in the box and select the option that satisfies the same relationship.

Blood : Basophils : Release histamine

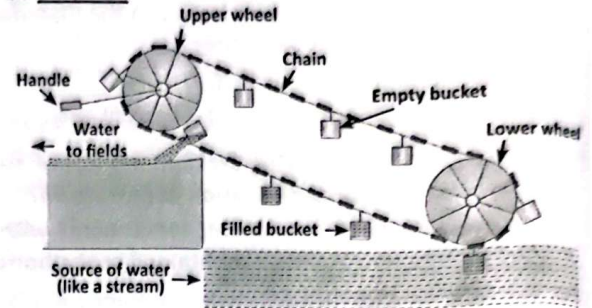
- A. Lymph : Adipocytes : Stores fat
 B. Cartilage : Chondroblasts : Formation of lamellae
 C. Bone : Osteoblasts : Synthesis of bone matrix
 D. Cyton : Macrophage : Releases acetylcholine

42. Identify the blood cells (i)-(iv) shown in the given figures and select the incorrect match of the cell and its function.



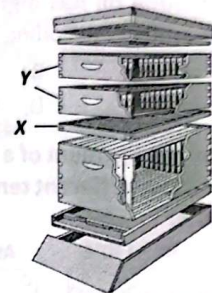
- A. (i) – Secretes antibodies to destroy microbes
 B. (ii) – Phagocytise bacteria and cellular debris at injured site
 C. (iii) – Releases histamine and heparin
 D. (iv) – Helps in clotting of blood

43. X does not belong to the same class of irrigation methods as the one shown in the given figure. X could be _____.



- | | |
|-----------|---------------------|
| A. Dhekli | B. Sprinkler system |
| C. Rahat | D. Both A and C |

44. Which of the following statements is correct regarding the structure shown in the given figure?



- A. This is an apiary used in pisciculture.
 B. This is a feeding box used in polyculture.
 C. The labelling X shows queen excluder.
 D. The labelling Y shows deep super.

45. X and Y are used to improve soil fertility. X is obtained from natural organic sources while Y is synthetic. Select the option that correctly differentiates between X and Y.

- | | | |
|----|----------------------------|------------------------------|
| | X | Y |
| A. | Readily soluble in water | Not readily soluble in water |
| B. | Quickly absorbed by plants | Slowly absorbed by plants |
| C. | Nutrient specific | Not nutrient specific |
| D. | None of these | |

ACHIEVERS SECTION

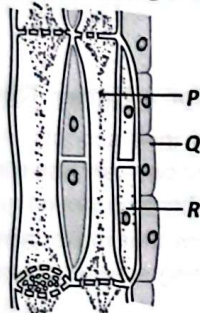
46. Read the given statements (i)-(vi) where few words have been italicised and select the incorrect option regarding them.

- (i) Nucleus was discovered by Robert Hooke in 1831.

- (ii) A true nucleus is absent in *prokaryotic* cells.
 (iii) Mitochondria and *endoplasmic reticulum* are the cell organelles which are self-replicating in nature.

- (iv) *Leucoplasts* are yellow or reddish in colour and are present in flowers and fruits.
- (v) *Vacuoles* are cell organelles found only in animal cells.
- (vi) Peroxisomes are bounded by *double* membrane and contain *hydrolytic* enzymes.
- A. *Robert Hooke* should be replaced with *Robert Brown* whereas *prokaryotic* should not be replaced as it is correctly mentioned.
- B. *Endoplasmic reticulum* should be replaced with *chloroplast* whereas *vacuoles* should be replaced with *centrosomes*.
- C. *Double* should be replaced with *single* whereas *hydrolytic* should be replaced with *oxidative*.
- D. *Robert Hooke* should be replaced with *Ernst Haeckel* whereas *leucoplasts* should not be replaced as it is correctly mentioned.

47. Identify *P*, *Q* and *R* from the given figure of a plant tissue and read the following characteristics.



- (i) Living cells with small intracellular spaces that help in storage of food.
- (ii) Metabolically active cells with a large, elongated nucleus that support the conduction of food.
- (iii) Long, living, cylindrical cells with perforated end walls.

Now, select the option that correctly matches the given characteristics with the labelled parts *P*, *Q* and *R*.

(i)	(ii)	(iii)
A. <i>P</i>	<i>Q</i>	<i>R</i>
B. <i>Q</i>	<i>R</i>	<i>P</i>
C. <i>P</i>	<i>R</i>	<i>Q</i>
D. <i>Q</i>	<i>P</i>	<i>R</i>

48. Read the given information about atoms *P*, *Q*, *R*, *S* and *T*:

- (i) *P* and *Q* are isotopes with mass number differ by 2 units.

(ii) *S* and *T* are isobars with *S* having 18 number of protons.

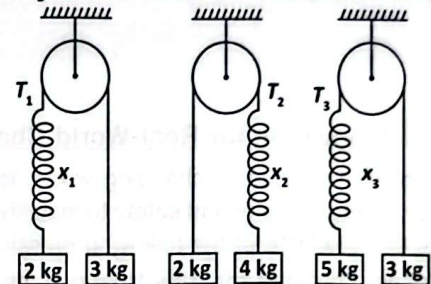
(iii) The electronic configuration of *P* is 2, 8, 7.

(iv) *P* and *R* differ by 5 electrons and *R* and *S* differ by 6 electrons.

Which of the following statements are correct?

- I. *P*⁻ (anion) and *S* will have the same number of electrons in their outermost shell.
- II. The molecular mass of a compound *X* formed by 1 atom of *R* and 2 atoms of *P* will be 195 u.
- III. *T* can combine with *P* in 1 : 2 ratio by number of atoms to form a stable compound.
- IV. The correct notation of atom *Q* can be ${}^{37}_{17}\text{Q}$.
- A. I and II only B. II, III and IV only
- C. I and III only D. I, III and IV only

49. Same spring is attached with 2 kg, 4 kg and 5 kg blocks in three different cases as shown in the given figure. Let x_1 , x_2 and x_3 be the extensions in the spring in three cases.



Now, match the column I with column II and select the correct option from given codes. (Here, *g* is the acceleration due to gravity.)

Column I	Column II
P. Extension, x_2 greater than	(i) x_1
Q. Extension, x_2 less than	(ii) 2.4 <i>g</i>
R. T_1	(iii) 3.75 <i>g</i>
S. T_3	(iv) x_3
A. P - (i), Q - (iii), R - (ii), S - (iv)	
B. P - (i), Q - (iv), R - (ii), S - (iii)	
C. P - (iv), Q - (ii), R - (i), S - (iii)	
D. P - (i), Q - (iv), R - (iii), S - (ii)	

50. A 50 HP electric motor lifts an elevator having a maximum total load capacity of 10 persons with each having mass of 60 kg. If the frictional force on the elevator is 300 N, then the speed of the elevator while carrying the full load is close to (1 HP = 746 W, $g = 10 \text{ ms}^{-2}$)

- A. 4.5 m/s B. 4.9 m/s C. 6.5 m/s D. 5.9 m/s

SPACE FOR ROUGH WORK