

Assessment of Practical Skills in Science

Class X

(Effective from March, 2009 Examination)

Central Board of Secondary Education
Shiksha Kendra, 2, Community Centre, Preet Vihar, Delhi – 110092

CBSE, Delhi - 110092

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हम, भारत के लोग, भारत को एक (सम्पूर्ण प्रभुत्व—संपन्न समाजवादी पंथनिरपेक्ष लोकतंत्रात्मक गणराज्य) बनाने के लिए तथा उसके समस्त नागरिकों को :

सामाजिक, आर्थिक और राजनैतिक न्यय,
विचार, अभिव्यक्ति, विश्वास, धर्म
और उपासना की स्वतंत्रता,
प्रतिष्ठा और अवसर की समता
प्राप्त कराने के लिए,
तथा उन सब में

व्यक्ति की गरिमा और² (राष्ट्र की एकता और अखण्डता) सुनिश्चित करने वाली बंधुता बढ़ाने के लिए दृढ़संकल्प होकर अपनी इस संविधान सभा में आज तारीख 26 नवम्बर, 1949 ई० को एतद्वारा इस संविधान को अंगीकृत, अधिनियमित और आत्मार्पित करते हैं।

1. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977 से) "प्रभुत्व—संपन्न लोकतंत्रात्मक गणराज्य" के स्थान पर प्रतिस्थापित।
2. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977 से) "राष्ट्र की एकता" के स्थान पर प्रतिस्थापित।

Hkkx 4 d emy dÜkD;

5-1 d- emy dÜkD; & भारत के प्रत्येक नागरिक का यह कर्तव्य होगा कि वह—

- (क) संविधान का पालन करे और उसके आदर्शों, संस्थाओं, राष्ट्र ध्वज और राष्ट्रगान आदर करे;
- (ख) स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन को प्रेरित करने वाले उच्च आदर्शों को हृदय में संजोए रखे और उनका पालन करे;
- (ग) भारत की प्रभुता, एकता और अखंडता की रक्षा करे और उसे अक्षुण्ण रखे;
- (घ) देश की रक्षा करे और आह्वान किए जाने पर राष्ट्र की सेवा करे;
- (ङ) भारत के सभी लोगों में समरसता और समान भ्रातृत्व की भावना का निर्माण करे जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभाव से परे हों, ऐसी प्रथाओं का त्याग करे जो स्त्रियों के सम्मान के विरुद्ध हैं;
- (च) हमारी सामाजिक संस्कृति की गौरवशाली परंपरा का महत्व समझे और उसका परिरक्षण करे;
- (छ) प्राकृतिक पर्यावरण की जिसके अंतर्गत वन, झील, नदी और वन्य जीव हैं, रक्षा करे और उसका संवर्धन करे तथा प्राणि मात्रा के प्रति दयाभाव रखे;
- (ज) वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करे;
- (झ) सार्वजनिक संपत्ति को सुरक्षित रखे और हिंसा से दूर रहे;
- (ञ) व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करे जिससे राष्ट्र निरंतर बढ़ते हुए प्रयत्न और उपलब्धि की नई ऊँचाईयों को छू ले।

THE CONSTITUTION OF INDIA

Preamble

We, The people of India, having solemnly resolved to constitute India into a'
(Sovereign Socialist Secular democratic republic) and to secure to all its
citizens :

Justice, Social, Economic and Political;

Liberty of thought, expression, belief, faith and worship;

Equality of status and of opportunity; and to promote among them all

Fraternity assuring the dignity of the individual and the² (unity and integrity of the
Nation);

In our Constituent Assembly this twenty-sixth day of November, 1949, do **hereby
adopt, enact and give to ourselves this constitution.**

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, sec. 2, for "Sovereign Democratic Republic (w.e.f. 3.1.1977)".
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, sec. 2, for "Unity of the Nation (w.e.f. 3.1.1977)".

THE CONSTITUTION OF INDIA

Chapter IV A

Fundamental Duties

Article 51-A

Fundamental Duties— It shall be the duty of every citizen of India-

- (a) to abide the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the rich natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;
- (h) to develop the specific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the national constantly rises to higher levels of endeavour and achievement.

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FOREWORD

The central role of experiments and practical work in school science curriculum is universally accepted. A balanced science curriculum should not only give due emphasis to both theory and experiments, but also integrate these complimentary aspects of the subject in teaching-learning process. Present-day science, as we all know, is the result of creative interplay of observations, experimentation and theoretical inferences.

The importance of practical work in science education has also been recognized and greatly emphasized in national policy of education for the past several decades. However, despite several laudable efforts in the past, experiments, by and large, have continued to be marginalized in the schools. The challenge arises due to combination of several factors. The Board has been keen to find out ways to promote laboratory work in the subject and introduce greater uniformity, objectivity and reliability in the assessment of practical work. With the objective of strengthening experimentation and skills through a written test also as part of its evaluation procedure in class IX during 2005-2006. The scheme was extended to class X from the academic session 2006-07 onwards. It is hoped that this initiative given experiments their due place in subject and has promoted, an experimental culture in our school system. The present documents includes questions based on experiments included in class IX as well as class X practical syllabus and has been thoroughly revised.

I shall put on record my heartfelt and sincere thanks to Homi Bhabha Centre for Science Education, Bombay for extending its full academic expertise and providing all necessary facilities for development of this material during two six-day workshops organized by the Board at the centre. The immensely rich and creative contribution made to the development and finalization of this material by Prof. Arvind Kumar, Director, HBCSE is gratefully acknowledged. The honest efforts put in by Prof. Chitra Natrajan, Prof. S.C. Agarkar, Mr. V.G. Gambhir and other faculty members of the centre and thankfully acknowledged. Sincere thanks are also due to other eminent subject experts from IGNOU, Delhi University, School Systems in Delhi and Chennai who worked hard and made rich contributions to the development of this material. My deep appreciation and thanks are also due to Shri G. Balasubramanian, Director (Academic), CBSE and Shri R.P. Sharma, Education Officer (Science), for putting in their best efforts in designing of this material and publication of this document.

It is hoped that concerted efforts will be put in by all schools and subject teachers to make best use of this document and make learning of science a joyful and meaningful experience for learners.

Feedback and suggestions from readers for further improvement of this document will be highly appreciated.

VINEET JOSHI, I.A.S.
CHAIRMAN

Introduction

The crucial role of experiments in school science curriculum is universally accepted. A good science curriculum must not only give balanced emphasis to both theory and experiments but also integrate these two essential and complementary aspects of science in the teaching-learning process. Modern science, as we all know, is the result of a creative interplay of experiments, observations and theoretical inference.

There are several ways in which experiments facilitate and improve the learning of science. First and foremost, experiments help students develop the right perspective of science, namely that science is not just a theoretical abstraction – it is an attempt to describe the working of the real world around us. A hypothesis or idea in science is acceptable only if observations and experiments confirm it. Second, experiments are among the most effective ways to generate interest in science. For many students, an apparently ‘dry’, ‘uninteresting’ fact of a theory textbook can become live and exciting when translated into an experiment. Third, experiments promote the basic skills and competencies of doing science: procedural and manipulative skills, observation skills, skills of representing and interpreting data and the accompanying conceptual and critical abilities. For these various reasons, promoting activity and experiment based learning has been at the heart of many efforts aimed at improving science education in our country.

Despite several laudable efforts in the past, experiments, by and large, have continued to be marginalized in our schools. There seem to be two principal difficulties. Firstly, experiments require a certain minimum infrastructure – a laboratory with some basic equipments and consumables on a recurring basis. Secondly, assessment of practical skills in science in a sound and objective manner is by no means an easy task. The difficulty multiplies manifold if assessment is to be carried out on a large scale. Thus lack of infrastructure and, more important, lack of reliable assessment have resulted in the unfortunate neglect of experimental work in most of the schools in India.

The Board’s Initiative

The problem of neglect of experiments in our schools and of proper assessment of students in practical skills has always been a matter of great concern for the Central Board of Secondary Education. The problem assumes even greater importance for Class X, which is the terminal stage of secondary education. The Board has been keen to find out ways to promote laboratory work in our school system and has taken a number of initiatives in this direction. The Board tries to ensure that its affiliated schools have the necessary infrastructure to carry out experiments prescribed in the syllabus to Class IX and X. To make this feasible for all its schools, care is taken that the laboratory curriculum does not demand prohibitively costly equipment or other unrealistic requirements. As another important initiative to make assessment of practicals fair, uniform and reliable and to increase the emphasis on practicals in schools, the Board introduced a new scheme of assessment for Class IX from the academic year 2005-06. A document giving detailed guidelines on the new scheme of assessment of practicals with sample question papers was brought out by the Board. This was done to ensure that practicing teachers

understood the new scheme clearly and were sensitized and oriented to the same before it was introduced for the more critical Class X stage. The positive experience and feedback to the new scheme for Class IX convinced the Board that this was a step in the right direction. The Board published another similar document for class X at a later stage. The present document includes questions based on experiments included in class IX as well as class X and has been thoroughly revised.

As per the scheme, theory and practical examination will have a weightage of 60% and 40% respectively. The practical examination will comprise of two components. One component of this practical examination will be in the form of a multiple choice type theory paper test, to be conducted by the Board in Class X as an independent paper. This question paper will be of 20 marks and 1 ½ hour duration. It will aim at testing of practical skills through multiple-choice type questions. Each multiple-choice question will have four options, with only one of them as the correct option. The second component will also have a weightage of 20 marks but will be conducted at school level on the lines being followed presently.

The Board hopes that this initiative will be an important step not only to give experiments their due place in the subject of Science but also to promote, in general, an experimental culture in our school system.

LIST OF EXPERIMENTS (Only for MCQ Paper)

1. To Prepare

- a) A true solution of common Salt and alum
- b) A suspension of soil, chalk powder and fine sand in water
- c) A colloidal of starch in water and egg albumin in water and distinguish between these on the basis of
 - i) Transparency
 - ii) Filtration criterion
 - iii) stability

2. To prepare

- a) a mixture
- b) a compound

using iron filings and sulphur powder and distinguish between these on the basis of:

- i) appearance i.e. homogeneity and heterogeneity
- ii) behaviour towards a magnet
- iii) behaviour towards carbon disulphide a solvent.
- iv) effect of heat.

3. To study the extent of cooling caused by evaporation on the following liquids, using a thermometer. Also to arrange these liquids in the increasing order of the extent of cooling produced

- i) Water
- ii) Alcohol
- iii) Ether

4. To verify laws of reflection of sound.

5. To determine the density of solid (denser than water) by using a spring balance and a measuring cylinder.

6. To establish the relation between the loss in weight of a solid when fully immersed in

- i) tap water
- ii) strongly salty water, with the weight of water displaced by it by taking at least two different solids.

7. To measure the temperature of hot water as it cools and plot a temperature- time graph.

8. To determine the velocity of a pulse propagated through a stretched string/slinky.
 9. To prepare stained temporary mounts of (a) onion peel and (b) human cheek cells and to record observations and draw their labeled diagrams.
 10. To identify parenchyma and sclerenchyma tissues in plants, striped muscle fibers and nerve cells in animals, from prepared slides and to draw their labeled diagrams.
 11. To separate the components of a mixture of sand, common salt and ammonium chloride (or camphor) by sublimation.
 12. To determine the melting point of ice and the boiling point of water.
 13. To observe the onion peel cells placed in hypertonic solution under the microscope and draw labelled diagram of the same.
 14. To study the characteristic of Spirogyra/Agaricus, Moss/Fern, Pinus (either with male or female cone) and an Angiospermic plant. Draw and give two identifying features of groups they belong to.
 15. To observe and draw the given specimens - earthworm, cockroach, bony fish and bird. For each specimen, record
 - (a) one specific feature of its phylum
 - (b) one adaptive feature with reference to its habitat.
 16. To find the pH of the following sample by using pH paper / universal indicator
 - i) Dilute Hydrochloric acid
 - ii) Dilute NaOH solution
 - iii) Dilute Ethanoic acid solution
 - iv) Lemon juice
 - v) Water
 - vi) Dilute sodium Bicarbonate Solution
 17. To study the properties of acids and bases HCl & NaOH by their reaction with
 - i) Litmus solution (Blue/Red)
 - ii) Zinc metal
 - iii) Solid Sodium Carbonate
 18. To determine the focal length of
 - i) Concave mirror
 - ii) Convex lensBy obtaining the image of a distant object
-

19. To trace the path of a ray of light passing through a rectangular glass slab for different angles of incidence. Measure the angle of incidence, angle of refraction, angle of emergence and interpret the result.
 20. To study the dependence of current (I) on the potential difference (V) across a resistor and determine its resistance. Also plot a graph between V and I.
 21. To determine the equivalent resistance of two resistors when connected in series.
 22. To determine the equivalent resistance of two resistors when connected in parallel.
 23. To prepare a temporary mount of a leaf peel to show stomata.
 24. To show experimentally that light is necessary for photosynthesis.
 25. To show experimentally that carbon dioxide is given out during respiration.
 26. To study (a) binary fission in Amoeba and (b) budding in yeast with the help of prepared slides.
 27. To determine the percentage of water absorbed by raisins.
 28. To prepare SO₂ gas, observe its following properties and draw inferences in respect of
 - i) odour
 - ii) solubility in water
 - iii) effect on litmus paper
 - iv) action acidified potassium dichromate solution.
 29. a) To observe the action of Zn, Fe, Cu and Al metals on the following salt solutions.
 - i) ZnSO₄ (aq.)
 - ii) FeSO₄ (aq.)
 - iii) CuSO₄ (aq.)
 - iv) Al₂(SO₄)₃ (aq.)b) Arrange Zn, Fe, Cu and Al metals in the decreasing order of reactivity based on the above result.
 30. To study the following properties of acid (ethanoic acid) :
 - i) odour
 - ii) solubility in water
 - iii) effect on litmus
 - iv) reaction with sodium bicarbonate
-

CATEGORIES OF PRACTICAL SKILLS

A. Procedural and Manipulative Skills

To

- ▶ select appropriate apparatus / instruments for performing the experiment.
- ▶ know the limitations of the apparatus/instruments regarding their size, least count and accuracy.
- ▶ arrange / assemble / set and adjust the apparatus systematically.
- ▶ handle the apparatus, instruments, chemicals carefully to avoid any damage or injury.
- ▶ perform the experiment with reasonable efficiency and accuracy.
- ▶ separate and remove desired parts of a specimen for detailed study without damaging it.
- ▶ use appropriate methods and materials for specimen mounting.
- ▶ locate and rectify the errors in apparatus, instruments, etc.
- ▶ add chemicals in appropriate quantity.
- ▶ dismantle the experimental set-up carefully.
- ▶ practise the precautions in handling sensitive apparatus or chemicals or flame.

B. Observational Skills

To

- ▶ find the least count of the instrument.
- ▶ read the instrument correctly.
- ▶ notice colour change, evolution of gases, formation of precipitates, chemical reactions, etc., carefully.
- ▶ notice the relevant details in the given specimens minutely.
- ▶ locate the desired parts in a specimen accurately.
- ▶ take observations carefully and in a systematic manner.
- ▶ read graph correctly.

C. Drawing Skills

To

- ▶ make proper observation tables.
- ▶ draw circuit diagrams, ray diagrams, experimental set-ups, sketches, etc. correctly and proportionately.
- ▶ label sketches and diagrams correctly.
- ▶ draw graphs from observed data correctly.

D. Reporting and Interpretative Skills

To

- ▶ make a proper plan for recording the observations.
- ▶ record the observations/data/information correctly and systematically.
- ▶ classify and categorize organisms.
- ▶ make correct calculations/predictions.
- ▶ use proper formulae and mode of summarizing and reporting the result.
- ▶ report the result using correct symbols, units, terms and chemical equations.
- ▶ interpret the observations and results correctly.

DESIGN OF THE QUESTION PAPER

Science (Class X) Testing of Practical Skills (Multiple Choice Type Test)

Time allotted: 1 ½ hours

Max. Marks: 20

A. UNIT-WISE WEIGHTAGE

S. No.	UNIT	RELEVANT EXPERIMENTS IN THE SYLLABUS	MARKS ALLOTTED
Class IX	Syllabus		
1.	Food	-	-
2.	Matter - Its Nature & Behaviour	1, 2, 3, 11, 12	3
3.	Organization in the Living world	9,10, 13, 14, 15	3.5
4.	Motion, Force & Work	4, 5, 6, 7, 8	3
5.	Our Environment	-	-
Class X	Syllabus		
6.	Chemical Substances	16, 17, 28, 29, 30	3.5
7.	World of Living	23, 24, 25, 26, 27	3.5
8.	Effect of Current	20, 21, 22	3.5
9.	Light	18, 19	
10.	Nature Resources	-	-

B. SKILL-WISE WEIGHTAGE

Most questions involve multiple skills and it may not be possible to precisely assign a particular skill to a specific question. The skill-wise weightage given in the table below, may, therefore, be considered as only indicative of what is required in the question paper.

Skill	Weightage (Approximate)
Procedural and Manipulative Skills	35%
Observation Skills	35%
Drawing Skills	15%
Reporting and Interpretative Skills	15%
Total	100%

C. QUESTION-WISE WEIGHTAGE

All the 30 questions are of the multiple choice variety having only one correct answer each. Part A of the question paper contains 20 questions, each carrying 0.5 mark. Part B contains 10 questions, each carrying 1 mark.

S. No.	Estimated difficulty level	Percentage
1.	Easy	15
2.	Average	70
3.	Difficulty	15

D. DIFFICULTY-WISE WEIGHTAGE

E. EXPECTED TIME

Approximate time for reading and answering one question	:	2.5 minutes
Revision time	:	15 minutes
Total	:	1 hour 30 minutes

Sample Question Paper I

Time: 1 ½ hours
20

Maximum Marks:

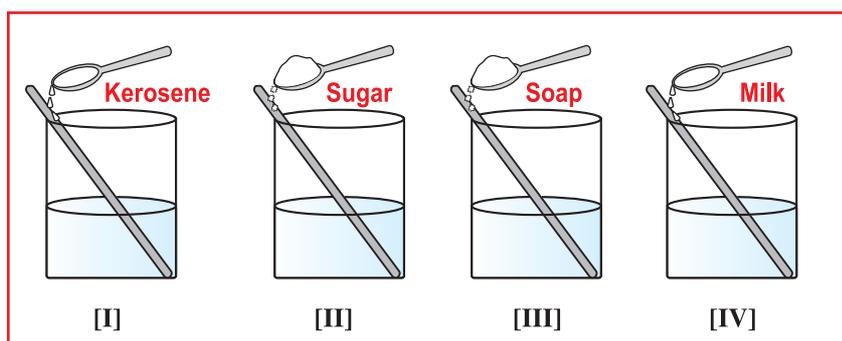
INSTRUCTIONS

1. Attempt all questions.
2. There are 30 multiple choice questions in total. Only one of the options in every question is correct.
3. The question paper consists of two parts – Section A and Section B. Each of the 20 questions in Section A carries 0.5 mark and each of the 10 questions in Section B carries 1.0 mark.

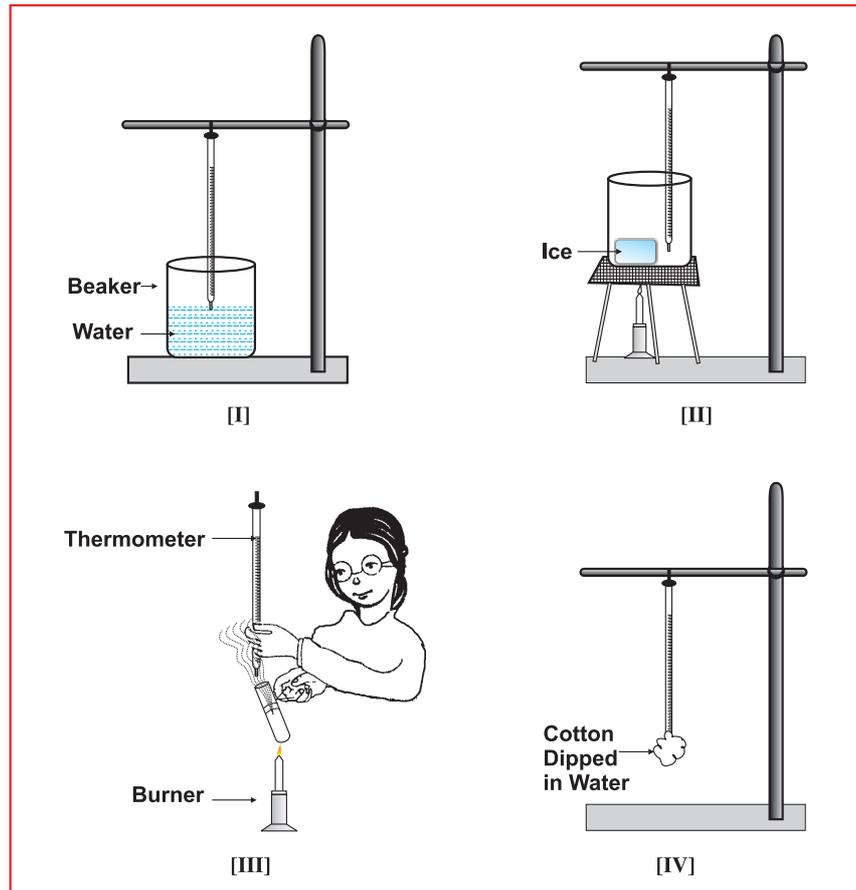
SECTION - A

1. The following substances are added to water in a beaker as shown below. The mixture is stirred well. A true solution is found in the beaker

- (a) I
- (b) II
- (c) III
- (d) IV



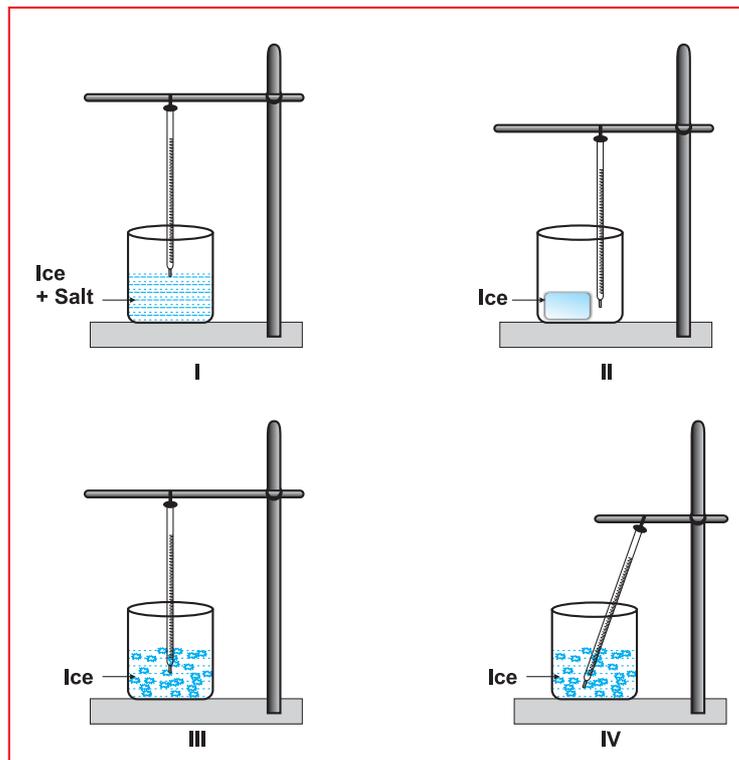
2. When we start heating a mixture of sulphur powder and iron filings, we would observe that
 - (a) sulphur starts melting.
 - (b) iron filings start melting.
 - (c) mixture becomes red hot.
 - (d) mixture evaporates
3. Which one of the following experimental set up is correct for studying the cooling caused by evaporation of water?



- (a) I
- (b) II
- (c) III
- (d) IV

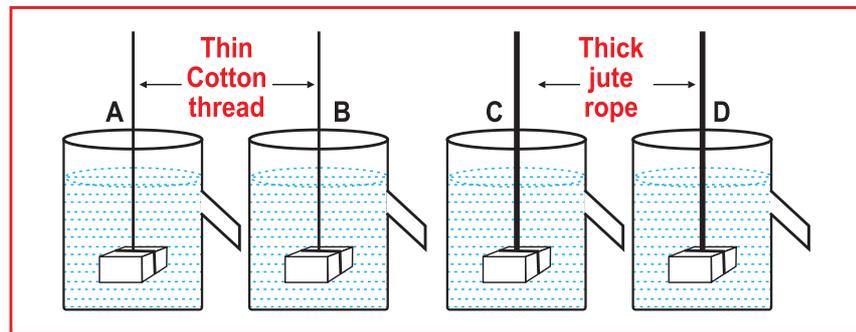
4. Which one of the following is the correct set up to determine the melting point of ice?

- (a) I
- (b) II
- (c) III
- (d) IV



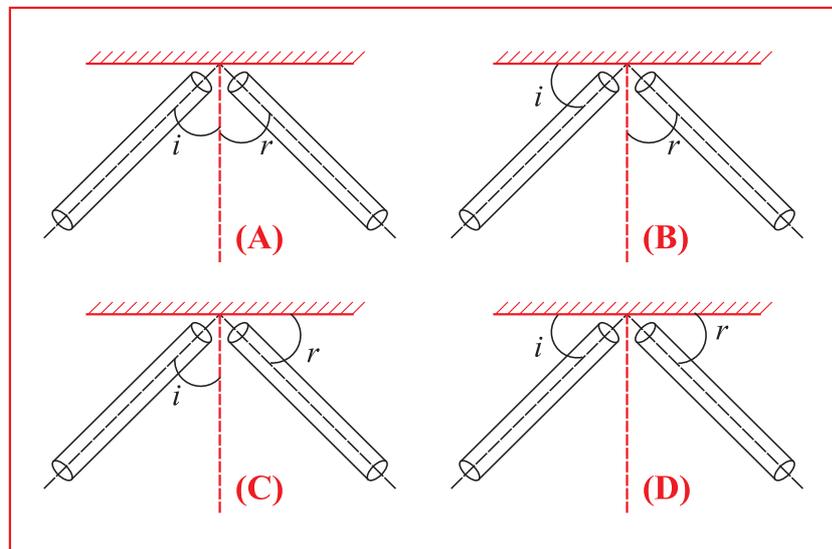
5. In the experiment to establish the relation between loss in weight of an immersed solid with the weight of water displaced by it, the correct setup is shown in figure

- (a) A
- (b) B
- (c) C
- (d) D



6. While doing expression on verifying the law of refraction of sound, four students measured the angles $\angle i$ and $\angle r$ as shown in the diagram below. The correct measurement of the angles of incidence and angle of reflections, has been done by student.

- (a) A
- (b) B
- (c) C
- (d) D



7. The table alongside gives the observations reported by two students X and Y for an experiment on the study of temperature-time graph. The experiment is likely to have been performed correctly by

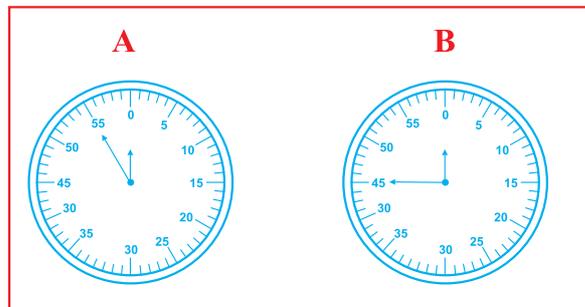
- (a) X.
- (b) Y.
- (c) both X and Y.
- (d) neither X nor Y.

Time (min)	Temp ($^{\circ}\text{C}$)	observed by
	Student X	Student Y
0	61.0	61.0
2	60.5	59.0

4	60.0	58.0
6	59.0	57.5
8	58.0	57.0
10	56.5	56.5
12	54.0	56.0

8. A strong transverse horizontal pulse, created at one end of a string, is observed to complete 5 journeys along its length, before fading out. The initial and final readings, on a stop-clock used in the experiment, are as shown here. If the length of the string is L metre, the speed of the pulse, through the string, is

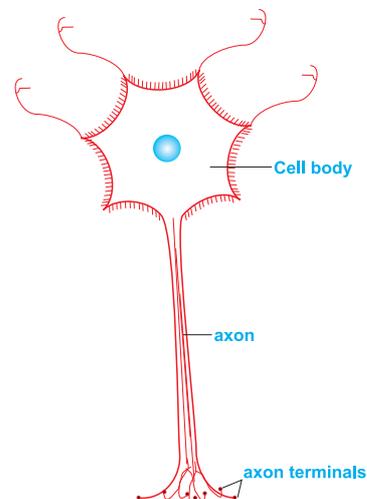
- (a) $(L/9) \text{ ms}^{-1}$
- (b) $(L/10) \text{ ms}^{-1}$
- (c) $(L/45) \text{ ms}^{-1}$
- (d) $(L/50) \text{ ms}^{-1}$



9. Nikita observed a slide of cheek cells, first under low power and then under high power of a microscope. Under the low power she must have seen.
- (a) fewer cells in a darker field of view.
 - (b) more cells in a brighter field of view.
 - (c) more cells in a darker field of view.
 - (d) fewer cells in a brighter field of view.
10. Raj observed nerve cells under the microscope and made the following sketch.

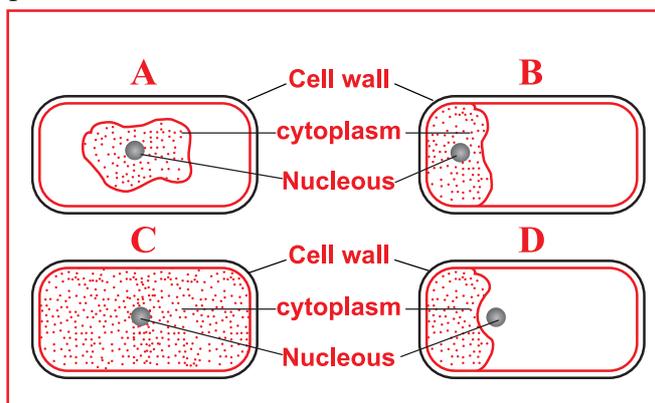
The mistake in his drawing is that cyton is shown to have

- (a) cilia
- (b) dendrites
- (c) nuclear
- (d) cytoplasm.



11. Onion peel cells were placed in hypertonic solution for some time and then observed under the microscope out of A, B, C, D which is the correct observation?

- (a) A
- (b) B
- (c) C
- (d) D



12. A student observed that the colour of pH paper changed to green when she dipped it in water. She added a few drops of concentrated hydrochloric acid to the water. The colour of pH would turn to

- (a) light red.
- (b) apple green.
- (c) dark blue.
- (d) lemon yellow.

13. 10 mL of freshly prepared iron sulphate was taken in each of four test tubes. Strips of copper, iron, zinc and aluminium were introduced, each metal in a different test tube. A black residue was obtained in two of them. The right pair of metals forming the precipitates is

- (a) copper and zinc.
- (b) aluminium and copper.
- (c) iron and aluminium.
- (d) zinc and aluminium.

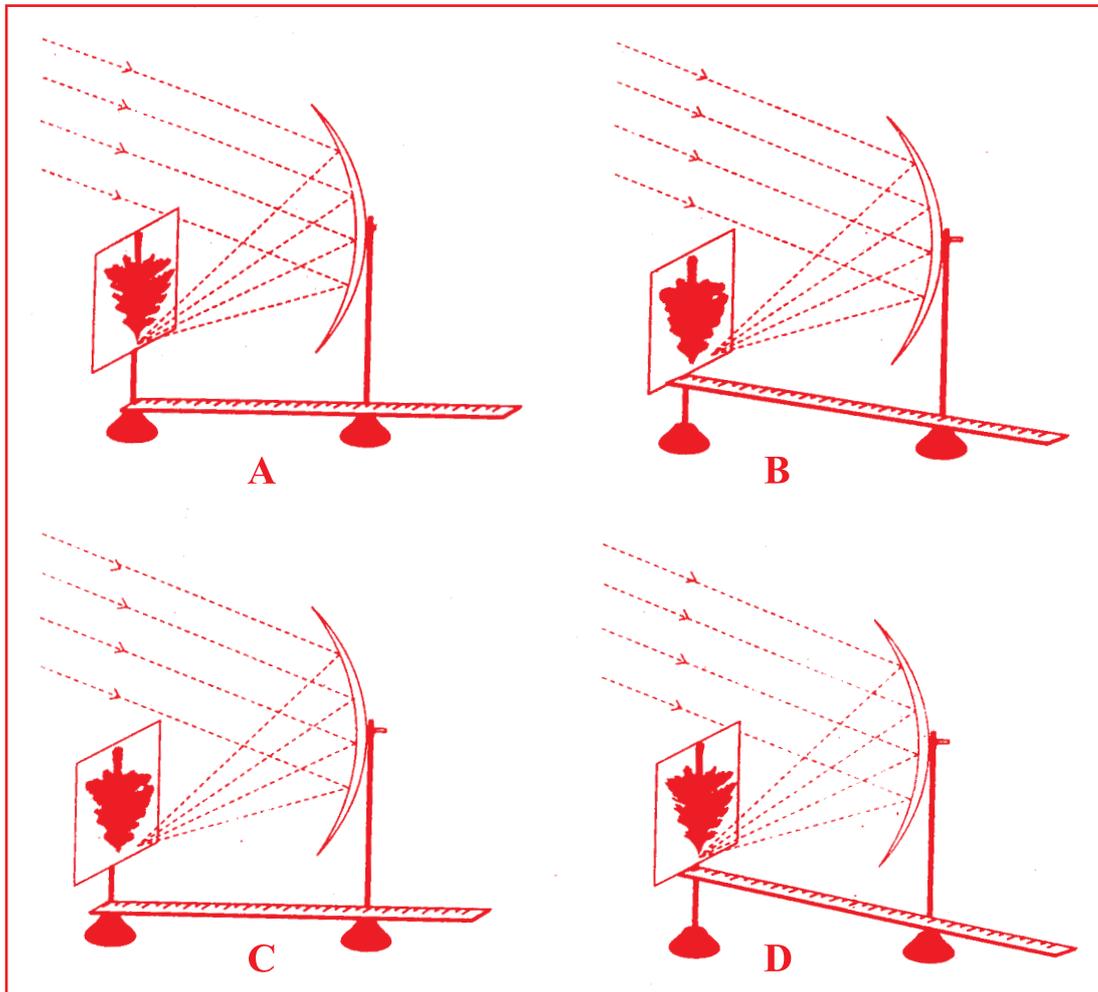
14. The following symbols are usually shown on the bottles of commercial acetic acid.



The symbols indicate that acetic acid is

- (a) corrosive and flammable.
- (b) radioactive and flammable.
- (c) oxidizing and corrosive.
- (d) flammable and explosive.

15. Four student A, B, C and D carried out measurement of focal length of a concave mirror as shown in the four diagrams.

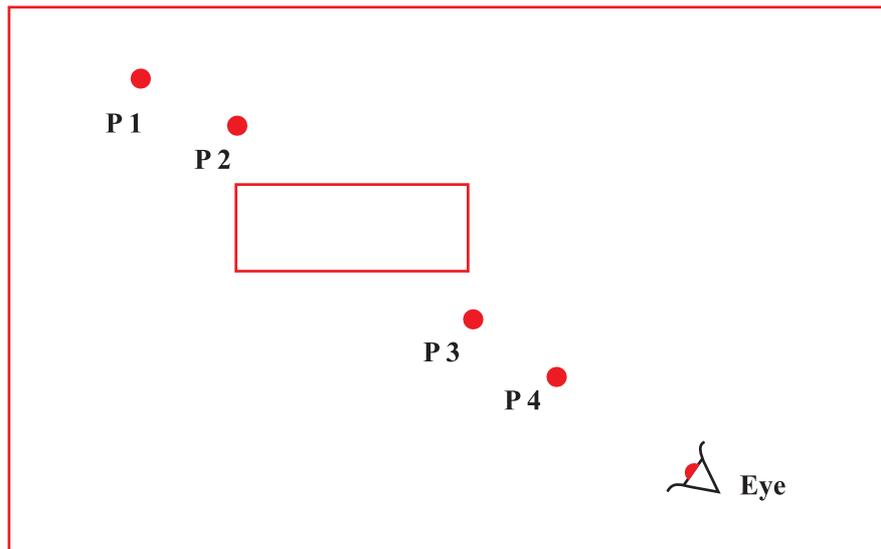


The best result will be obtained by student

- (a) A
- (b) B
- (c) C
- (d) D

16. In the glass slab experiment shown below, four students A, B, C and D did the following:

- A: kept the eyes far from the glass slab while placing both the pins P_3 and P_4
- B: kept the eyes close to the glass slab while placing both the pins P_3 and P_4
- C: kept the eyes close to the glass slab while placing pin P_3 and and far from the slab while placing pin P_4
- D: kept the eyes far from the glass slab while placing pin P_3 and close to the slab while placing pin P_4

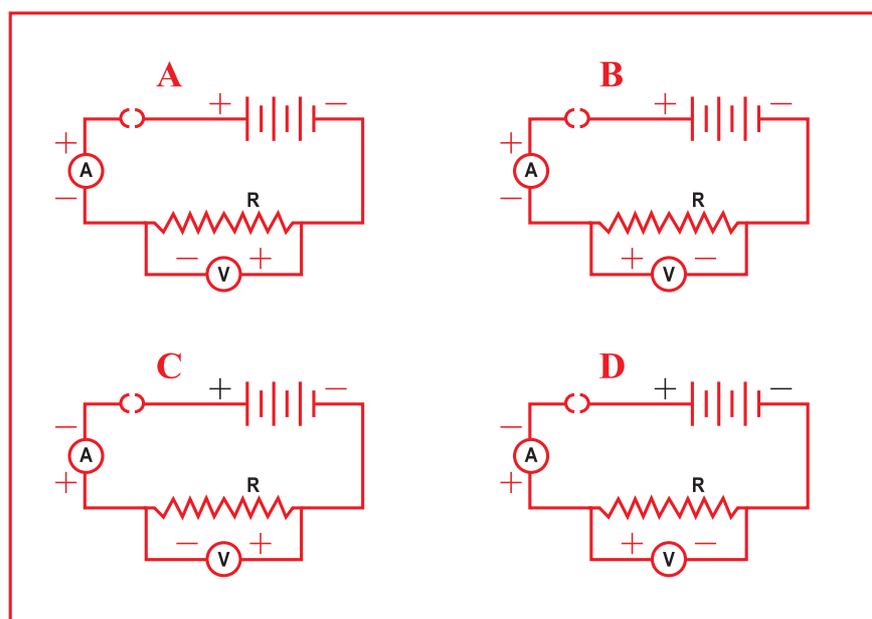


The correct procedure is that of student

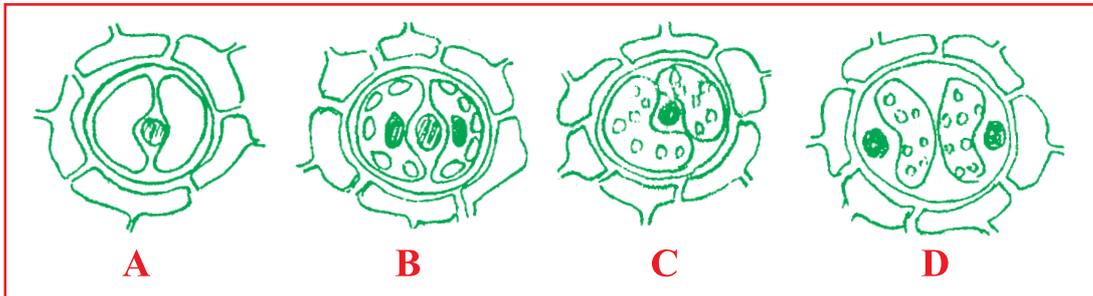
- (a) A.
- (b) B.
- (c) C.
- (d) D.

17. Out of the four circuits shown for studying the dependence of the current on the potential difference across a resistor, the correct circuit is

- (a) A
- (b) B
- (c) D
- (d) E



18. Students observed the epidermal peel of a leaf under the high power of a microscope. The following are the sketches made by them.



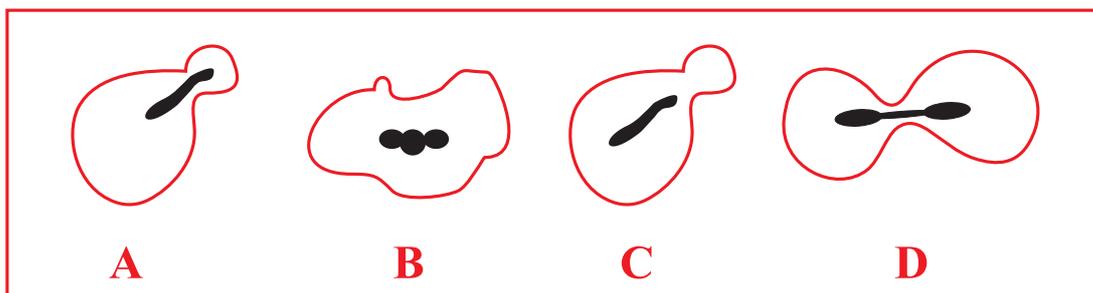
The correct sketch is

- (a) A
- (b) B
- (c) C
- (d) D

19. Student A, B and C were given five raisins each of equal weight. The raisins were soaked in distilled water at room temperature. A removed the raisins after 20 minutes. B after two hours and C after 40 minutes. If P_A , P_B and P_C denote percentage absorption of water obtained by students A, B and C respectively, then

- (a) $P_A > P_B > P_C$
- (b) $P_A < P_B < P_C$
- (c) $P_A < P_B > P_C$
- (d) $P_A = P_B = P_C$

20. Out of the following diagrams which one depicts a stage in binary fission of amoeba.



- (a) A
- (b) B
- (c) C
- (d) D

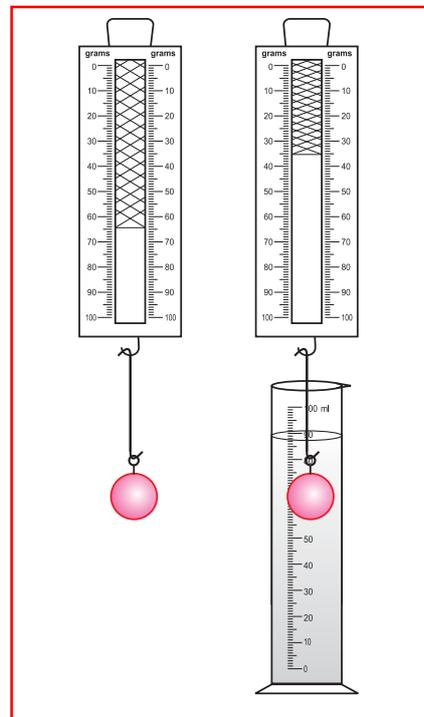
SECTION - B

21. Which one of the following would be the correct set of apparatus required if you have to separate camphor and common salt?

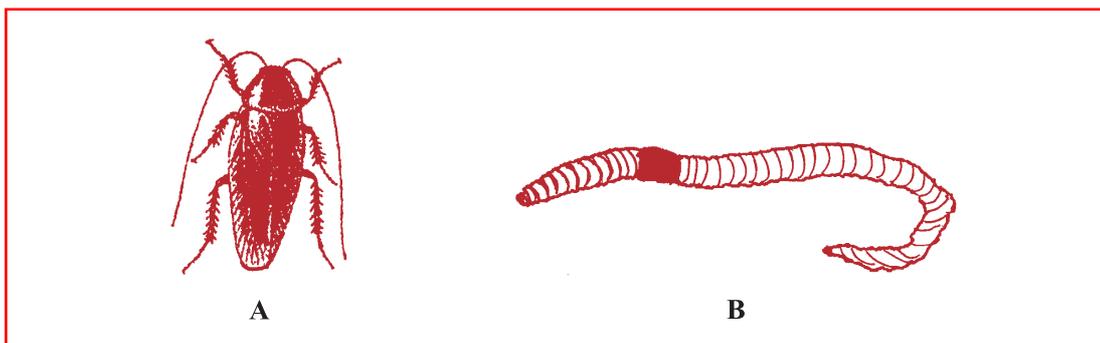
- (a) round bottom flask, funnel, burner, condensor, wire guage, stand with clamp
- (b) Conical flask, filter paper, funnel, beaker, stand with clamp, wire guage
- (c) Separating funnel, beaker, conical flask tripod stand, burner wire guaze
- (d) China dish, funnel, burner, cotton plug, tripod stand, stand with clamp, wire guaze.

22. A student notes down the observations in the two spring balances and the measuring cylinder shown in the figure. From the given observations, the volume of the solid is

- (a) 64 cc
- (b) 36 cc
- (c) 28 cc
- (d) 100 cc

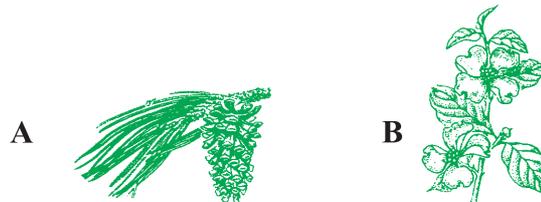


23. Given below are pictures of two animals A and B belonging to two different phyla. Which characteristic features of their bodies are specific features of their respective phyla?



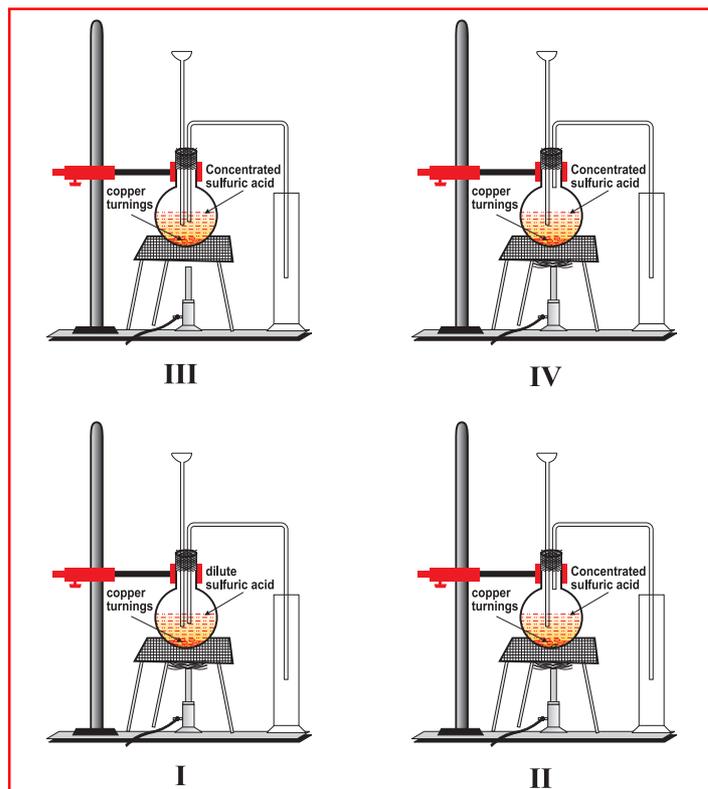
- (a) Antennae of A and segments of B
- (b) Three pairs of appendages of A and clitellum of B
- (c) Jointed appendages of A and segmented body without appendages
- (d) Wings of A and slender body of B

24. The teacher had shown the students two specimens A and B from the plant kingdom whose pictures are given below. Which was the correct identification and classification into its group?



- (a) Cone of gymnosperm and flower of angiosperm.
- (b) Cone of angiosperm and flower of gymnosperm.
- (c) Cone and flower of an angiosperm,
- (d) Cone and flower of a gymnosperm.

25. For preparing sulphur dioxide in the laboratory the correct set up is shown in figure.



- (a) I
- (b) II
- (c) III
- (d) IV

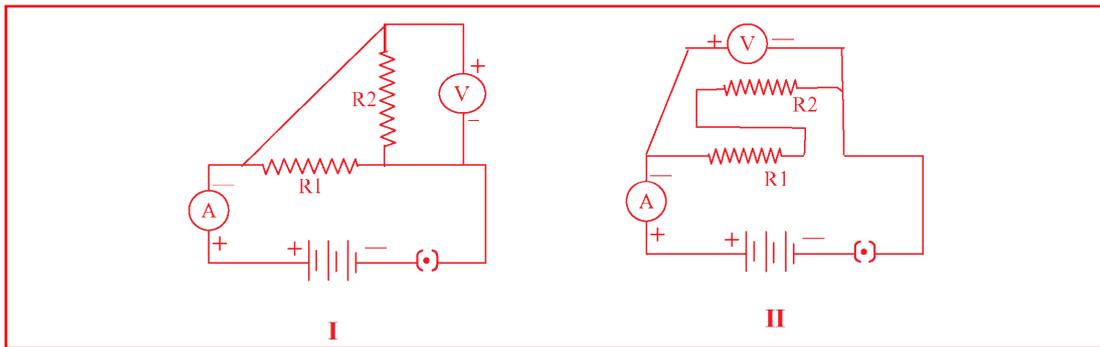
26. Four students studied reactions of zinc and sodium carbonate with dilute hydrochloric acid and dilute sodium hydroxide solutions and presented their results as follows. The '✓' represents evolution of gas, whereas 'X' represents absence of any reaction.

	Zn	Na ₂ CO ₃		Zn	Na ₂ CO ₃
HCl	✓	✓	A	✓	✗
NaOH	✓	✗		✓	✓
	Zn	Na ₂ CO ₃		Zn	Na ₂ CO ₃
HCl	✗	✗	C	✓	✓
NaOH	✓	✓		✗	✗
	Zn	Na ₂ CO ₃		Zn	Na ₂ CO ₃
HCl	✗	✗	D	✓	✓
NaOH	✓	✓		✗	✗

The right set of observations is that of student

- (a) A
- (b) B
- (c) C
- (d) D

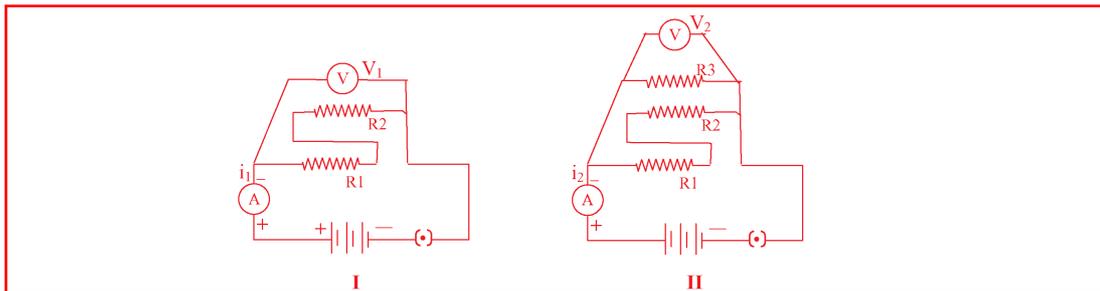
27. The resistors R1 and R2 are connected in



- (a) parallel in both circuits.
- (b) series in both circuits.
- (c) parallel in circuit I and in series in circuit II.
- (d) series in circuit I and in parallel in circuit II.

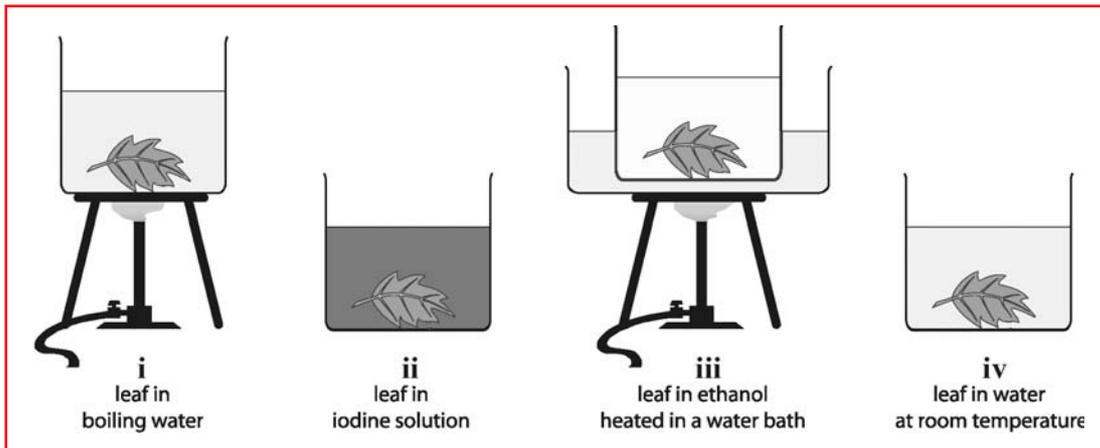
28. Circuit I : ammeter reads current i_1 , and voltmeter reads V_1
 Circuit II : ammeter reads current i_2 and voltmeter reads V_2

The relationship between the readings is



- (a) $i_1 > i_2$; $V_1 = V_2$
- (b) $i_1 < i_2$; $V_1 = V_2$
- (c) $i_1 > i_2$; $V_1 > V_2$
- (d) $i_1 < i_2$; $V_1 < V_2$

29. A student performed the starch test on a leaf. Some steps involved are shown



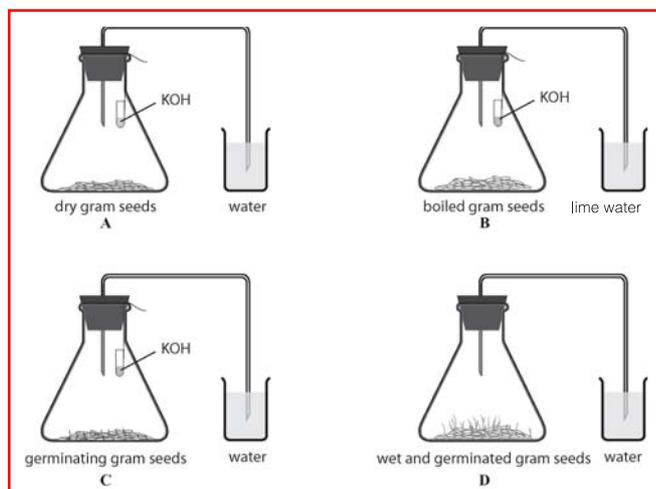
The correct swquence of steps should be

- (a) iv; iii; ii; i
- (b) i; ii; iii; iv
- (c) ii; iii; iv; i
- (d) i; iii; iv; ii

30. After performing the experiment to show that germinating seeds give out carbon dioxide during respiration, students drew the following diagrams.

The correct labelled diagram is

- (a) A
- (b) B
- (c) C
- (d) D



Key for Sample Paper 1

Q. No.	Key	Explanation
1.	(b)	Sugar makes a true solution.
2.	(a)	Sulphur has a lower melting point than iron.
3.	(d)	Only in this set up, the bulb is in direct contact with the liquid undergoing evaporation and hence extent of cooling can be correctly determined.
4.	(c)	Only in this set up, the bulb is inside the crushed ice and thermometer is straight to give the correct melting point.
5.	(b)	The solid must be suspended by an inextensible string in the centre of the overflow can without touching its bottom.
6.	(a)	The angles of incidence and reflection are measured with respect to the normal at the point of incidence.
7.	(b)	The rate of fall of temperature is faster first and slower later.
8.	(b)	The time taken for one journey is $(5+45)/5$ second i.e. 10 second Hence the speed of the pulse is $(L/10) \text{ ms}^{-1}$
9.	(b)	Lower the magnifying power, more is the number of cells seen. (in a brighter field.)
10.	(a)	No cilia in cyton.
11.	(b)	Shows cytoplasm shrunk and collected on a side of the cell due to loss of water.
12.	(a)	The colour of pH paper is green in neutral medium, whereas it is red in acidic medium.
13.	(d)	Zinc and aluminium being more reactive will replace iron from iron sulphate.
14.	(a)	Acetic acid is corrosive and flammable.
15.	(a)	For the correct measurement of focal length, must have a sharp image on the screen and the meter scale must be correctly positioned between the (sharp image) screen and the centre of the concave mirror.
16.	(a)	We need to keep the eye far from the glass slab to have a good and proper alignment of the pins.

17. (b) We must not only put the ammeter in series and the voltmeter in parallel (with the resistor) but also ensure that the polarities of both the instruments are correct.
18. (b) Guard cells have nucleus as well as chloroplasts.
19. (c) Absorption of water increases with time up to its maximum limit.
20. (d) Shows binary fission in amoeba
21. (d) Only in this set all necessary apparatus is given to set up an experiment for sublimation.
22. (c) The volume of the solid (in cc) has the same magnitude as its loss in weight (in grams) in water.
23. (c) Typical characteristics of phylum arthropoda and annelida
24. (a) Correct identification and classification.
25. (d) Copper reacts with concentrated H_2SO_4 on heating to give SO_2 . The tip of the thistle funnel should dip into conc. H_2SO_4
26. (a) Zinc reacts with dilute HCl and NaOH, whereas Na_2CO_3 reacts only with dilute HCl.
27. (c) We must not look for a stereotyped circuit diagram but look for the basic condition for (i) parallel (ii) series connection of two resistors in a given circuit.
28. (b) The equivalent resistance, of a parallel combination of resistors, is less than the resistance of either of its two branches. The equivalent resistance, in circuit 2, is, therefore, less than $(R_1 + R_2)$ (the equivalent resistance of circuit 1) and hence the current flowing through it increases. The voltage reading, in both cases, is, however, the same.
29. (d) Boiling kills the cells, chlorophyll leaches out when boiled in ethanol, but the leaf becomes brittle, made normal by washing it in water. Starch gets stained with iodine.
30. (d) Labelling is correct for seeds in the conical flask, KOH in the suspended test tube and water in the beaker.

Sample Question Paper II

Time: 1 ½ hours

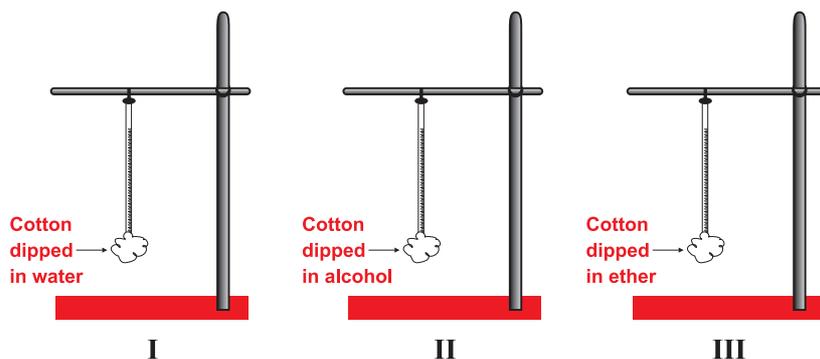
Maximum Marks: 20

INSTRUCTIONS

1. Attempt all questions
2. There are 30 multiple choice questions in total. Only one of the options in every question is correct.
3. The question paper consists of two parts – Section A and Section B. Each of the 20 questions in Section A carries 0.5 mark and each of the 10 questions in Section B carries 1.0 mark.

SECTION - A

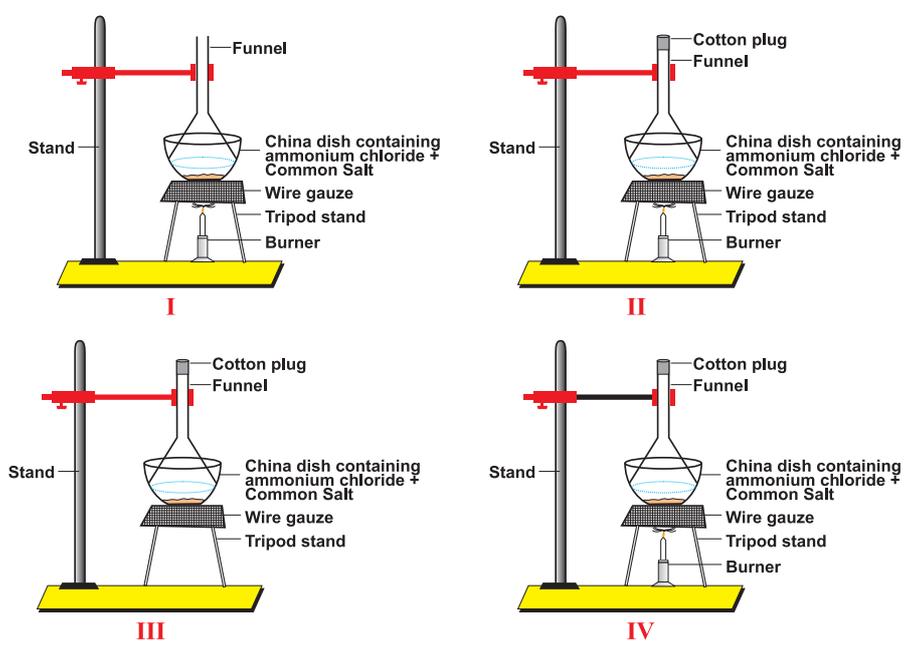
1. A student was asked to mix the white of an egg with water and stir well. The student observed that
 - (a) a transparent solution is formed.
 - (b) a translucent mixture is formed.
 - (c) egg white settles down at the bottom.
 - (d) egg white floats on the surface of the water.
2. A student by mistake mixed iron fillings and sulphur powder. He wanted to separate them from each other. The method you would advise him to use is dissolve the mixture in
 - (a) boiling water.
 - (b) cold water.
 - (c) carbon disulfide.
 - (d) kerosene.
3. The extent of cooling by evaporation was studied for water, alcohol and Ether by arranging the following three set ups :



Which one of the following is the correct observation?

- (a) All the three set ups showed an equal decrease in temperature
- (b) Set ups II and III showed decrease in temperature while no change in temperature was observed in set up I
- (c) Only set up I showed a decrease in temperature while an increase in temperature was observed in set ups II and III
- (d) The cooling (decrease in temperature) was largest in set up III followed by set up II and least cooling was observed in set up I.

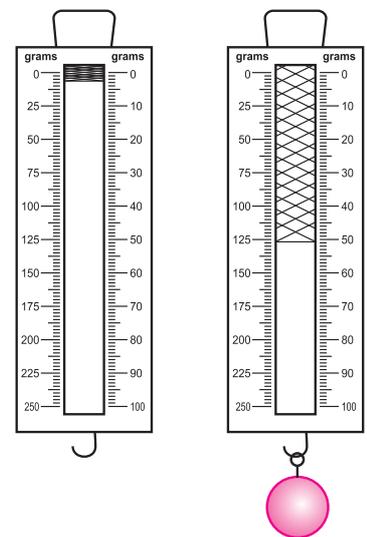
4. Which of the following is the correct arrangement for separation a mixture of common salt and ammonium chloride?



- (a) I
- (b) II
- (c) III
- (d) IV

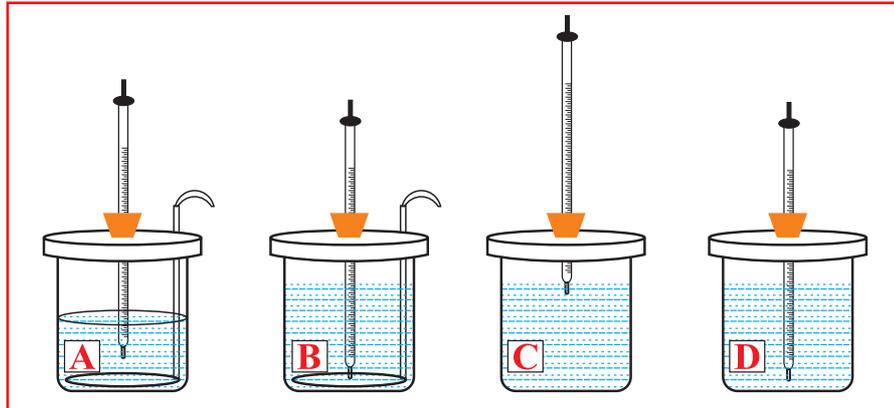
5. The spring balance shown here is used to measure the mass of given solid. The mass of the solid is

- (a) 115 g
- (b) 118 g
- (c) 120 g
- (d) 125 g



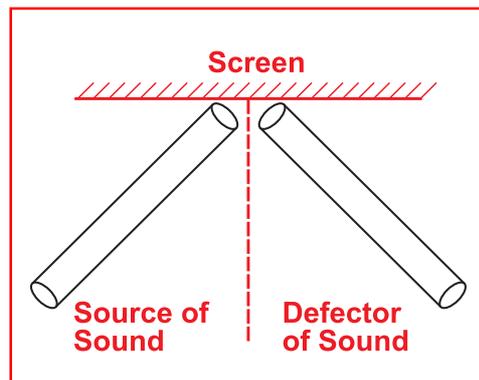
6. Of the four experimental set-ups shown here to study temperature-time graph, the best one is

- (a) A.
 (b) B.
 (c) C.
 (d) D.



7. For doing his experiment on verifying the laws of reflection of sound, a student sets up his apparatus as shown. The experiment is more likely to be performed successfully if the screen shown is a

- (a) well polished plane mirror.
 (b) wooden board with many holes in it.
 (c) a foam padded board.
 (d) a sheet of pure white cloth.



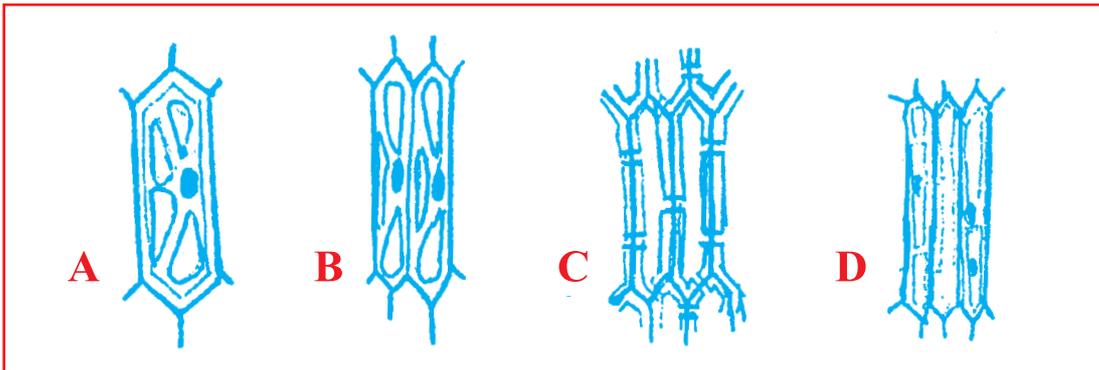
8. Four students did their experiment on measuring the speed of a pulse through a string as follows :
- Student A stretched his thick cotton string very taut and gave it a very mild transverse horizontal jerk
- Student B stretched his thin jute string just taut and gave it a mild transverse horizontal jerk
- Student C stretched his thick cotton string just taut and gave it a strong transverse horizontal jerk
- Student D stretched his thin jute string very taut and gave it a strong transverse horizontal jerk.

The best choice is that of student

- (a) A.
 (b) B.
 (c) C.
 (d) D.

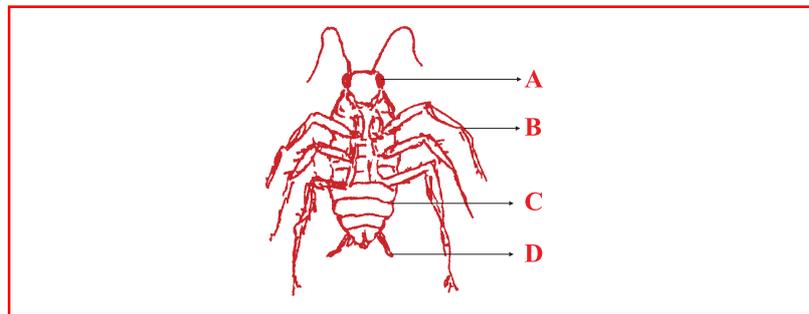
9. While observing a thin section of a plant stem, four students sketched sclerenchyma as given below. The correct diagram is

- (a) A.
- (b) B.
- (c) C.
- (d) D.



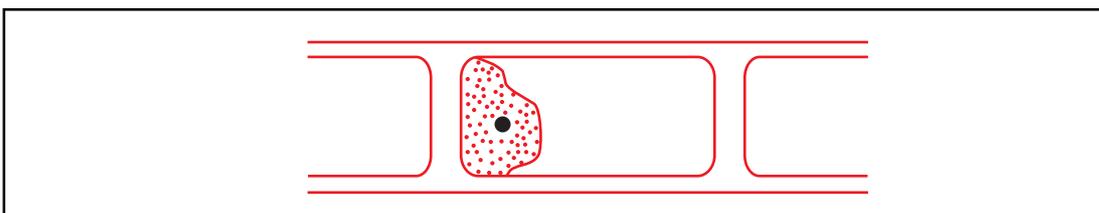
10. A student wants to observe a spiracle of a cockroach. She should observe the region on its body shown by the label

- (a) A.
- (b) B.
- (c) C.
- (d) D.



11. Students observed an onion peel cell, under the microscope and draw the following diagram corresponding to his observation and made following remarks. The observation corresponds to an onion peel cell placed in

- (a) An isotonic solution.
- (b) a hypotonic solution.
- (c) a hypertonic solution.
- (d) water.

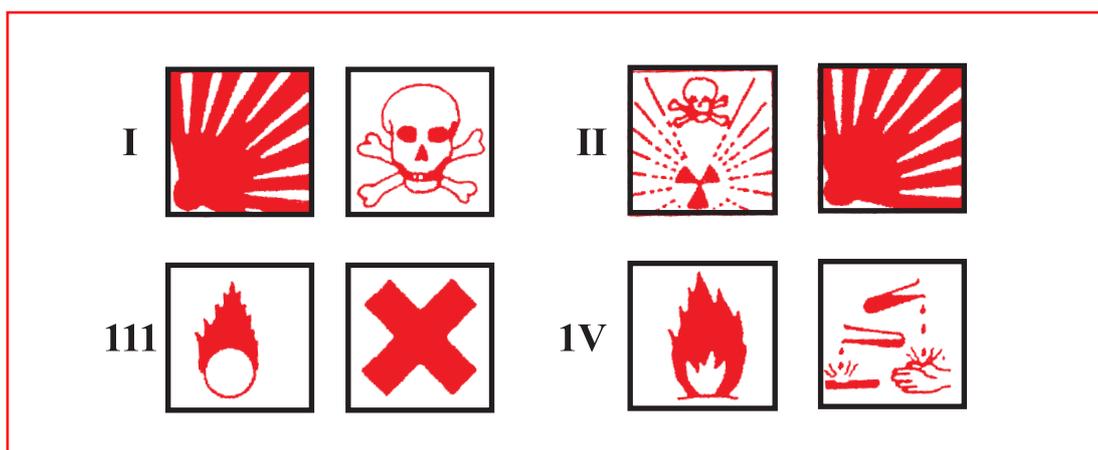


12. Bottle A contains oxalic acid and bottle B contains sodium carbonate solution. When pH paper is dipped in each of the solutions, the colour seen in A and B respectively be

- (a) orange, blue.
- (b) blue, orange.
- (c) green, blue.
- (d) orange, green.

13. The pair of safety symbols you notice on the bottles of commercial acetic acid available in the laboratory, is shown in

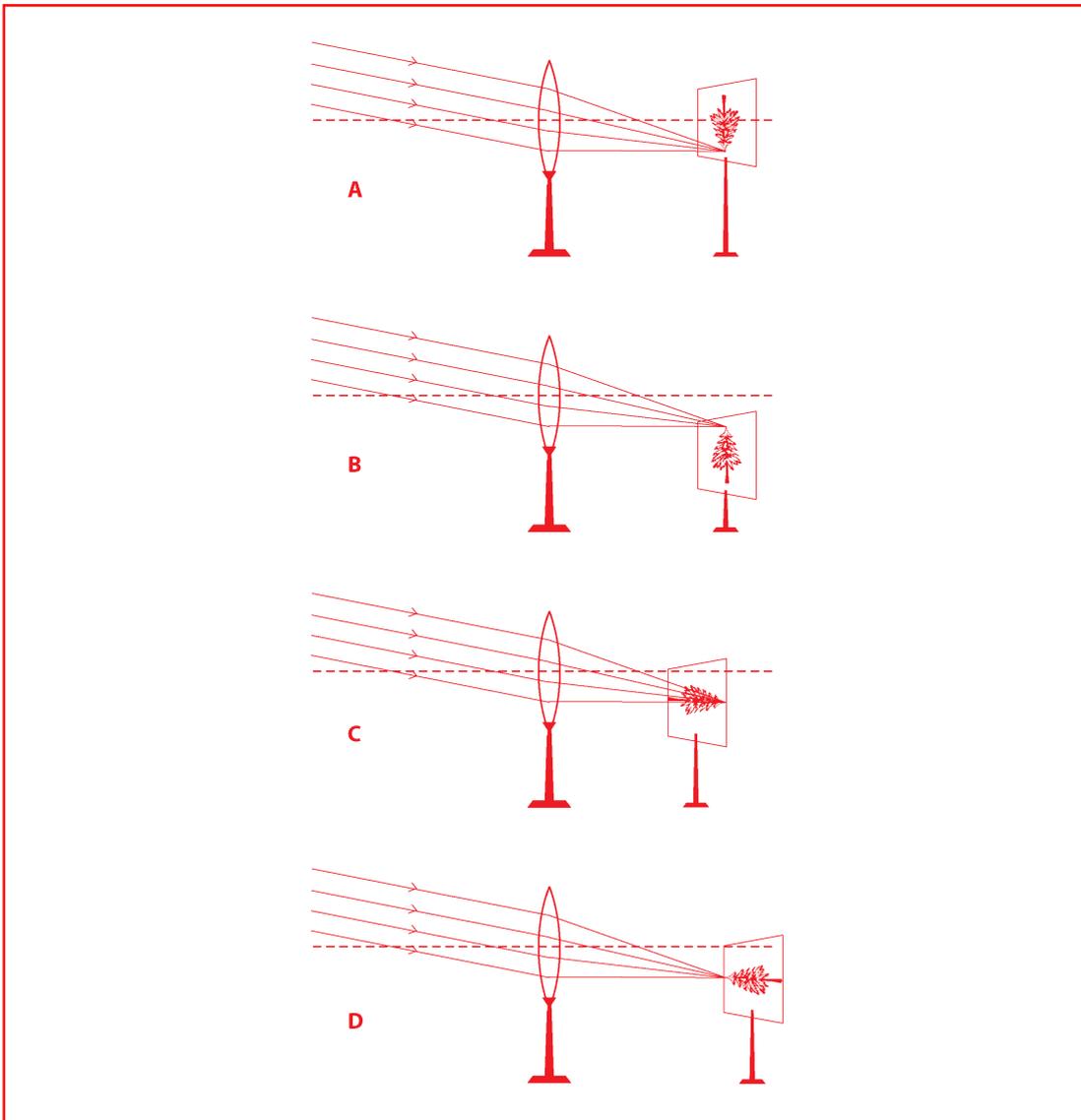
- (a) I.
- (b) II.
- (c) III.
- (d) IV



14. When you place an iron in copper sulphate solution, the reddish brown coating formed on the nail is

- (a) soft and dull.
- (b) hard and flaky.
- (c) smooth and shining.
- (d) rough and granular.

15. Parallel rays a distant tree incident on a convex lens form an image of the screen.

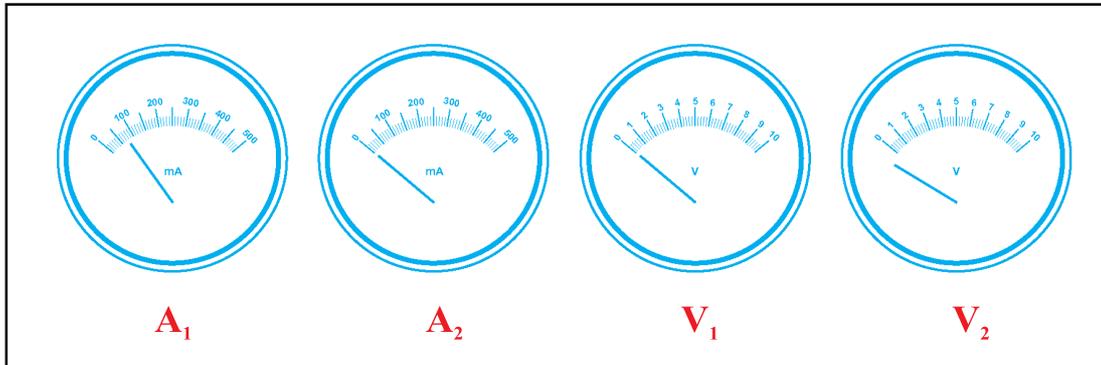


The diagram correctly showing the image of the tree on the screen is

- (a) A.
- (b) B.
- (c) D.
- (d) D.

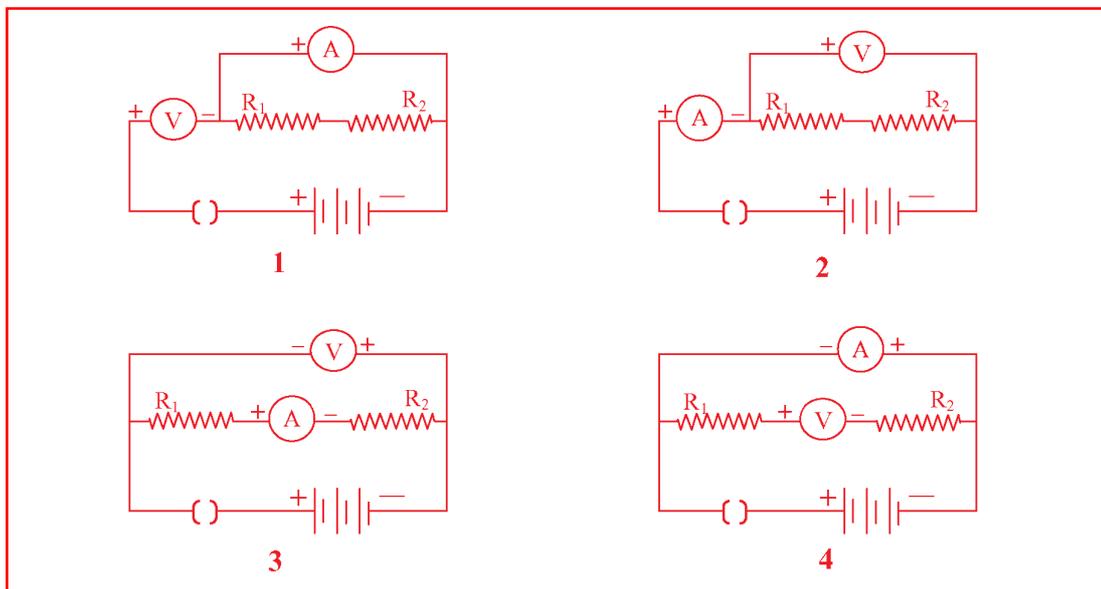
16. The normal positions of the pointers of the two ammeters A_1 and A_2 , and two voltmeters V_1 and V_2 available in the laboratory were as shown. For an experiment to study the dependence of the current on the potential difference across a resistor, the student should select.

- (a) ammeter A_1 and voltmeter V_1 .
- (b) ammeter A_2 and voltmeter V_1 .
- (c) ammeter A_1 and voltmeter V_2 .
- (d) ammeter A_2 and voltmeter V_2 .

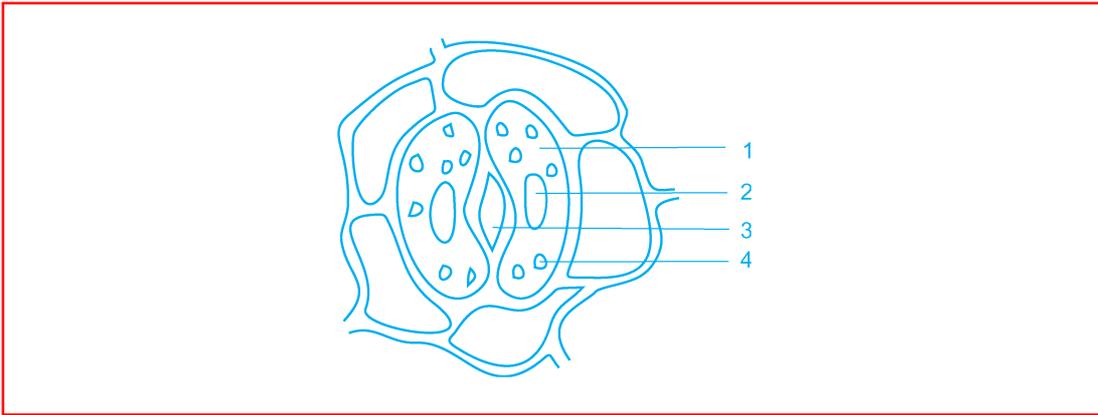


17. The correct way of connecting the ammeter and voltmeter with a series combination of two resistors in a circuit for finding their equivalent resistance, is shown in diagram

- (a) 1.
- (b) 2.
- (c) 3.
- (d) 4.



18. A student draws the following sketch of stomatal apparatus and members the parts to label them.



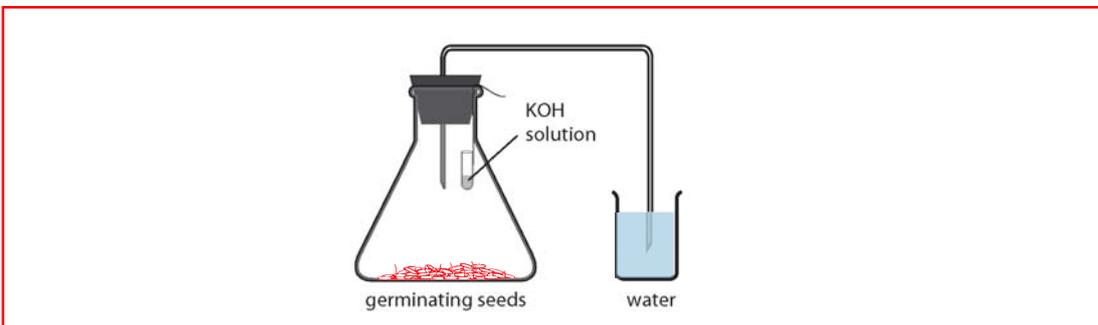
The chloroplast is denoted by

- (a) 1.
- (b) 2.
- (c) 3.
- (d) 4.

19. A part of de-strached leaf of a potted plant was covered with black paper strips on both sides and the plant was kept in sunlight for 8 hours. The leaf was then tested with iodine after boiling it in alcohol. Only the uncovered part of the leaf turned blue black. The inference is that.

- (a) CO_2 is necessary for photosynthesis.
- (b) light is necessary for photosynthesis.
- (c) chlorophyll is necessary for photosynthesis.
- (d) water is necessary for photosynthesis.

20. In the experiment shown in the figure, water is found to rise in the bent tube. The reason is that



- (a) CO_2 in the delivery tube pushes up water.
- (b) Partial vaccum is created in the flask.
- (c) Atmospheric presure outside is reduced
- (d) Water as germinating always rises due to capillary action.

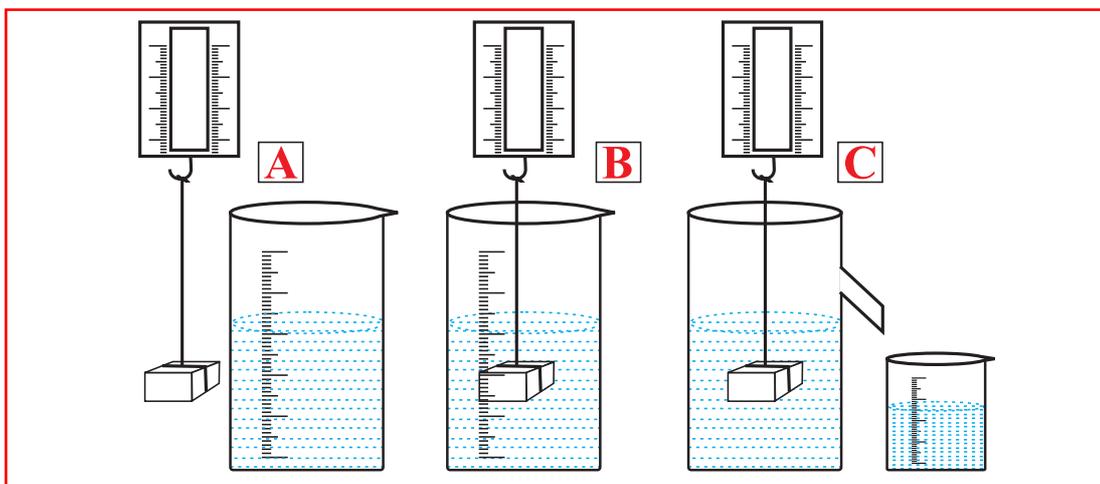
SECTION - B

21. Which of the following set of apparatus is required to determine the boiling point of water ?

- (a) tripod stand, conical flask, thermometer, wire gauze, stand with clamp, pair of tags
- (b) funnel, burner, clamp and stand, test tube, thermometer, wire gauze, stand with clamp
- (c) boiling tube, beaker, thermometer, burner, cork with one hole, stand with clamp, wire gauze
- (d) round bottom flask, burner, thermometers wire guage, stand with clamp, cork with 2 holes, glass tube

22. The readings of the spring balance will be

- (a) equal to each other in all cases A, B and C.
- (b) equal to each other in cases A and C only.
- (c) equal to each other in cases B and C only.
- (d) different in every case.

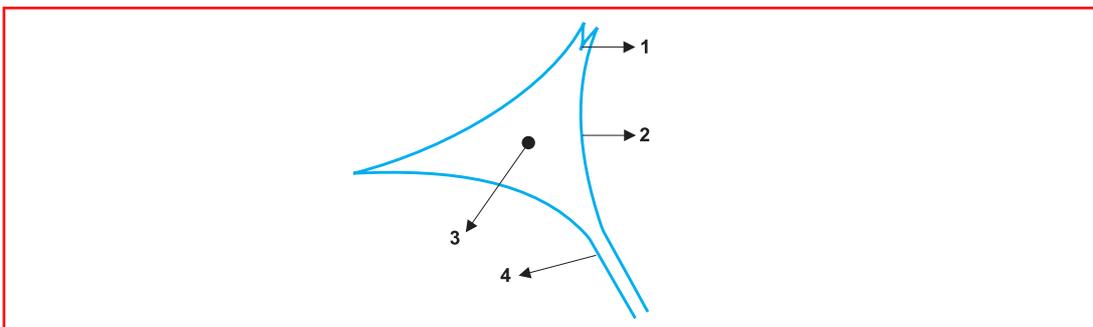


23. You are viewing a prepared slide of striped muscle fibers cockroach leg. When you focus the microscope, the striations appear pale and indistinct. To make the striations clearly visible, you would

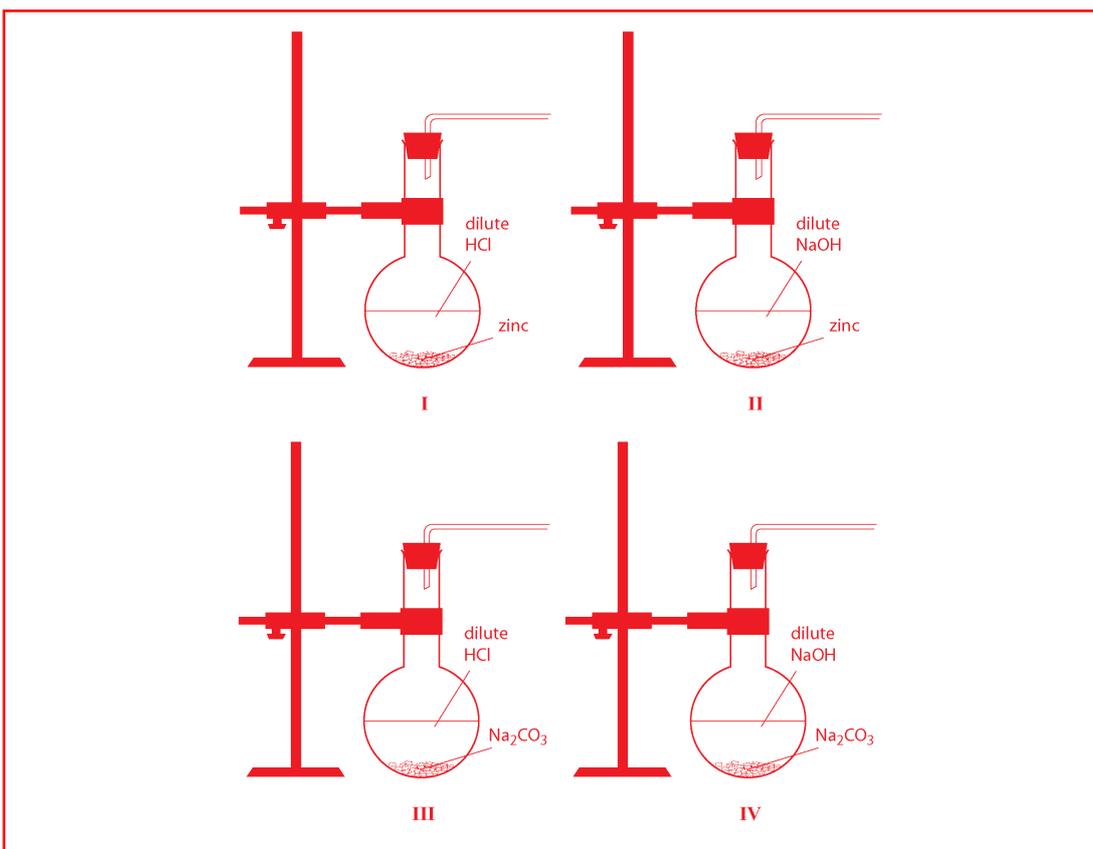
- (a) slowly close the diaphragm to reduce the light.
- (b) remove the mirror to cut out light.
- (c) change the eye piece to increase magnification.
- (d) replace the objective to decrease magnification.

24. A figure depicting parts of a neuron is given below. The correct identification of the labels 1, 2, 3, 4 respectively is

- (a) dendrite, cytoplasm, nissl granules, nerve fibre.
- (b) cilia, endoplasmic reticulum, nucleoli, nerve fibre.
- (c) dendrons, cell body, Nissl granule, axon.
- (d) dendrites, cyton, nucleus, axon.



25. Four experimental set ups are shown below.



The set ups that would result in a rapid evolution of gas would be

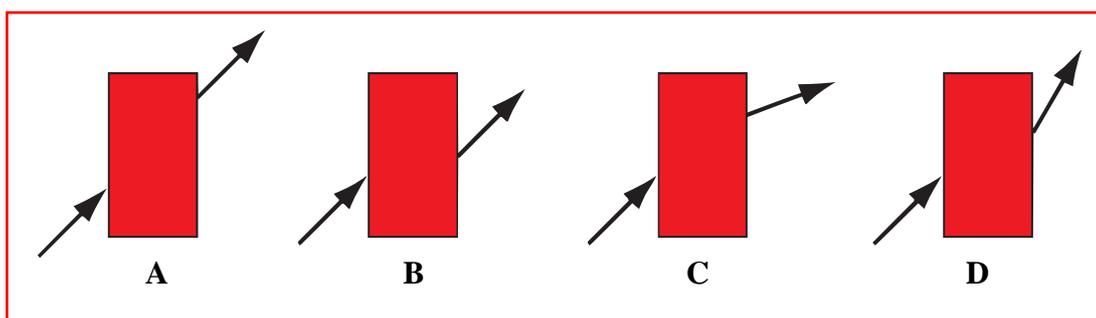
- (a) I and III
- (b) II and IV
- (c) I and II
- (d) III and IV

26. Among the four sets of apparatus given below, the correct one to prepare sulphur dioxide gas is

Set I	Set II	Set III	Set IV
Hard glass test tube 2, double holted rubber cork 1, thistle funnel 1, delivery tube 1, spirit lamp 1	Round bottmed flask 1, gas jar 1, double holed rubber cork 1, thistle funnel 1, delivery tube 1, spirit lamp 1	Conical flask 2, delivery tube 1, thistle funnel 1, single holed rubber cork 2, spirit lamp 1	Conical flask 1, beaker1, funne 1, delivery tube 1, double holed rubber cork 1, spirit lamp 1

- (a) Set I
- (b) Set II
- (c) Set III
- (d) Set IV

27. Four students showed the following traces of the path of aray of light passing through a rectangular glass slab.



The trace most likely to be correct is that or student

- (a) A.
- (b) B.
- (c) C.
- (d) D.

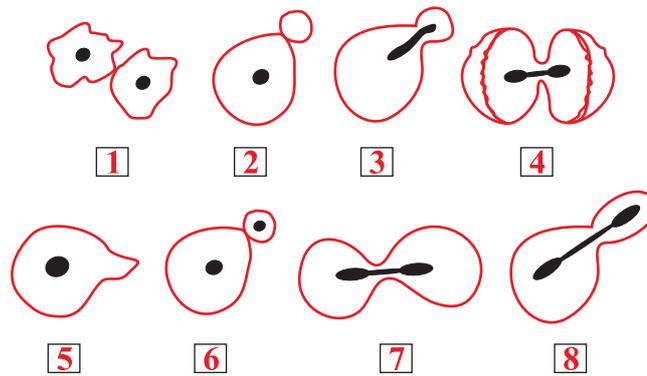
28. The following apparatus is available in a laboratory.

- Cell : adjustable from 0 to 1.5 volt
- Resistor : 4Ω and 12Ω
- Ammeters : A1 of Range 0 to 3 A : Least Count 0.1 A
A2 of Range 0 to 1 A : Least Count 0.05 A
- Voltmeters : V1 of Range 0 to 10 V : Least Count 0.5 V
V2 of Range 0 to 5 V : Least Count 0.1 V

The best combination of voltmeter and ammeter for finding the equivalent resistance of the resistors in parallel would be

- (a) ammeter A1 and voltmeter V1.
- (b) ammeter A1 and voltmeter V2.
- (c) ammeter A2 and voltmeter V1.
- (d) ammeter A2 and voltmeter V2.

29. From the following diagrams, select the correct ones showing stages of binary fission in amoeba and budding in yeast in their proper sequence



- (a) 5, 1, 4 and 2, 3, 6.
- (b) 3, 4, 7 and 2, 8, 6.
- (c) 7, 4, 1 and 3, 8, 6.
- (d) 8, 7, 4 and 3, 2, 6.

30. Student weight 108 raisins and designated the weight as A. She then soaked them in 50 ml distilled water in a beaker. After 2 hours, she removed the raisins wiped them dry from outside and weighed again and called that B for determining the percentage of H₂O absorbed by raisins, she should calculate as follows :

- (a) $\frac{B-A}{A} \times 100$
- (b) $\frac{B-A}{B} \times 100$
- (c) $\frac{B-A}{A} \times \frac{1}{100}$
- (d) $(B-A) \times 100$

Key for Sample Paper II

Q. No.	Correct Choice	Explanation/Remarks
1.	(b)	Egg white forms colloids
2.	(c)	Sulphur is soluble in carbon disulphide
3.	(d)	The extent of cooling is largest in case of ether because of its fastest evaporation. This is followed by evaporation of alcohol which is faster than that of water. Hence, cooling is faster for alcohol than water.
4.	(d)	This is correct arrangement because of presence of burner, wire gauze and cotton plug.
5.	(a)	The zero error has to be correctly accounted for.
6.	(a)	We need a stirrer and a thermometer correctly positioned without touching the sides of the colorimeter.
7.	(a)	All the other screens would absorb/transmit sound.
8.	(c)	String should not be stretched too taut and the jerk should be as strong as possible.
9.	(c)	Pits, non-nucleated cells and thick cell walls are the characteristics of sclerenchyma.
10.	(c)	Correct location of spiracles.
11.	(b)	Water reaches out of the cell when it is placed in hypertonic solution so cytoplasm with the nucleus shrinks to one side.
12.	(a)	The colour of pH paper is orange in acidic medium while it is blue in basic medium.
13.	(d)	Acetic acid is flammable and corrosive.
14.	(a)	The freshly deposited copper is soft and dull.
15.	(b)	The image of the (vertical) tree on the screen will be an inverted vertical image.
16.	(b)	We should select instruments without any zero error.
17.	(b)	The ammeter must be connected in series, between the battery and the series combination of the two resistors, and the voltmeter should be put in parallel across the series combination of the two resistors. All the polarities must also be correct.

18. (d) Label No. 4 shows the chloroplast
19. (b) The covered part did not get sunlight which is necessary for photosynthesis.
20. (b) Seeds take up the O_2 and release CO_2 during respiration. This CO_2 is absorbed by KOH creating partial vacuum in the flask. So water rises in the tube.
21. (d) This set of apparatus contains all the required items for determination of boiling point.
22. (c) The loss in weight of a solid does not depend on the shape of the vessel or the volume of water in it.
23. (a) Reduction of light gives better contrast.
24. (d) Correct labelling.
25. (a) The reactions between (i) Zinc and dil. HCl and (ii) dil HCl and Na_2CO_3 are fast whereas the reaction between Zn and NaOH is slow.
26. (b) The apparatus required for the preparation and collection of SO_2 is given in Set II only.
27. (b) The emergent ray, from the rectangular glass slab, is parallel to the incident ray and is laterally displaced to the left (or lower side) of the incident ray.
28. (d) The overall range of the voltage is from 0 to 4.5V and that of current is from 0 to $4.5/9 A=0.5A$. We, therefore, prefer, instruments that cover these ranges and also have a better least count.
29. (c) show the correct sequence of binary fission in amoeba and budding in yeast.
30. (a) correct formula

Sample Question Paper III

Time: 1 ½ hours

Maximum Marks: 20

INSTRUCTIONS

1. Attempt all questions
2. There are 30 multiple choice questions in total. Only one of the options in every question is correct.
3. The question paper consists of two parts – Section A and Section B. Each of the 20 questions in Section A carries 0.5 mark and each of the 10 questions in Section B carries 1.0 mark.

SECTION A

1. To prepare a colloidal solution of starch we should
 - (a) add starch powder to boiling water and cool.
 - (b) add starch powder to cold water and boil.
 - (c) heat starch powder, add it to cold water and then bring to boil.
 - (d) add a thin paste of starch to boiling water while stirring.

 2. To prepare iron sulphide, by heating a mixture of iron filings and sulphur powder, we should use a
 - (a) copper dish.
 - (b) watch glass.
 - (c) china dish.
 - (d) petri dish.

 3. When a mixture of common salt and ammonium chloride is heated, it is observed that
 - (a) Solid common salt gets deposited on the cooler parts of the funnel while solid ammonium chloride remains in the china dish.
 - (b) Mixture of common salt and ammonium chloride turns into greenish crystals when allowed to cool.
 - (c) Ammonium chloride gets deposited on the cooler parts of the funnel and solid common salt remains in the china dish.
 - (d) droplets containing both common salt and ammonium chloride appear on the upper part of the funnel while some molten mixture of common salt and ammonium chloride remains in the china dish.
-

4. To check the cooling caused by evaporation of alcohol

- (a) The thermometer is first dipped in alcohol and then left in air and decrease in temperature is noted with time.
- (b) A plug of cotton is dipped in alcohol and attached to the bulb of the thermometer. This is then kept under a fan and a decrease in temperature is noted with time.
- (c) A plug of cotton is dipped in hot alcohol and attached to the bulb of the thermometer. This is then kept in sun the temperature is noted with time.
- (d) A plug of cotton is dipped in alcohol and is attached to the bulb of the thermometer. The decrease in temperature is then noted with time.

5. While determining the density of a copper piece using a spring balance and a measuring cylinder, Seema carried out the following procedure :

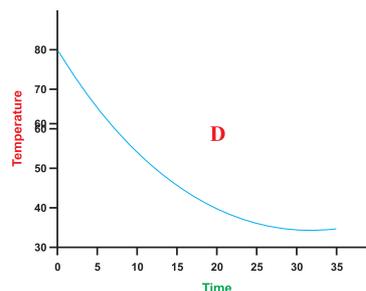
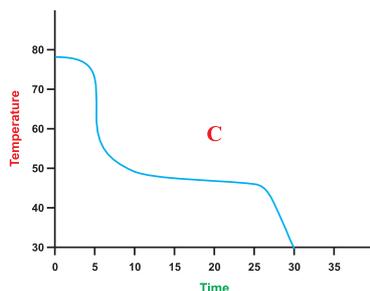
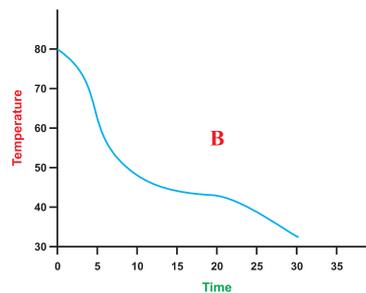
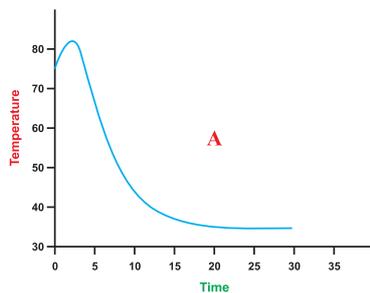
- i. noted the water level in the measuring cylinder without the copper piece
- ii. immersed the copper piece in the water
- iii. noted the water level in the measuring cylinder with the copper piece inside it.
- iv. removed the copper piece from the water and immediately weighed it using a spring balance.

The wrong step in the procedure is

- (a) step (i)
- (b) step (ii)
- (c) step (iii)
- (d) step (iv)

6. The temperature-time variation graphs, as obtained by four students A, B, C and D are as shown. The graph, likely to be correct is that of student.

- (a) A.
- (b) B.
- (c) C.
- (d) D.



7. A laboratory had the following apparatus available in it :

- (A) Two thin hollow wooden tubes
- (B) An intense & broad source of sound
- (C) An Intense, pointed source of sound
- (D) An sharp pointed deflector of sound
- (E) A well polished metal sheet
- (F) A white painted thermocol sheet

A student can do his experience on verificating in laws of reflection of sound successfully by choosing the appartus labelled as

- (a) A, C, D, E
- (b) A, C, E
- (c) A, B, D, E
- (d) A, C & D

8. While doing the experiment on measuringt the velocity of a pulse through a stretched string, a student had to choose between using a

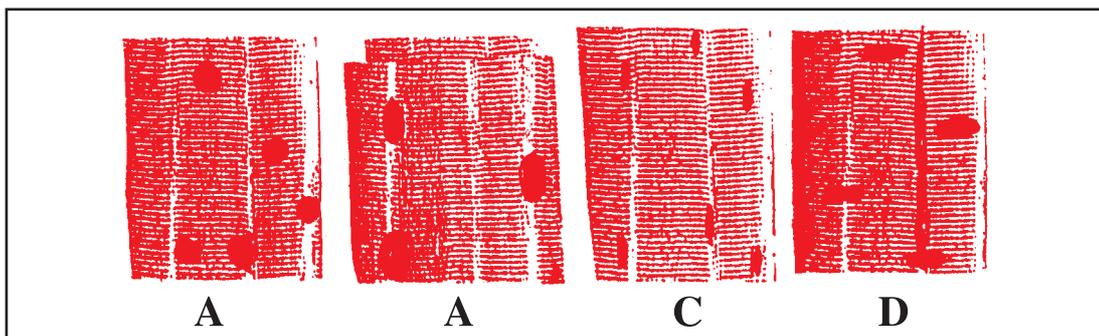
- (i) thick silk string and a thick cotton string
- (ii) stop clock and a table clock.

The combination choice that he should prefer is

- (a) silk string and the table clock
- (b) silk string and the stop clock
- (c) cotton string and the table clock
- (d) cotton string and the stop clock

9. Observe the location and shape of the nuclei in the four four drawings of the striated muscle fibers given below. The drawing that most resembles the slide of striated muscle fibre under the microscope is

- (a) A
- (b) B
- (c) C
- (d) D



10. Given below are four operations for preparing a temporary mount of human cheek cells:

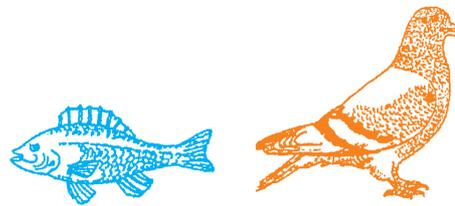
- (i) taking scraping from inner side of the cheek and spreading it on a clean slide
- (ii) putting a drop of glycerine on the material
- (iii) adding two or three drops of methylene blue
- (iv) rinsing the mouth with fresh water and disinfectant solution.

The correct sequence of these operation is

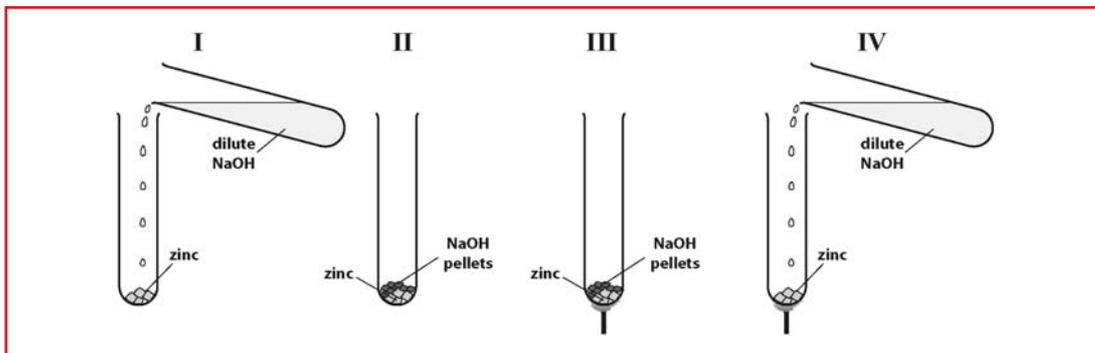
- (a) i-ii-iii-iv
- (b) iv-i-iii-ii
- (c) iv-i-ii-iii
- (d) i-iii-ii-iv

11. The feature that places them in the same phylum is

- (a) pointed heads.
- (b) bulky thorax.
- (c) presence of scales.
- (d) post anal tails.



12. The figures below show set-ups for studying the reaction of zinc with sodium hydroxide.

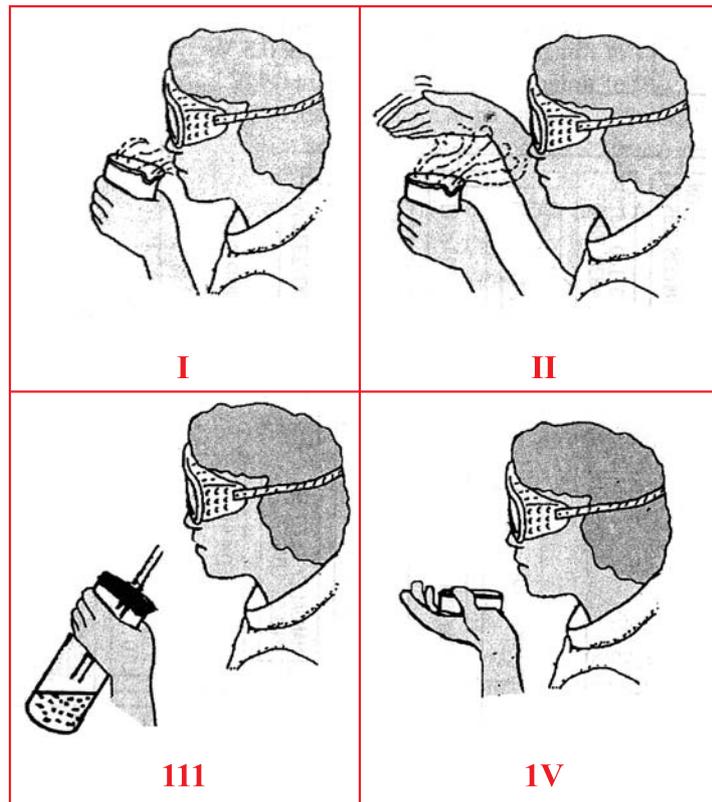


- (a) I.
- (b) II.
- (c) III.
- (d) IV.

13. An iron nail was suspended in copper sulphate solution and kept for a while. The solution.

- (a) remained blue and a coating was formed on the nail.
- (b) turned green and a coating was found on the nail.
- (c) remained blue and no coating was found on the nail.
- (d) turned green and no coating was formed on the nail.

14. The most appropriate method of testing the odour of a given liquid is

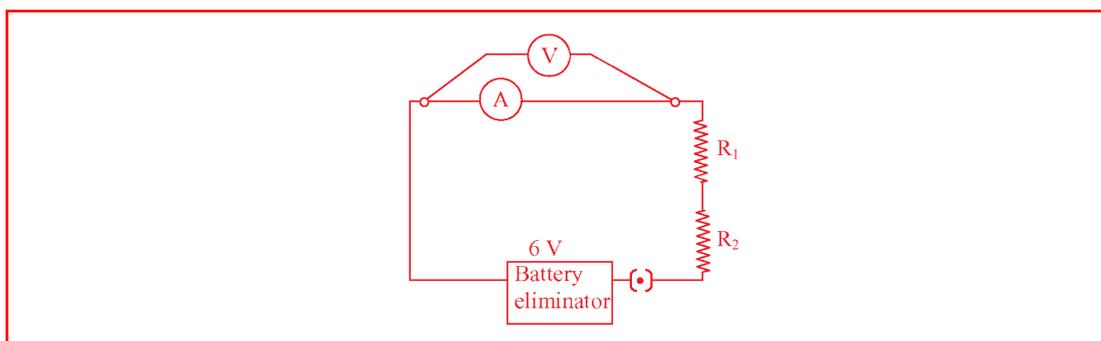


- (a) I
- (b) II
- (c) III
- (d) IV

15. In an experiment to determine the focal length of a convex lens, a student obtained a sharp inverted image of distant tree on the screen behind the lens. She then removed the screen and looked through the lens in the direction of the object. She will see

- (a) an inverted image of the tree as the focus of the lens.
- (b) no image as the screen has been removed.
- (c) a blurred image on the wall of the laboratory.
- (d) an erect image of the tree on the lens.

16. In an experiment, to find the equivalent resistance of a series combination of two resistors R_1 and R_2 student uses the circuit shown here.



The circuit will give

- (a) correct reading for volage V, but incorrect reading for current I.
- (b) correct reading for current I, but incorrect reading for voltage V.
- (c) correct reading for both current I and voltage V.
- (d) incorrect readings for both current I and voltage V.

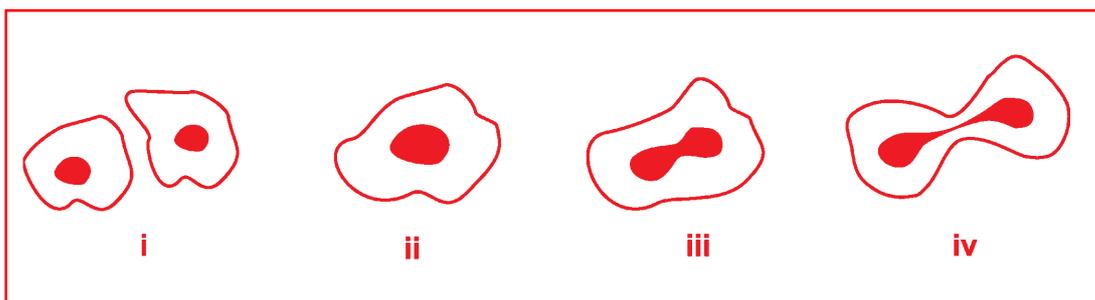
17. In an experimet to study dependence of current I on the potential difference across a given resistor, students kept the plug key in the circuit closed for time t1 and then open for time t2 for students P, Q, R and S are given in the table below.

Student	Closed time t1 seconds	Open time t2 seconds
P	30	60
Q	60	30
R	60	15
S	45	15

The best choice of open and closed time is that of student

- (a) P.
- (b) Q.
- (c) R.
- (d) S.

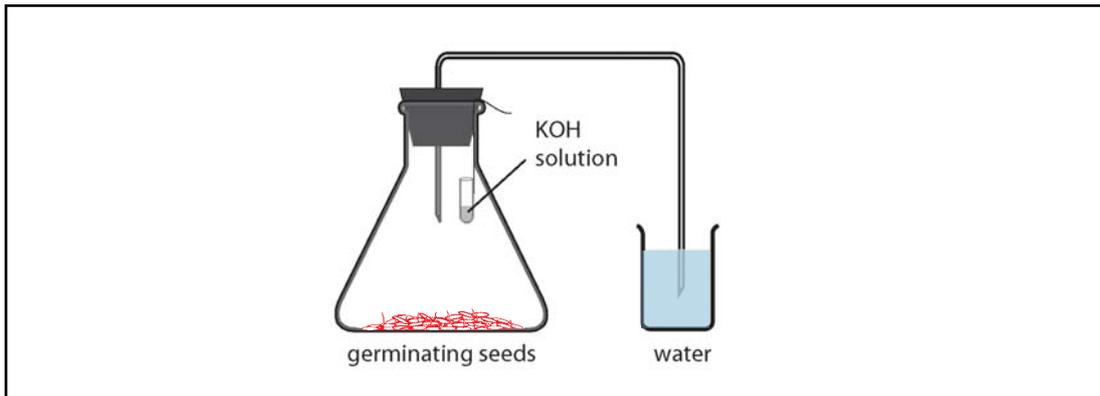
18. The following figures illustrate binary fission in Amoeba in an incorrect sequence.



The correct sequence is

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

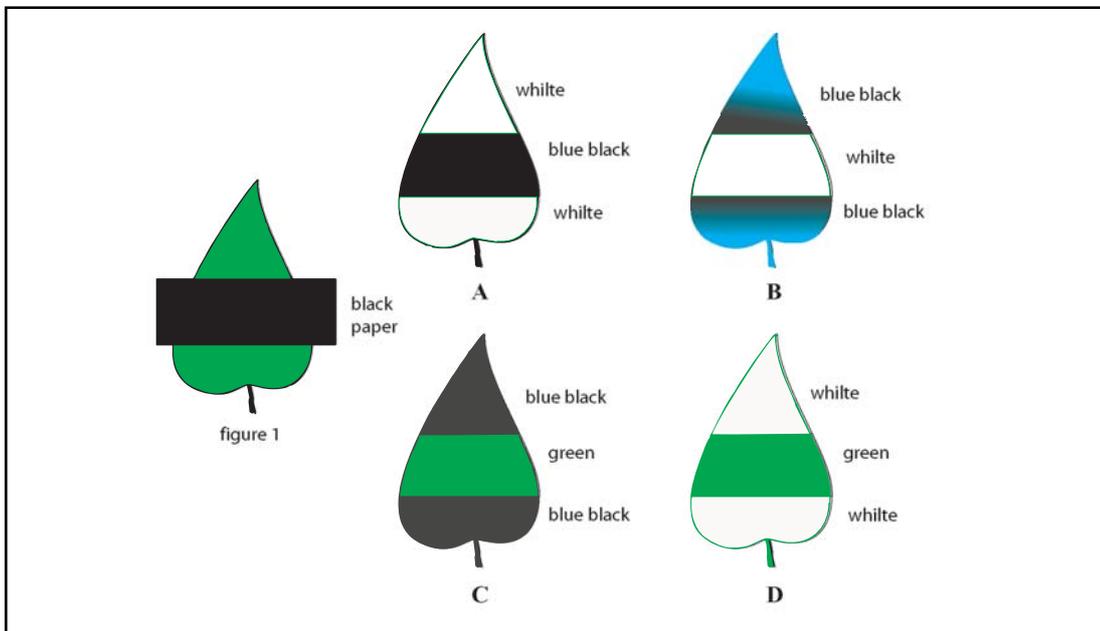
19. The following experiment is set up to show that a gas is released during respiration.



In this set up, the small test tube containing pellets of KOH is kept in the conical flask to absorb

- (a) air in the flask.
- (b) moisture in the flask.
- (c) O_2 in the air in the flask.
- (d) CO_2 released by the germinating seeds.

20. A leaf from a de-stached plant is covered with black paper strip as shown in figure 1. The starch test is done on the leaf after 8 hours.

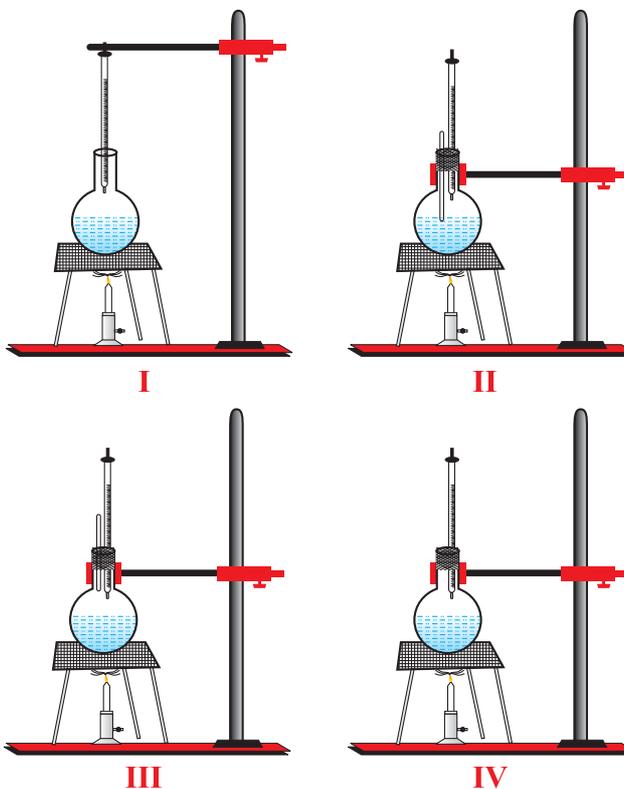


The results will be as shown in diagram

- (a) A.
- (b) B.
- (c) C.
- (d) D.

SECTION B

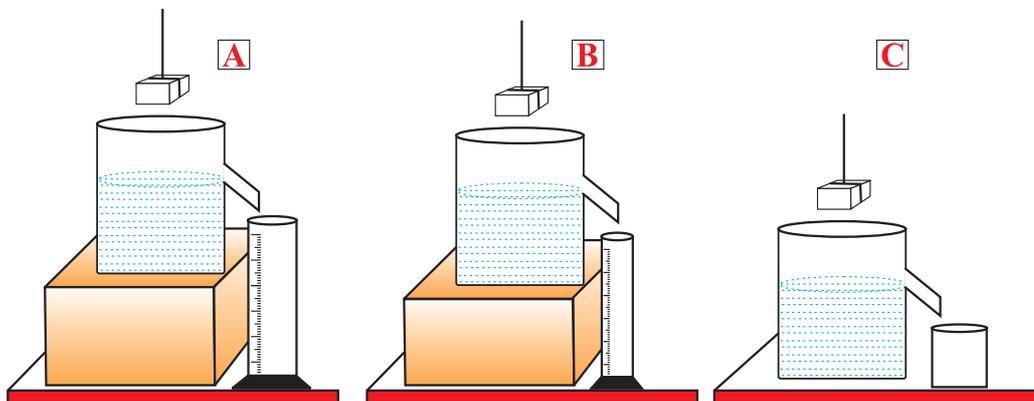
21. Which one of the following experimental arrangements is correct for the determination of boiling point of water?



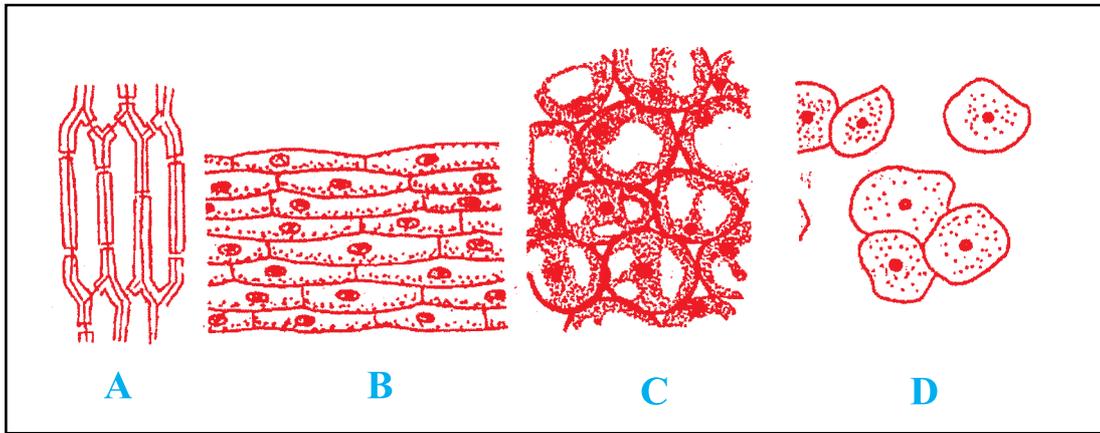
- (a) I.
- (b) II.
- (c) III.
- (d) IV.

22. Three students A, B and C determined the volume of a solid by immersing it in water in the overflow cans set up as shown. The result obtained will be wrong for

- (a) student A.
- (b) student B.
- (c) student C.
- (d) all three student.



23. Four slides were observed under the microscope for spot test as shown below. The correct identification of the four spots is



(a)	A : onion peel	B : cheek cell	C : sclerenchyma	D : parenchyma
(b)	A : cheek cells	B : parenchyma	C : sclerenchyma	D : onion peel
(c)	A : parenchyma	B : cheek cells	C : onion peel	D : sclerenchyma
(d)	A : sclerenchyma	B : onion peel	C : parenchyma	D : cheek cells

24. Figures of two plants are given below. Observe them carefully and select the option which correctly gives their identification and the names of groups to which they belong.

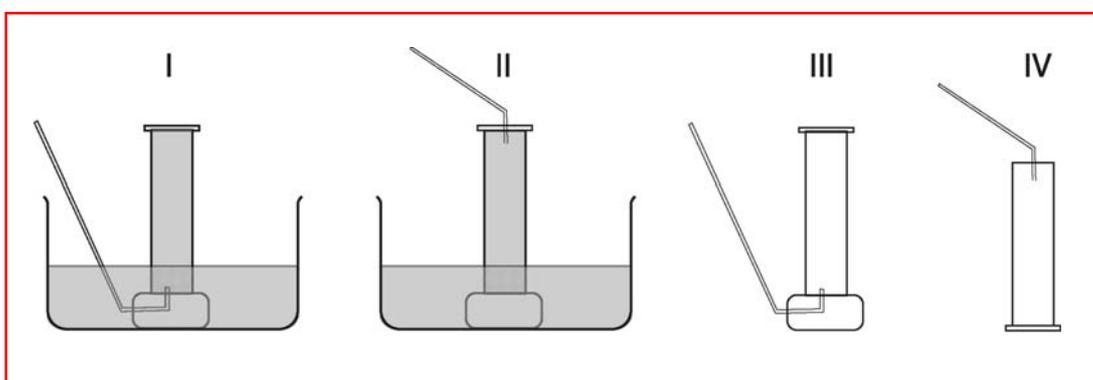


- (a) A : moss; Bryophyta
B : Fern; Tracheophyta
- (b) A : pine; Gymnospermae
B : leafy plant; Angiospermae
- (c) Both A and B are liverworts and belong to Tracheophyta
- (d) Both A and B are ferns and belong to Bryophyta.

25. A student was given three samples containing ethanoic acid, sodium bicarbonate solution and water in test tubes I, II and III, respectively. On dipping a pH paper in them, he observed that the colour turned orange in I, blue in II and green in III. If arranged in increasing order of their pH, the sequence of these bottles would be

- (a) I, III, II.
- (b) I, II, III.
- (c) III, I, II.
- (d) II, III, I.

26. The proper experimental arrangement to collect sulphur dioxide is as shown in



- (a) I.
- (b) II.
- (c) III.
- (d) IV.

27. In an experiment to trace the path of a ray of light passing through a rectangular glass slab, four students tabulated their observation as given below.

	S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
A	1	30	18	32
	2	45	28	43
	3	60	35	60

S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
1	30	15	38
2	45	20	53
3	60	28	67

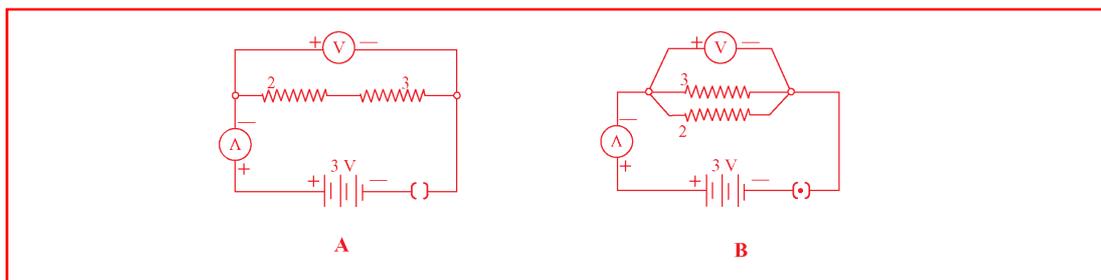
S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
1	30	10	31
2	45	15	44
3	60	22	60

S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
1	30	28	28
2	45	40	40
3	60	56	56

The student most likely to have done the experiment properly is

- (a) A.
- (b) B.
- (c) C.
- (d) D.

28. For the circuits A and B shown below, the voltmeter readings would be



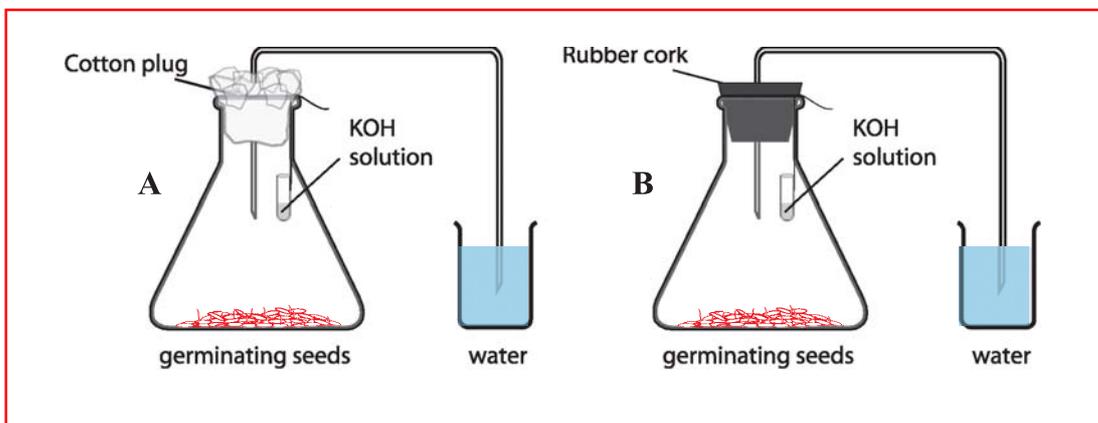
- (a) 0.6 in circuit A and 2.5 V in circuit B.
- (b) 0 V in both circuits.
- (c) V in both circuits.
- (d) 0 V in circuit A and 3 V in circuit B.

29. While performing an experiment with raisins, a student recorded the following data.

Mass of water taken in the beaker	= 50 g
Mass of raisins before soaking	= 20 g
Mass of raisins after soaking	= 30 g
Mass of water in beaker left after experiment	= 40 g
The % of water absorbed by the raisins is	

- (a) 10%
- (b) 20 %
- (C) 45 %
- (d) 50 %

30. Using the same number of given germinating gram seeds, two student A and B set up the experiment separately. Student A used a cotton plug to hold the bent tube in the mouth of the flask. Student B used a rubber cork.



After 4 hours they noticed that

- (a) water level increased in the bent tube only of A.
- (b) water level increased in the bent tube only of B.
- (c) the cotton plug was wet.
- (d) the water in the beaker of tube turned milky.

Key for Sample Paper II

Q. No.	Correct Choice	Explanation/Remarks
1.	(d)	Thin paste of starch enables colloidal formation.
2.	(c)	To avoid side reaction and breakage at high temperature.
3.	(c)	Amonium chloride sublimes and gets deposited on the cooler parts of the funnel and common salt does not sublime and the china dish unaffected leading to separation of the two compouunds.
4.	(d)	The correct way to observe the cooling by evaporation under normal (undisturbed) conditions.
5.	(d)	It is wrong to weigh a wet copper piece in air.
6.	(d)	The liquid cools faster first and slowly later on when its temprature gets close to the surrounding temprature.
7.	(a)	We would prefer using a pointed source and a pointed detector. The wooden tubes are needed for guiding the path of sound while the polished metal sheet acts as a good reflector sound.
8.	(d)	The cotton string is a better carrier of the pulse while the stop clock enables us to measure time more accurately.
9.	(c)	Nuclei at periphery
10.	(b)	Mouth to be disinfected first and glycerine to be added last.
11.	(d)	Post anal tail is a chordate characteristic.
12.	(d)	Zinc reacts with sodium hydroxide on heating to produce hydrogen gas rapidly.
13.	(b)	Iron being more reactive displaces copper from copper sulphate.
14.	(b)	The gases should not be smelt directly or kept too close to nose.
15.	(a)	The screen is just a device to observe the (real) image formed by a convex lens. The image of a distant object continues t get formed at focus of the convex lens even when no screen is being used to show its formation.
16.	(b)	The voltmeter has to be put in parallel with the resistances being measured and not across the ammeter.
17.	(a)	We must keep the ciruit closed for a relatively shorter time and open for a relatively longer time.

18. (b) Nucleus divides first and then the cytoplasm, when Amoeba undergoes fission.
19. (d) KOH absorbs CO_2 released by the seeds.
20. (b) Sunlight is not available to the covered portion, Hence no starch remains white after starch test.
21. (c) This arrangement, the set up is a closed arrangement with proper position of the glass tube fitted in a cork with two holes; the thermometer is inserted through the other hole.
22. (d) The overflow can must always be filled up to its spout before using it to measure the volume of water displaced by the immersed solid.
23. (d) correct identification of the four tissues
24. (a) correct identification and classification
25. (a) Ethanoic acid has the lowest pH and NaHCO_3 has the highest pH whereas the pH of water is in between the two.
26. (d) SO_2 is soluble in water and heavier than air.
27. (a) We must not only have the angle of emergence (nearly) equal to the angle of incidence but also have an idea of the magnitude of the angle of refraction (for a glass slab) for the three most often used values (30° , 45° , 60°) of the angle of incidence.
28. (d) Only circuit B, with a dot within the symbol of the plug key, is a closed circuit in which current is flowing and will show non-zero voltage. The voltmeter reading, for the set ups shown, would be (nearly) equal to the voltage of the battery.
29. (d) Calculation using the formula.
30. (b) The conical flask should be closed with rubber cork to make it air tight. Otherwise partial vacuum will not be created.

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