Annexure

General Guidelines for Practical Examination (March 2015) in Physics, Chemistry and Biology for Visually Impaired students of classes XI and XII

General Instructions:

- The practical examination for these students will be of two hour duration.
- A separate list of ten experiments for these students for Physics, Chemistry and Biology is given here.
- The written examination in practicals for these students will be conducted at the time of practical examination of all the other students.
- The written test will be of 30 minutes duration.
- The question paper given to the student should be legibly typed. It should contain a total of 15 (very short answer type questions). The student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question papers should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus simple theory, procedure, related practical skills, precautions etc. (Depending upon the experiment).
- Sample practical related questions for the written examination are also attached herewith. Similar questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory/principle/concept, apparatus/materials/chemicals required, procedure, precautions, sources of error etc.

PHYSICS

Class-XI

Evaluation scheme

Time: 2hrs. **Max. Marks: 30**

Practical Record	5 marks
Viva	10 marks
Written test (Based on given/prescribed syllabus)	10 marks
Identification/Familiarity with the apparatus	5 marks
Total	**30 marks**

A. Items for Identification/Familiarity of the apparatus

Experiment. No.1

Spherical ball, Cylindrical objects, vernier callipers

Experiment. No. 2

Beaker, calorimeter, vernier calipers

Experiment. No. 3

Screw gauge, wire

Experiment. No. 4

Screw gauge

Experiment. No. 5

Beam balance, spring balance, weight box, gram and milligram weights, forceps

Experiment. No. 6

Parallelogram law of vectors apparatus, pulleys and pans used in the same 'weights' used.

Experiment. No.7

Bob and string used in a simple pendulum, meter scale, split cork, suspension arrangement, stop clock/stop watch

Experiment. No. 8

Helical spring, suspension arrangement used, weights, arrangement used for measuring extension

Experiment. No. 9

Sonometer, Wedges, pan and pulley used in it, 'weights' Tuning Fork, Meter scale, Beam balance, Weight box, gram and milligram weights, forceps

Experiment. No.10

Resonance Tube, Tuning Fork, Meter scale, Flask/Beaker used for adding water.

B. List of Practicals

Note: The following experiments may be carried out in an experiential manner rather than recording observations.

1. To measure diameter of a small spherical/cylindrical body using vernier calipers.

2. To measure the internal diameter and depth of a given beaker/calorimeter using vernier calipers and hence find its volume.

3. To measure diameter of given wire using screw gauge.

4. To measure thickness of a given sheet using screw gauge.

5. To determine the mass of a given object using a beam balance.

6. To find the weight of given body using the parallelogram law of vectors.

7. Using a simple pendulum plot L-T and L-T2 graphs. Hence find the effective length of second's pendulum using appropriate length values.

8. To find the force constant of given helical spring by plotting a graph between load and extension.

9. (i) To study the relation between frequency and length of a given wire under constant tension using a sonometer.

(ii) To study the relation between the length of a given wire and tension, for constant frequency, using a sonometer.

10. To find the speed of sound in air, at room temperature, using a resonance tube, by observing the two resonance positions.

C. Sample Questions

Experiment No.1

1. Write the reading of a vernier callipers for which the least count equals 0.01cm and the main scale and vernier scale readings are 1.7 cm and 6^{th} division respectively.

2. A student uses a vernier callipers having a least count of 0.1 mm. He finds that the mean of his three measurements for the diameter of a given spherical ball, equals 2.423 cm.

   Write the value that should quote as his result.

3. When the jaws of a given vernier callipers are in their 'closed' position, the reading of the vernier scale does not equal zero.

   How can a student still use this vernier callipers for carrying out her measurements?

Experiment No.2

4. Suggest the type of measurement in which the sliding jaws of a vernier calipers are likely to be used.

5. Can a student use vernier callipers for finding the depth of a large graduated cylinder?

6. The 'least count' values, for two different vernier calipers, are 0.01 cm and 0.05mm respectively. Which one of the two would give measurements with a higher precision and why?

Experiment No.3

7. The pitch of a given screw gauge equals 1 mm. The number of divisions, on its circular scale, equals to 100. Find the least count of this screw gauge.

8. When the jaws of a screw gauge are 'just closed' around a given wire , its main scale reading is 0.25 cm and its circular scale reading is 48 divisions. If the least count of this screw gauge is 0.01 mm, calculate the value of the radius of the wire.

9. When the jaws of a screw gauge are 'just closed' its circular scale reading does not equal zero. How can a student use this screw gauge for finding the diameter of a given wire?

Experiment No.4

10. A student has to find the thickness of a thin sheet of paper. He is provided with ten identical sheets of this type.

    Suggest the instrument that he should use and state the usual value of its least count.

11. A student finds that the readings of the main scale and the circular scale of a screw gauge (when a given card board sheet is put between its jaws) equal 0.30 cm and 35 respectively. Given that the least count of this screw gauge equals 0.01 mm, state the valve of the thickness of this sheet.

12. A student moved the 'rotating head' of his screw gauge first 'forwards' and then 'backwards' while taking his readings.

    Why is his method of 'taking readings' not advisable?

Experiment No.5

13. A student finds that he needs to put weights of 5g, 2g, 200mg, 100 mg and 10 mg in the right hand pan of the balance to 'balance out' the object put in the left hand pan.

    Write the value of the mass of the object.

14. A student finds that the 'weights' needed to be put in the

    (i) right hand pan when the object is in the left hand pan and

    (ii) left hand pan when the object is in the right hand pan of a given 'beam balance'

    are not equal to each other.

    State the 'likely errors' in this 'beam balance'.

    State the values of the 'gram weights' that are normally present in the 'weight box' used along with a physical balance.

Experiment No.6

16. State parallelogram law of vectors.

17. Why is it advisable to oil and grease the pulleys used in a 'parallelogram law of vectors' apparatus?

18. When two equal 'weights', say W each, are put in the two pans of a 'parallelogram law of vectors' apparatus, would their 'resultant weight' be necessarily 2 W always?

Experiment No.7

19. State the likely nature of the graph between the (i) 'L' 'T^2' values (ii) L and T^2 values in a simple pendulum experiment.

20. A given simple pendulum has a time period equal to that of a seconds'pendulum. What is the likely value of the affective length of this simple pendulum?

21. A simple pendulum can be used to find the value of a useful physical 'constant'. Name this constant and state its usual value along with its relevant units.

Experiment No.8

22. The ratio of the 'force constant' of two springs of the same material and same diameter is 2:3 If 50 g mass are suspended, separately, from each of these two springs, find the ratio of their extensions.

23. The length, of a given helical spring, is observed to increase by 1 cm when a 50 gram mass is attached to its lower end. If $g=10m/s^2$, find the force constant of this spring.

24. Keeping the material and the

(i) length of the spring the same, the diameter of its wire is increased.

(ii) diameter of the wire the same, the length of the spring is increased.

How is the force constant of the spring likely to change in each case and why?

Experiment No.9

25. A student observes that a tuning fork, of frequency 256 Hz, shows resonance with a sonometer wire when the length of the wire, between the wedges, equals 16 cm. Using exactly the same set up, find the length of the wire, between the wedges, when the tuning fork used has a frequency of 512 Hz.

26. In a sonometer experiment, how do we need to strike tuning fork against a rubber pad?

27. What can we say about the 'sound produced' by a vibrating sonometer wire, when it is adjusted to be in 'resonance' with a given vibrating tuning fork?

Experiment No.10

28. How are the 'lengths of the air column' corresponding to the first and second resonance positions, in a resonance tube apparatus, related to each other?

29. The first resonance position, in a resonance tube apparatus, occurs for a length l of its air column. If the frequency of the tuning fork used equals n, give the (approximate) expression for the velocity of sound in air.

30. In the resonance tube apparatus set up, the first two resonance positions are observed for lengths l_1 and l_2 of the air column.

The values of these lengths are measured for tuning forks of different frequencies. A graph is then plotted between these different valves of l_1 and l_2 with l_1 on the x-axis and l_2 on the y-axis state the likely value of the slope of this straight line graph.

PHYSICS

Class-XII

Evaluation scheme

Time: 2hrs. **Max. Marks: 30**

Practical Record	5 marks
Viva	10 marks
Written test (Based on given/prescribed syllabus)	10 marks
Identification/Familiarity with the apparatus	5 marks
Total	**30 marks**

A. Items for Identification/ familiarity with the apparatus

Experiment. No.1

Meter scale, general shape of the voltmeter/ammeter, battery/power supply, connecting wires

Experiment. No.2

Standard resistances, connecting wires, voltmeter/ammeter

Experiment. No.3

Meter Bridge, screw gauge, jockey Galvanometer, Resistance Box, standard Resistance, connecting wires

Experiment. No.4

Potentiometer, jockey, Galvanometer, Lechlanche cell, Daniell cell (simple distinction between the two vis-à-vis their outer (glass and copper) containers, rheostat connecting wires

Experiment. No.5

Galvanometer, resistance box, Plug-in and tapping keys, connecting wires battery/power supply

Experiment. No.6

Diode, Transistor, IC, Resistor (Wire-wound or carbon ones with two wires connected to two ends), capacitors (one or two types), Inductors

Experiment. No.7

Simple electric/electronic bell, battery/power supply, Plug-in and tapping keys

Experiment. No.8

Convex lens, concave lens, convex mirror, concave mirror

Experiment. No.9

Core/hollow wooden cylinder, insulated wire, ferromagnetic rod

Experiment. No.10

Transformer core, insulated wire

B. List of Practicals

Note: The following experiments may be carried out in an experiential manner rather than recording observations.

1. To determine the resistance per cm of a given wire by plotting a graph between voltage and current.
2. To verify the laws of combination (series/parallel combination) of resistances by ohm's law.
3. To find the resistance of a given wire using a meter bridge and hence determine the specific resistance (resistivity) of its material.
4. To compare the e.m.f of two given primary cells using a potentiometer.
5. To determine the resistance of a galvanometer by half deflection method.
6. To identify a
   (i) diode, transistor and IC
   (ii) resistor, capacitor and inductor,
   from a mixed collection of such items.
7. To understand the principle of (i) a NOT gate (ii) an OR gate (iii)an AND gate and to make their equivalent circuits using a bell and cells/battery and keys /switches.
8. To observe the difference between
   (i) a convex lens and a concave lens
   (ii) a convex mirror and a concave mirror
   and to estimate the likely difference between the power of two given convex / concave lenses.
9. To design an inductor coil and to know the effect of
   (i) change in the number of turns
   (ii) introduction of ferromagnetic material as its core material
   on the inductance of the coil.
10. To design a (i) step up (ii) step down transformer on a given core and know the relation between its input and output voltages.

C. Sample Questions

Experiment No.1

1. State the nature of the graph between the current (I) flowing through a conductor and the potential difference (V) applied across it.

2. Name, from the following, the device for which Ohm's law is most likely to be valid:

   (i) A metal wire resistor (ii) A semi conductor diode

   (iii) The electrolyte in a cell

3. A student sets up a circuit for finding the resistance of a given length of a metal wire. He connects the voltmeter in series with the wire and the ammeter in parallel across it.

   State the correction, if any, needed in this circuit.

Experiment No.2

4. A student finds that when a given battery is connected across two resistors, P and Q one by one, the currents drawn from the battery are I, and I_2 respectively.

   The two resistors are now joined in parallel and this combination is connected across the same battery. How would the current drawn from the battery now compare with I_1 and I_2.

5. A student finds that when a given battery is connected across two resistors, P and Q one by one, the currents drawn from the battery are I, and I_2 respectively.

   The two resistors are now joined in series and this combination is connected across the same battery. How would the current drawn from the battery now compare with I_1 and I_2.

6. Two resistors X and Y are joined first in series and then in parallel with each other. The equivalent of the two combinations one S and P, respectively which of the two S and P, will be the smaller of the two?

Experiment No 3.

7. In a given meter bridge set up, the null point is obtained at a length *l* cm. If without making any other change, the radius of the meter bridge is doubled, what would be the likely position of the null point now?

8. Why do we use thick copper strips to connect the wire of the meter bridge to the rest of the set up?

9. Name the SI unit of the specific resistance (resistivity).

Experiment No.4

10. Name the device that is preferred for comparing the emf's of two cells.

11. The p.d. across a length L of the potentiometer wire, equals V. What is the potential gradient across this wire?

12. The potential gradient, across a given potentiometer wire, equals k. Find the length at which a null point would be obtained for a cell of emf E.

Experiment No.5

13. A student correctly sets up a circuit for finding the resistance of a galvanometer by half deflection method. Did she connect a fixed high resistance in series, or in parallel, to the galvanometer, in her circuit?

14. In the half deflection method, how is the value of the adjustable resistance related to the galvanometer resistance when the deflection becomes half of its original value?

15. Name the method in which a high resistance and an adjustable resistance are used for setting up a circuit for finding the resistance of a galvanometer.

Experiment No.6

16. State the number of 'wires' that are then coming out of a (i) diode (ii) Transistor

17. Do we have two wires, three wires or more wires that are a part of an IC?

18. Which of these three (i) a resistor (ii) a capacitor (iii) an inductor is

    most likely to be like a cylindrical coil?

    Or most likely to be like a flattish dish?

Experiment No.7

19. A student sets up the equivalent of a NOT gate by connecting a key (K) a battery and a bell in series and by putting a switch (s) in parallel across the bell.

    The key K is plugged in. Will the bell produce a sound when the switch S is also plugged in?

20. A student sets up the equivalent of an OR gate by connecting the parallel combination of two keys K_1 and K_2 in series with a cell and a battery. Will the bell produce a sound when one of the keys K_1 is plugged in while the other key K_2 is kept plugged out?

21. A student sets up the equivalent of an AND gate by connecting a battery, a bell and two keys K_1 and K_2 all in series with one another.

    State the condition under which the bell will produce a sound in this circuit.

Experiment No.8

22. State the difference between the thickness at the centre and at the edges for a convex lens and a concave lens.

23. Which of the two : a convex mirror and a concave mirror protrudes more at the centre as compared to edges?

24. To which type of mirror does a (i) convex lens (ii) concave lens correspond with regard to the nature of image formation.

Experiment No.9

25. How does the inductance of an inductor change when the number of turns, in its coil, increase?

26. A student prepares an inductance by winding a number of insulated turns of a wire on a hollow woolen cylindrical core. How would the inductance of this set up change when a soft iron rod is introduced in the core of the cylinder?

27. A given length of straight insulated wire is 'coiled up'. How is this likely to affect the inductance of the wire?

Experiment No.10

28. Give one example of a set up/device in which a step-down transformer is used.

29. Does the type of transformer used for transmission (of electrical power) at a 'power station' cause an increase or decrease in the 'voltage' of the electric power produced by the generator?

30. Keeping the number of turns of the primary coil unchanged the number of turns in the 'secondary coil' (of a given transformer) is doubled. If the input voltage is now made half of its earlier value, how would be output voltage compare with its earlier value?

Chemistry

Class- XI

Evaluation scheme

Time: 2hrs. **Max. Marks: 30**

Practical Record	5 marks
Viva	10 marks
Written test (Based on given/prescribed syllabus)	10 marks
Identification/Familiarity with the apparatus	5 marks
Total	**30 marks**

A. List of apparatus for identification

Experiment A & C

Beaker, Tripod stand, Wire gauze, glass rod, funnel, filter paper, Bunsen burner.

Experiment B & E

Test tube, test tube stand, dropper, test tube holder, ignition tube, china dish, tongs, funnel, tripod stand, wire gauze, Bunsen burner.

Experiment D

Standard flask, pipette, burette, conical flask, funnel, clamp stand, dropper, wash bottle, filter paper.

Identification/familiarity with the apparatus

- Odour detection in qualitative analysis
- Procedure/Setup of the apparatus

B. List of Experiments

Note: The following experiments may be carried out in an experiential manner rather than recording observations.

A. **Characterization and Purification of Chemical Substances**

1. Crystallization of an impure sample of any one of the following: copper sulphate, benzoic acid

B. **Experiments based on pH**

2. Determination of pH of some solutions obtained from fruit juices, solutions of known and varied concentrations of acids, bases and salts using pH paper
3. Comparing the pH of solutions of strong and weak acids of same concentration.

C. **Chemical Equilibrium**

4. Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either ions.
5. Study the shift in equilibrium between $[Co(H_2O)_6]^{2+}$ and chloride ions by changing the concentration of either of the ions.

D. **Quantitative estimation**

6. Preparation of standard solution of oxalic acid.
7. Determination of molarity of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.

E. **Qualitative Analysis**

8. Determination of one anion and one cation in a given salt
   Cations – $NH4^{+}$
   Anions – $CO3^{2-}$, S^{2-}, $SO3^{2-}$, CI^{-}, CH3COO-

   (Note: insoluble salts excluded)

9. Detection of Nitrogen in the given organic compound.
10. Detection of Halogen in the given organic compound.

C. Sample questions

Experiment no. 1

1. Two impure samples of copper sulphate and benzoic acid are to be purified by crystallization technique. The following solvents are available to dissolve the given samples:

   Water and benzene

   Which is a better choice and why?

2. During the crystallization technique, after the concentrated solution of the impure sample was heated for some time, the teacher removed a drop of the solution by a glass rod and cooled it by blowing. What is the purpose of this particular step?
3. During the process of crystallization, Seema obtained small sized crystals of copper sulphate whereas Pari obtained one big sized crystal. Who obtained better crystals? Justify.

Experiment no. 2 & 3

4. Write two safety measures to be taken while testing the samples for their pH values.
5. A student was given the following samples:
   a. Soap solution
   b. Lemon juice
   c. A solution of baking soda
   d. Water

   Write the approximate pH values for the above samples.

6. A student took a sample of acetic acid in a test tube and determined its pH. Out of curiosity, he added a small amount of sodium acetate to the above sample. Will there be any change in pH of the resulting solution. Explain.
7. Are the pH values of the samples tested consistent? Why?
8. Determine the pOH of a solution of Hydrochloric acid (HCl) having concentration 10^{-2} M.
9. Ashok tested a sample of pure water and found its pH to be 7. He accidentally dropped few drops of Sodium hydroxide (NaOH) in the tested sample. Will it affect the pH of water? Explain.

Experiment no. 4&5

10. What happens when hydrochloric acid (HCl) is added to a solution of cobalt chloride?
11. In the given equilibrium reaction:

$[Co(H_2O)_6]^{2+}$ (aq.) + 4 Cl^- (aq.) $\longrightarrow$ $[CoCl_4]^{2-}$ (aq.) + 6 H_2O
Pink Blue

How is the colour of the solution affected by the addition of HCl? In which direction will the equilibrium shift?

12. When solutions of ferric chloride and potassium thiocyanate are mixed in an appropriate proportion, the yellow colour of the solution changes gradually to red at equilibrium. Following is the reaction:

Fe^{3+} (aq.) + SCN^- (aq.) $\longrightarrow$ $FeNCS^{2+}$ (aq.)
Yellow Colourless Red

What is the effect of adding the potassium chloride solution to the above reaction mixture?

13. Equilibrium is dynamic in nature. Justify the statement.
14. In the given equilibrium:
Fe^{3+} (aq.) + SCN^- (aq.) $\longrightarrow$ $FeNCS^{2+}$ (aq.)
Yellow Colourless Red

If KNCS solution is added, the intensity of the red colour increases. Explain.

15. What conditions other than concentration, could affect the position of equilibrium?

Experiment No. 6

16. To prepare a 100 mL standard solution of M/10 oxalic acid in water, what should be the amount of oxalic acid to be weighed in grams?
17. Mention a precaution that may be followed while preparing a standard solution of Oxalic acid.
18. A student prepared a standard solution of oxalic acid and used it for the volumetric analysis the next day. Will the molarity of the oxalic acid solution change? What type of standard solution is oxalic acid?

Experiment No. 7

19. A student titrated M/10 standard solution of oxalic acid against Sodium hydroxide solution of unknown molarity. The volume of Sodium hydroxide required to titrate against 10mL of oxalic acid is 20.0mL. Calculate the molarity of the given Sodium hydroxide solution using the following equation:

$$2NaOH + (COOH)_2 \rightarrow (COONa)_2 + H_2O$$

20. What type of titration is involved when oxalic acid is titrated against Sodium hydroxide solution? Name the type of reaction involved.
21. The following indicators are provided to a student for Sodium hydroxide versus oxalic acid titration: Methyl orange, Phenolphthalein, Methyl red

How will a student select the appropriate indicator?

Experiment No. 8

22. When an unknown salt is treated with dilute H_2SO_4 solution , the gas liberated has a suffocating smell which when passed through Potassium dichromate turns green. What could be the ion present in the given salt?

23. While carrying out the Chromyl chloride test for the confirmation of chloride ions in the given unknown salt, a student used water extract of the salt. The student did not get a positive test, even though chloride ions were present in the salt. Explain.

24. A student added NaOH to the given salt and heated. He observed the evolution of a gas which gave dense white fumes when a glass rod dipped in HCl was brought closer to the mouth of the test tube. Identify the gas evolved and give a confirmatory test for the ion present in the salt.

Experiment No. 9 and 10

25. During Lassaigne's test for the identification of Nitrogen in the given organic compound, only freshly prepared ferrous sulphate solution is used. Justify.

26. In the preparation of Lassaigne's extract for the detection of Nitrogen and halogens in the organic compound, what is the purpose of fusion of the organic compound with Sodium metal?

27. Lassaigne's extract is alkaline in nature. Explain.

28. An organic compound contains chlorine as an extra element. Give a chemical test to confirm the presence of chlorine in the given organic compound.

29. A student prepared Lassaigne's extract of an organic compound containing nitrogen. On heating the extract with freshly prepared Ferrous sulphate solution and acidifying with dilute sulphuric acid, a bluish green precipitate is obtained. What is the chemical composition of this precipitate?

30. Can metal Potassium be used instead of Sodium for the preparation of Lassaigne's extract?

Class-XII

Evaluation scheme

Time: 2hrs. Max. **Marks: 30**

Practical Record	5 marks
Viva	10 marks
Written test (Based on given/prescribed syllabus)	10 marks
Identification/Familiarity with the apparatus	5 marks
Total	**30 marks**

A. List of Apparatus for identification

Experiment A

Surface Chemistry /**Experiment E**: Preparation of Potash Alum

Beaker, glass rod, tripod stand, wire gauze, Bunsen burner

Experiment B

Chromatography

Whatman filter paper, gas jar, capillary tube, Pestle and mortar

Experiment C, D, G

Test tubes, tongs, test tube holder, test tube stand

Experiment F

Volumetric Analysis

Burette, Pipette, conical flask, standard flask, clamp stand, Tripod stand, burner, wire gauze, funnel, filter paper

Hands-on Assessment

- Identification /familiarity with the apparatus (list attached)
- Odour detection in qualitative analysis

B. List of Practicals

Note: The following experiments may be carried out in an experiential manner rather than recording observations.

The experiments have been divided into two sections: Section A and Section B. The experiments mentioned in Section B are mandatory.

SECTION- A

A Surface Chemistry

(1) Preparation of one lyophilic and one lyophobic sol

Lyophilic sol - starch, egg albumin and gum

(2) Preparation of one lyophobic sol

Lyophobic sol - Ferric hydroxide

B Chromatography

(3) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f values (distance values may be provided).

C Tests for the functional groups present in organic compounds:

(4) Alcoholic and Carboxylic groups.

(5) Aldehydic and Ketonic

D (6) Characteristic tests of carbohydrates and proteins in the given food stuffs.

E (7) Preparation of Inorganic Compounds- Potash Alum

SECTION-B (Mandatory)

F Quantitative analysis

(8) (a) Preparation of the standard solution of Oxalic acid of a given volume

(b) Determination of molarity of $KMnO_4$ solution by titrating it against a standard solution of Oxalic acid.

(9) The above exercise [F 8 (a) and (b)] to be conducted using Ferrous ammonium sulphate (Mohr salt)

G Qualitative analysis:

(10) Determination of one cation and one anion in a given salt.

Cation –NH_4^+

Anions – CO_3^{2-}, S^{2-}, SO_3^{2-}, Cl^-, CH_3COO^-

(Note: Insoluble salts excluded)

C. Sample Questions

Experiment No. 1 and 2

1. Ram and Anuja prepared Ferric hydroxide sol. Ram prepared it in tap water while Anuja prepared it in distilled water. Whose method is correct? Justify your answer.
2. Why Ferric hydroxide sol cannot be prepared directly by adding water to ferric hydroxide?
3. Give the chemical equation involved in the preparation of Ferric hydroxide sol.

4. Frank and John wanted to prepare a starch sol in the laboratory. Frank added the starch powder directly to the boiling water whereas John made a paste of starch in cold water and then added it to the boiling water. The teacher pointed out that Frank's method was not correct. Explain why Frank's method is incorrect.
5. How is a Ferric hydroxide sol different from a starch sol?
6. Out of lyophilic and lyophobic sol, which can be easily converted to a gel and why?

Experiment No. 3

7. Two components A and B were separated using paper chromatography technique. The distance travelled by component A is 5.6 cm while the distance travelled by the solvent is 7.0 cm. Calculate the R_f value (Retardation factor) of component A.
8. A student was given an experiment to separate the pigments from the extract of the leaves using chromatography technique. Suggest the stationary and the mobile phase that may be used in the experiment.
9. What is the basis of separation of various components in chromatographic technique? Explain the significance of R_f .

Experiment No. 4

10. Two samples A and B are given to a student. One of the samples contains carboxyl group. Name the reagent/ compound used to detect the presence of carboxyl group. Write the chemical equation involved.

11. Name the reagent that can react with both alcoholic and carboxyl group in the two samples of the organic compound. Which chemical test can help to identify the gas evolved in both the cases?
12. A student was asked to perform the sodium metal test for the detection of alcoholic group in the given organic compound. The teacher instructed the student to use a dry test tube for the above test. Explain.

Experiment No. 5

13. A student took a small amount of Silver nitrate in the test tube and added Sodium hydroxide to it. A grey precipitate was formed which dissolved in Ammonium hydroxide solution. What is this clear solution known as? Which functional group is identified/ detected by the above solution?
14. Following four samples of organic compounds were taken in four test tubes. Excess of solid Iodine was added to each one of them followed by the addition of sodium hydroxide solution.
    Sample A: Acetaldehyde
    Sample B: Acetone
    Sample C: Benzophenone
    Sample D: Butanone
    Which of the above samples will give a positive test? Name the above test.
15. Give the chemical composition of Fehling B solution. Give the chemical equation involved when Fehling A & Fehling B solutions are added in equal amounts to ethanal and heated.

Experiment No. 6

16. Name the test in which conc. HNO_3 is used to test the presence of proteins in the given sample of the food stuff. What is the role of HNO_3 in the test?
17. A reagent is prepared using β-naphthol and is used to detect the presence of carbohydrates in the food stuff. Identify the reagent and give the method for its preparation.
18. When equal volumes of Fehlings A and Fehlings B solution are added to a sample of carbohydrate and heated, a red precipitate is observed. Give an example of a carbohydrate which gives the above test and an example of a carbohydrate which does not give the above test.

Experiment No. 7

19. Crystals of Potash alum had to be prepared in the laboratory. Alex and Tina prepared a solution of the constituents required for the preparation. Alex heated the solution for some time while Tina left it at room temperature. Who will get better crystals? Explain in brief.
20. Name two salts that are used in the preparation of Potash alum crystals? What is the approximate ratio of the two salts taken to obtain a good yield of the crystals?

21. Sulfuric acid is used rather than nitric acid for acidification in the preparation of Potash alum. Explain briefly.

Experiment No. 8

22. The oxalic acid solution should be heated before carrying out the titration with $KMnO_4$. Why? What happens if the solution starts boiling?
23. Write the ionic equation involved in the $KMnO_4$ vs. oxalic acid titration and identify the substance reduced in the reaction.
24. Oxalic acid solution is acidified using dilute Sulphuric acid before titrating it with $KMnO_4$. Can any other mineral acid be used for acidifying oxalic acid? Explain.

Experiment No. 9

25. To prepare 100mL of a standard solution of M/10 Mohr salt solution, how much Mohr salt should be weighed in grams? (use molarity formula)
    (Molar mass of Mohr salt = $392 g/mol^{-1}$)
26. While preparing a standard solution of Mohr salt, a student forgot to add dilute Sulphuric acid. Will he be able to get a proper standard solution required for the $KMnO_4$ titration? Justify your answer.
27. While pipetting out the solution in the volumetric analysis experiment, the last drop should not be blown into the conical flask. Why?

Experiment No.10

28. Give a confirmatory test to detect the presence of sulphide ions in the given salt sample.
29. Give the formula of the Nessler's reagent used for the detection of ammonium cation.(NH_4^+)
30. A student took a little amount of crushed egg shells in a test tube and experimented by adding dilute sulphuric acid to it. He observed the evolution of a gas. Identify the gas evolved and the ion present in the egg shell that is responsible for the reaction.

Biology

Class XI

Evaluation scheme

Time: 2hrs. Max. **Marks: 30**

Practical Record	5 marks
Viva	10 marks
Written test (Based on given/prescribed syllabus)	10 marks
Identification/Familiarity with the apparatus	5 marks
Total	**30 marks**

A. Familiarity with the required apparatus/equipment/animal and plant material/chemical etc.

Experiment No. 1

Plants of -

Solanaceae- Brinjal, Petunia, any other

Fabaceae- Rice, Wheat, any other

Liliaceae- Any of the lilies

Experiment No. 2

A compound microscope

Experiment No. 3

Seeds of monocot and dicot- maize and gram or any other

Experiment No. 4

Model of Human skeleton to show –

- Ball and socket joints of girdles and limbs
- Rib cage

Experiment No. 5

Honey comb, Mollusc shell, Models of Pigeon and Star fish

Experiment No. 6

Mushroom, petridish

Experiment No. 7

Cacti and succulents

Experiment No. 8

Raisins, beaker, water, sugar solution

Experiment No. 9

- ❖ Potatoes, scalpel, sugar solution, common pins
- ❖ Chromatography paper, Chromatography chamber, alcohol, water

Experiment No. 10

Specimen/model of Cockroach

B. List of experiments

Note: The following experiments may be carried out in an experiential manner rather than recording observations.

1. Study three locally available common flowering plants of the families – Solanaceae, fabaceae, Liliaceae and identify

- Types of roots as Tap and Adventitious
- Types of stem as Herbaceous or woody
- Types of leaf as Compound or Simple

2. Study the parts of a compound microscope- eye piece and objective lenses, mirror, stage, coarse focus knob

3. Differentiate between monocot and dicot plants by counting the number of cotyledons

4. Study the following parts of human skeleton

- Ball and socket joints of thigh and shoulder

- Rib cage

5. Study the given specimen (animal): honey bee through comb, snail through shell, Pigeon through model, Starfish through model

6. Identify the given specimen of a fungus - Mushroom

7. Study the adaptive features of xerophytic plants

8. Study of osmosis through endosmosis in raisins

9. Identify and relate the given experimental set up with aim of experiment :

-Paper Chromatography

or

-Potato Osmometer

10. Study the external features/morphology of cockroach through model

C. Sample Questions

Experiment No. 1

1. Touch and identify the given stem as herbaceous or woody. Also state the reason for your identification.

2. Identify the given leaf as simple or compound. State the basis of your identification.

3. Identify the root as tap or adventitious and state the basis of identification.

4. Touch and feel the material and identify it as root, shoot or flower of a plant. You may also smell it.

Experiment No. 2

5. Which two lenses are responsible for magnification of an object seen under the microscope?

6. What is the function of the mirror/stage/focussing knob in a microscope?

Experiment No. 3

7. Identify the given material as seeds of dicot or monocot plant and state the basis of identification.

Experiment No. 4

8. Where are the ball and socket joints found in the human skeleton and why?

9. Keeping the position of ribs in view, what can be the major function of rib cage in humans?

Experiment No. 5

10. Identify by touching the given part of a specimen and state which animal it is a part of?

11. Hear the sound clip carefully and identify the animal. (Sound of bird chirping/singing)

Experiment No. 6

12. Touch and identify the given organism and state the character on the basis of which it has been identified. (Mushroom)

Experiment No. 7

13. Identify the given plant specimen and state its habitat. (Cactus)

Experiment No. 8

14. Which kind of osmosis is demonstrated in the set up? Also define osmosis.

Experiment No. 9

15. Which phenomenon is being carried out in the experimental set up given here? Give reasons why you think so. (Paper chromatography)

Experiment No. 10

16. Write any two distinguishing features of the organisms whose model is provided to you. State a feature which is used for classifying it under phylum Arthropoda. (Cockroach)

Suggested viva questions

Experiment No. 1

1. If you were asked to identify tap root from adventitious roots, how will you distinguish by touching them?

2. What are the roles of root, stem and flower in the plants?

3. Give the scientific name of any plant which you used in the practical class.

Experiment No. 2

4. Which kind of lens, concave or convex, is used in the microscope?

5. What is the role of the mirror in a microscope?

6. what is microscope used for?

Experiment No. 3

7. What is the function of cotyledons in a germinating plant?

Experiment No. 4

8. Point out one ball and socket joint and the rib cage in your body.

Experiment No. 5

9. What are the roles of shell in a snail, beak in a bird, wings in a cockroach?

Experiment No. 6

10. What does the mushroom feed on?

Experiment No. 7

11. State two ways in which a cactus is different from a common garden plant and also state the reason behind this difference.

Experiment No. 8

12. Give one difference between exosmosis and endosmosis.

13. Why is osmosis an important phenomenon for living cells?

Experiment No. 9

14. State the principle underlying the use of chromatography for separating components of a mixture.

Experiment No. 10

15. Why is cockroach placed in the phylum Arthropod

Class XII

Evaluation scheme

Time: 2hrs. Max. **Marks: 30**

Practical Record	5 marks
Viva	10 marks
Written test (Based on given/prescribed syllabus)	10 marks
Identification/Familiarity with the apparatus	5 marks
Total	**30 marks**

A. Familiarity with the required apparatus/equipment/animal and plant material/chemical etc.

Experiment No.1

Beaker, flask, petridishes, soil from different sites- sandy, clayey, loamy

Experiment No.2

Small potted plants, aluminium foil, paint brush

Experiment No.3

Beaker, test tubes, starch solution, iodine, ice cubes, Bunsen burner/water bath

Experiment No.4

Large colourful flowers, Maize inflorescence

Experiment No.5

Model of developmental stages highlighting morula and blastula of frog

Experiment No.6

Beads of different shapes (cubes, round) /size, smooth and rough

Experiment No.7

Beads of different shapes (cubes, round) / size, smooth and rough

Experiment No.8

Tags of different shapes, bags

Experiment No.9

Ascaris

Experiment No.10

Cacti (opuntia, mammalaria)

B. List of experiments

Note: The following experiments may be carried out in an experiential manner rather than recording observations.

1. Study of the soil obtained from at least two different sites for their texture and water holding capacity.

2. Study of presence of suspended particulate matter in air at two widely different sites.

3. Study of the effect of different temperatures on the activity of salivary amylase.

4. Study of flowers adapted to pollination by different agencies (wind, insects).

5. Identification of T.S of morula or blastula of frog.

6. Study of Mendelian inheritance pattern using beads of different colour/sizes.

7. Prepararation of pedigree charts of genetic traits such as rolling of tongue, colour blindness.

8. Study of emasculation, tagging and bagging by trying out an exercise on controlled pollination.

9. Identify common disease causing organisms like *Ascaris* and learn some common symptoms of the disease that they cause.

10. Comment upon the morphological adaptations of plants found in xerophytic conditions.

C. Sample Questions

Experiment No.1

1. You were asked to touch three different samples of soil kept in three different petri dishes. The samples were of equal amount and same amount of water was poured over each of the samples. How will you identify as to which of these is sandy soil?

2. You are given three samples of soil. What will you do to identify the one with maximum water holding capacity?

Experiment No. 2

3. You were given two pots having same plant growing at two different sites, one getting fresh air and another growing at a traffic junction. How will you distinguish one from the other?

4. You are told that one of the two identical plants of the same age are grown in a home in the interior of a colony and another in a home near the main road. The two plants showed difference in their rate of growth and colour and lustre of leaves. Which one do you think would have dull looking leaves and why?

Experiment No. 3

I used my saliva to make a solution and then placed it in three test tubes. Starch solution was added to all these test tubes containing saliva. Then one I kept in a water bath at 37^0C and called it A, one in ice cold water; called it B and another one in boiling water and called it C. After ten minutes, I added iodine solution to the tubes and found that the change in iodine was not the same in all three tubes.

5. In which tube did it not turn black and why?

6. Why did it turn black in others?

Experiment No. 4

7. You are provided with two kinds of flowers. Touch and feel them and say which one is insect pollinated and why do you think so?

Experiment No. 5

8. Here is a model made of thermocol which shows sections through few stages of development of a frog. Feel and identify the 'Blastula stage'.

9. Plaster cast model of three stages of development of an animal are placed in front of you, one looks like a ball of cells and other has a cavity in between cellular layers. You have to make your friend feel the blastula.

i) Which one will you show him/her?

ii) Which is the other stage?

Experiment No. 6

10. We are using square and round beads for observing Mendelian inheritance. Square beads represent the dominant allele and round beads represent the recessive. How will you place a pair of beads to show heterozygous and homozygous dominance?

11. Derive with the help of beads, the probability of a child getting a recessive trait from two heterozygous parents.

12. If father is colour blind, what are the chances of his son being colour blind?

13. When does a child express a recessive trait such as colour blindness? Speak in context of the parents.

Experiment No. 7

14. You are given small cubes and small balls to prepare a pedigree chart for Anoops's trait of rolling tongue. His parents are unable to roll their tongue but both of his grandmothers can. Cubes represent male and round balls with smooth surface represent females. Rolled tongue is shown by balls with rough surface. How will you show the inheritance of Anoop's rolling tongue trait with the help of cubes and balls?

15. Cubes with smooth surface represent male and balls with smooth surface represent females, colour blind males are represented by the cubes having rough surface. Draw a pedigree chart indicating colour blindness in Rehman whose father and mother are not colour blind.

16. Rehman marries Reena who is without any history of colourblindness in the family. They have a boy and a girl. What kind of colour vision will they have?

Experiment No. 8

You were asked to set up an experiment on controlled pollination. Enumerate the steps in a sequence.

17. What precaution will you take during emasculation of a flower for controlled pollination?

18. Why is removal of stamens termed as emasculation?

19. Why is tagging and bagging needed for experiments on controlled pollination?

Experiment No. 9

20. Feel the worm *(Ascaris)* (preserved specimen or model), name it and comment on the disease it causes.

21. How does this worm reach the intestine of an uninfected human?

22. Describe the shape of round worm that causes Ascariasis.

23. A person was suffering from intestinal discomfort and found a long slender worm in the faeces one day. Which worm could it be and what disease does it cause?

Experiment No. 10

24. Touch and feel the specimen provided. Comment on the spines and the succulent part and relate them to life under desert conditions

25. Why are leaves modified into spines in the cacti?

26. Why do the stems of cacti feel thick and spongy (or succulent)?

Suggested Viva questions

Experiment No.1

1. You are asked to collect soil of two different kinds. Name two places from where you shall collect them.

2. Which soil out of these would you be able to recommend to your mother for growing vegetables based on your feeling of its texture when dry and wet?

Experiment No.2

3. You are going alone to keep a plant at a place where a lot of dust settles on it. How will you identify the place?

4. You are given two leaves of approximately same size, texture and shape. When you feel them you will make out which one was in an area with lot of SPM, how?

Experiment No.3

5. What happens when,

(a) salivary amylase is added to starch?

(b) Iodine is added to starch?

Experiment No.4

6. A swarm of honey bees was found moving in a particular direction. What do you think was attracting them?

7. How would the attractants get benefitted by the honey bees?

8. What kind of flowers, dull and small or colourful and large, attracts insects? Why is this attraction necessary?

Experiment No.5

9. If you were asked to identify the ‘Blastula stage’ in the series of developmental stages of an animal put in front of you, what would you look for?

Experiment No.6

10. What do heterozygous and homozygous mean?

11. What did Mendel prove by his experiments?

Experiment No.7

12. Why are pedigree charts important?

Experiment No.8

13. Distinguish between self and cross pollination.

14. How can you prevent self-pollination for experimental purposes?

Experiment No.9

15. How can you prevent *Ascaris* infection?

Experiment No.10

16. Why is adaptation to a habitat necessary?