Chapter 6:

LIST OF PRACTICALS AND APPARATUS:

PRACTICALS XI-XII

Grade XI

Chapter 1: Cell Structure and Functions

1. Use of graticule and micrometer to study stomata and cells
2. Measuring the size of primary, secondary cell walls and middle lamella by micrometry
3. Preparation and examination of the slides of animal and plant cells using differential staining

Chapter 2: Biological Molecules

4. Performing Benedict's test for reducing sugars and confirmation of the presence of starch through Iodine test
5. Confirmation of the presence of proteins through Biuret test
6. Confirmation of the presence of lipids through Emulsion test
7. Demonstration of the presence of nucleic acids in biological materials

Chapter 3: Enzymes

8. Performing of chemical test to demonstrate that enzymes are proteins
9. Performing amylase test on starch with boiled amylase and un-boiled amylase in separate test tubes and confirmation through iodine test

Chapter 4: Bioenergetics

10. Extraction of the leaf pigments and their separation by paper chromatography

Chapter 5: Acellular Life

☛ No Practical Activity

Chapter 6: Prokaryotes

11. Identification of bacteria from curd, mouth, or bacterial culture and observation of bacterial culture for different shapes and sizes
12. Staining bacteria using Grams staining technique
13. Preparation and observation of the temporary mount of root nodule bacteria
14. Study of Nostoc, Ocillatoria and Anabaena from fresh or preserved material

Chapter 7: Protists and Fungi

15. Observation and drawing of representative members of each group of protists
16. Observation and drawing labeled diagrams of the life cycle of black bread mold and *Penicillium* from fresh culture and prepared slides

Chapter 8: Diversity among Plants

17. Identification of the vegetative and reproductive structures of *Marchantia* and *Funaria* by examining the fresh or preserved material
18. Identification of the vegetative and reproductive structures of a local fern and a *Pinus* and relate them with the concerned life cycles
19. Study of different types of inflorescence of *Cassia, Brassica*, *Achyranthus*, *Morus*, Candytuft, *Helianthus* and *Avena sativa*
20. Describing the flowers of Rose, *Cassia fistula*, *Solanum nigrum* and *Avena sativa*

Chapter 9: Diversity among Animals

21. Classifying the given invertebrates into phyla and given chordates into classes by using classification key

Chapter 10: Form and Functions in Plants

22. Demonstration of the evolution of CO_2 from leaf discs placed in dark and light, with the help of indicator (hydrogen carbonate)
23. Microscopic observation of the slide of LS of a dicot stem, identifying and drawing vessel element, vessel, and phloem sieve tubes
24. Locating annual rings in the log of a tree and calculation of the age of a plant by counting number of annual rings
25. Demonstration of phototropism, geotropism and thigmotropism in plants
26. Demonstration of the folding of leaf after touch in *Mimmosa pudica*

Chapter 11: Digestion

27. Tests to locate buds on tongue for detection of salt, sweet, sour and bitter taste
28. Microscopic observation of the villi, liver and pancreas from prepared slides

Chapter 12: Circulation

29. Correlating the *lub-dub* sounds of the closing of heart valves with the monitoring of the heartbeat
30. Identification of the phases of heartbeat on a printed ECG and comparison of the ECG of a cardiac patient with that of a healthy man
31. Dissection of the heart of sheep and describing its internal structure
32. Differentiation of an artery and a vein by observing prepared slides
33. Measuring blood pressure by using sphygmomanometer

Chapter 13: Immunity

34. Recognizing phagocytes and lymphocytes while observing prepared slides

Grade XII

Chapter 14: Respiration

35. Identification of different parts of the respiratory and reproductive system of a dissected frog (dissection would be done by the teacher)
36. Examination of sheep lungs
37. Comparison and interpretation of the X-ray films of lungs of a smoker with that of a healthy man

Chapter 15: Homeostasis

- ☛ No Practical Activity

Chapter 16: Support and Movement

38. Identification of the bones of the pelvic girdles, pectoral girdle, arms and legs by using the model of human skeleton
39. Comparison of the structure of skeletal, smooth and cardiac muscles with the help of prepared slides

Chapter 17: Nervous Coordination

40. Observation of the MRI scan of the brain of a sleeping human and compare it with that of a fully awake individual

Chapter 18: Chemical Coordination

- ☛ No Practical Activity

Chapter 19: Behavior

41. Observation of a spider's web and recording the instincts by providing it various stimuli.

Chapter 20: Reproduction

42. Examination of the prepared slides of histology of ovaries and drawing its structures

Chapter 21: Development and Aging

43. Identification of the group of vertebrates, through diagrams of different blastula.
44. Identification of the different stages in chick development through observation of prepared slides

Chapter 22: Inheritance

45. Evaluation of the inheritance of genes and their mixing during fertilization as based on mathematical probabilities
46. Calculation of probability by using the dice to calculate how many times out of 100 throws can students get sixes
47. Data collection from the class to see how many individuals have AB blood group and construction of a pie chart and histogram for the collected data
48. Testing of blood group using Antisera and performing agglutination reaction for Rh factor

Chapter 23: Chromosomes and DNA

- ☛ No Practical Activity

Chapter 24: Evolution

49. Interpretation of different homologous and analogous structures through observation in plants

Chapter 25: Man and His Environment

- ☛ No Practical Activity

Chapter 26: Biotechnology

- ☛ No Practical Activity

Chapter 27: Biology and Human Welfare

- No Practical Activity

REQUIRED APPARATUSES, CHEMICALS, CHARTS, MODELS AND ANIMATIONS

Sr. No.	APPARATUSES	Qty
1.	Balance	10
2.	Beaker (50ml, 100ml, 250ml, 500ml, 1000 ml)	10 Each
3.	Bell jar	20
4.	Blades (Safety razor)	20
5.	Burner (Bunsen)	10
6.	Burner (Spirit Lamp)	20
7.	Conical Flask	20
8.	Cotton Wool	04
9.	Differential air Thermometer	10
10.	Dissecting Board	20
11.	Dissecting Box	20
12.	Dissecting Tray	20
13.	Dropper	20
14.	Funnel 4” and 6” dm	20 Each
15.	Glass Tube	04 Packets
16.	Incubator	01
17.	Inoculation Loop	06
18.	Insect Net	12
19.	Lens Paper	06
20.	Light Source	10
21.	Magnifying Glass	10
22.	Measuring Cylinder	10
23.	Microscope (Compound: 10X eye piece, 4X, 10X and 40X objectives)	20
24.	Microscope (Dissecting)	20
25.	Microscope Cover Slip	04 Packets
26.	Microscope Slide	04 Packets
27.	Petri Dish	20
28.	Pipette (10 ml)	10
29.	Plant Presser	04
30.	Plate (Glass)	06
31.	Potometer	04
32.	Preserved Specimens of representative animals	01 Each
33.	Reagent Bottles	20

34.	Specimen Jars	10
35.	Sphygmomanometer	02
36.	Stop Watch	05
37.	Stopper (Cork)	20
38.	Syringe	10
39.	Test Tube Rack	08
40.	Thermometer	20
41.	Thermos Flask	20
42.	Tripod Stand	10
43.	Watch Glass	20

Sr. No.	PREPARED SLIDES	Qty
44.	Bacteria	02
45.	Cells of onion epidermis and *Hydrilla* Leaf	02
46.	Conjugation in *Paramecium*	02
47.	Mitosis and Meiosis in Onion root tip	02
48.	Nerve Cell	02
49.	Rhizopus and Mushroom	02
50.	Section of Mammalian kidney	02
51.	Sections of animal tissues	02
52.	Transverse Section of Artery, Vein and Capillary	02
53.	Transverse Section of Human Small Intestine	02
54.	Transverse Section of Leaf, Root and Stem of *Brassica*	02
55.	Transverse Section of Mammalian Air sacs	02
56.	Transverse Section of Woody stem	02

Sr. No.	CHEMICALS	Qty
57.	Acetic acid	2.5 Liter
58.	Alcohol	2.5 Liter
59.	Ascorbic acid	2.5 Liter
60.	Benedict's solution	2.5 Liter
61.	Bromothymol blue solution	2.5 Liter
62.	Chloroform	2.5 Liter
63.	Copper sulfate solution	2.5 Liter

64.	Diastase	2.5 Liter
65.	Distilled water	2.5 Liter
66.	Eosine	2.5 Liter
67.	Ethanol	2.5 Liter
68.	Formaline	2.5 Liter
69.	Glucose solution 01%	2.5 Liter
70.	Glycerine	2.5 Liter
71.	Hydrogen carbonate indicator	2.5 Liter
72.	Iodine solution 01%	2.5 Liter
73.	Lime water	2.5 Liter
74.	Methylene Potassium hydroxide blue 01%	2.5 Liter
75.	Starch	2.5 Liter
76.	Sudan III solution	2.5 Liter
77.	Trypsin	2.5 Liter
78.	Wax	2.5 Liter

Sr. No.	CHARTS	Qty
79.	Animal and Plant Cell	01
80.	Biodiversity	01
81.	Biogeochemical Cycles	01
82.	Cell Division	01
83.	Germination	01
84.	Human Body Systems	01
85.	Mandelian Genetics	01
86.	Mechanism of Enzyme Action	01
87.	Plant Propagation	01
88.	Reflex Arc	01
89.	Sexual Reproduction in Plants	01
90.	Structure of DNA	01
91.	Transport of Material in Plants	01

Sr. No.	MODELS	Qty
92.	DNA	01
93.	Human Brain	01
94.	Human Diaphragm and Intercostal Muscles	01
95.	Human Ear	01
96.	Human Eye	01
97.	Human Kidney	01
98.	Human Skeleton	01
99.	Neuron	01
100.	Skeleton of Rabbit	01

Sr. No.	ANIMATIONS	Qty
101.	Antagonistic Muscles	01
102.	Ascent of Sap	01
103.	Crossing Over	01
104.	DNA Replication	01
105.	Heartbeat	01
106.	Kidney Function	01
107.	Nerve Impulse	01
108.	Photosynthesis	01
109.	Polymerase Chain Reaction	01
110.	Pressure Flow Mechanism	01
111.	Recombinant DNA Technology	01
112.	Swallowing and Peristalsis	01
113.	Transcription	01
114.	Translation	01