MARKING SCHEME

TOTAL: 80 MARKS

SECTION A (30 MARKS)

1. Career Day at School (3 marks)

a) Definition of Biology (1 mark)

- Study of living organisms and their interactions

b) Applications (Any 2 ×1 = 2 marks)

- Medicine (treatment/prevention of diseases)
- Agriculture (crop and animal production)
- Environmental conservation
- Food production and preservation

2. Matching Fields and Careers (4 marks)

i – B (Botany – Plant Scientist)
ii – C (Zoology – Animal Scientist)
iii – A (Microbiology – Microbiologist)
iv – D (Genetics – Genetic Engineer)

(1 mark each correct match)

3. Specimen Collection (3 marks)

a) Apparatus (Any 2 ×1 = 2 marks)

- ✔ Sweep net
- ✔ Pooter/aspirator
- ✔ Pitfall trap
- ✔ Forceps

b) Importance (1 mark)

- For study/reference/identification/conservation

4. True/False (3 marks)

a) True
b) False
c) True(1 mark each)

5. Cell Structure (4 marks)

A – Nucleus
B – Cytoplasm
C – Vacuole
D – Cell wall

(1 mark each)

6. Comparison (2 marks)

Any two differences (1 mark each):

- ✔ Plant cell has cell wall; animal cell lacks
- ✔ Plant cell has chloroplast; animal lacks
- ✔ Plant cell has large vacuole; animal has small/none

7. Specialized Cells (3 marks)

Brian – Root hair cell
Amina – Palisade cell
Kevin – Nerve cell

(1 mark each)

8. Chemicals of Life (4 marks)

a) Food substances (Any 3 ×1 = 3 marks)

- ✔ Carbohydrates
- ✔ Proteins
- ✔ Lipids
- ✔ Vitamin C

b) Factor affecting enzymes (1 mark)

- ✔ Temperature / pH / concentration

9. Photosynthesis (2 marks)

- ✔ Light stage – absorption of light energy, splitting of water
- ✔ Dark stage – formation of glucose

(1 mark each)

10. Transport in Plants (2 marks)

a) Xylem – transports water and mineral salts (1 mark)
b) Phloem – transports manufactured food (1 mark)

SECTION B (50 MARKS)

11. Biology Career Fair (8 marks)

a) Factors (Any 2 ×1 = 2 marks)

- ✔ Interest
- ✔ Ability

b) Importance of Biology (Any 3 ×1 = 3 marks)

- ✔ Improves health
- ✔ Food production
- ✔ Environmental conservation
- ✔ Industrial applications

c) Fields & Careers (Any 3 ×1 = 3 marks)

- ✔ Ecology – Environmentalist
- ✔ Genetics – Genetic engineer
- ✔ Microbiology – Lab technologist

12. Specimen Project (8 marks)

a)

i. (pair of) forceps

ii. For picking up small crawling animals e.g. stinging insects.

b) Apparatus (Any 2 ×1 = 2 marks)

- ✔ Sweep net
- ✔ Pooter
- ✔ Pitfall trap
- ✔ Forceps
- ✔ Hand lens

c) Herbarium steps (4 marks)

- ✔ Collect specimen (1)
- ✔ Press and dry (1)
- ✔ Mount on paper (1)

- ✔ Label and store (1)

13. Microscope (8 marks)

a. K-arm L-Mirror

b.

L: Move the body tube/rough focusing/positioning of the specimen.

M: Concentrate light on the stage/object/specimen.

c) Differences (Any 2 ×2 = 4 marks)

- ✔ Light microscope uses light; electron uses electrons
- ✔ Light has low resolution; electron high resolution
- ✔ Light magnification lower; electron higher

14. Enzymes (8 marks)

a) Definition (1 mark)

- ✔ Biological catalysts that speed up reactions

b) Role (2 marks)

- ✔ Speed up reactions
- ✔ Specific to substrates

c) Factors (Any 3 ×1 = 3 marks)

- ✔ Temperature
- ✔ pH
- ✔ Substrate concentration
- ✔ Enzyme concentration

d) Functions of water (Any 2 ×1 = 2 marks)

- ✔ Solvent
- ✔ Transport medium
- ✔ Temperature regulation

15. Chloroplast (6 marks)

a.

1. M – Intergrana;
2. L – Stroma

b. Chlorophyll molecules absorb light energy; light energy is used to split water molecules into hydrogen and oxygen atoms; some light energy is converted into ATP;

c) Importance (Any 2 ×1 = 2 marks)

- ✔ Produces food (glucose)
- ✔ Releases oxygen
- ✔ Basis of food chain
- ✔ Maintains atmospheric balance

16. Transport in Plants (6 marks)

a. K - Root hair
   L - Xylem vessel
b. Water moves from the soil into the root hair by osmosis. Because concentration of cell sap is higher than water in the soil; the cell sap of the root hair is diluted thus making it less concentrated than neighbouring cells; therefore water moves into the neighbouring cell. It is then actively secreted into L.
c. Active transport/diffusion.
d. Factors (Any 3 ×1 = 3 marks)

- ✔ Temperature
- ✔ Wind
- ✔ Humidity
- ✔ Light

17. Gaseous Exchange (6 marks)

a) Sites (Any 2 ×1 = 2 marks)

- ✔ Stomata
- ✔ Lenticels
- ✔ Pneumatophores

b) Mechanism (4 marks)

- ✔ Guard cells control opening/closing (1)
- ✔ Water enters → cells turgid → open (1)
- ✔ Water leaves → flaccid → close (1)
- ✔ Influenced by light/CO_2 (1)

18. Insect Mouthparts (6 marks)

a) Types (2 marks)

- ✔ Biting and chewing
- ✔ Piercing and sucking

b) Adaptations (4 marks)

- ✔ Biting: strong mandibles for chewing
- ✔ Piercing: needle-like for sucking fluids

19. Transport in Animals (6 marks)

a) (2 marks)

i. **Plasma:** The liquid portion of the blood that carries water, salts, and enzymes.
ii. **Red Blood Cells** (Erythrocytes),
iii. **White Blood Cells** (Leukocytes), and
iv. **Platelets** (Thrombocytes)

b) Heart mechanism (4 marks)

- ✔ Atria receive blood (1)
- ✔ Ventricles pump blood (1)
- ✔ Valves prevent backflow (1)
- ✔ Double circulation (1)

20. Respiration (6 marks)

a) Differences (2 marks)

- ✔ Aerobic uses oxygen; anaerobic does not

b) Respiratory quotient (2 marks)

- ✔ Ratio of CO_2 produced to O_2 used

c) Factors (Any 2 $\times 1 = 2$ marks)

- ✔ Temperature
- ✔ Activity level
- ✔ Oxygen availability