

BIOLOGY MODEL QUESTION PAPER 1

Answer key

Section A: Answer any 5 questions

(Each question carries 1 mark)

1. **Bowman's capsule**
 2. **b) Geotropism**
 3. **The large surface area and thin walls of alveoli enhance gaseous exchange efficiency.**
 4. **Haemoglobin**
 5. **Contractile vacuole**
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Section B: Answer any 6 questions

(Each question carries 2 marks)

6. **Comparison of Inspiration and Expiration:**
 - **Movement of diaphragm:**
 - Inspiration: Contracts and flattens.
 - Expiration: Relaxes and moves upward.
 - **Thoracic cavity:**
 - Inspiration: Volume increases.
 - Expiration: Volume decreases.
7. **Significance of Haemoglobin:**
 - Haemoglobin binds to oxygen in the lungs to form oxyhaemoglobin and releases oxygen in tissues.
 - It also helps transport carbon dioxide as carbaminohaemoglobin.
8. **Role of Stomata:**
 - Allows carbon dioxide to enter during photosynthesis.
 - Releases oxygen as a by-product of photosynthesis.
 - Facilitates water vapor loss during transpiration.
9. **Concentration Gradient in Alveolar Exchange:**
 - Oxygen diffuses from alveoli (high concentration) into blood (low concentration).
 - Carbon dioxide diffuses from blood (high concentration) into alveoli (low concentration).

10. **Anaerobic Respiration:**

- Respiration in the absence of oxygen.
- Example: In human muscles during intense exercise, lactic acid is produced.

11. **Differences between Cartilage and Bone:**

- **Cartilage:** Softer, flexible, lacks blood vessels. Found in joints, nose, and ears.
- **Bone:** Hard, rigid, vascularized. Provides structure and support.

12. **Flowchart for Air Passage:**

- Nostrils → Pharynx → Larynx → Trachea → Bronchi → Bronchioles → Alveoli.

Section C: Answer any 5 questions

(Each question carries 3 marks)

13. **Phases of Urine Formation:**

- **Ultrafiltration:** High-pressure filtration in the glomerulus produces filtrate.
- **Reabsorption:** Essential substances (water, glucose, ions) are absorbed back into the blood.
- **Secretion:** Waste substances (urea, hydrogen ions) are secreted into the renal tubule.

14. **Nastic vs. Tropic Movements:**

- **Nastic:** Non-directional movement in response to stimuli (e.g., folding of Mimosa leaves).
- **Tropic:** Directional movement towards/away from stimuli (e.g., phototropism in plants).

15. **Structural Adaptations of Alveoli:**

- Thin walls for diffusion.
- Rich capillary network.
- Large surface area for gas exchange.

16. **Completion of Joint Table:**

Joint Type	Peculiarity	Example
Ball and Socket	Allows movement in all directions	Shoulder Joint
Hinge Joint	Allows back-and-forth movement	Elbow Joint
Pivot Joint	Allows rotational movement	Neck Joint
Gliding Joint	Smooth sliding of bones	Wrist Joint

17. **Role of Lenticels:**

- Small pores on woody stems.

- Facilitate gaseous exchange between internal tissues and the atmosphere.
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Section D: Answer any 2 questions

(Each question carries 4 marks)

18. Diagram and Explanation of Nephron:

- **Labels:**

- Bowman's capsule: Initial site of ultrafiltration.
- Collecting duct: Transports urine to the pelvis.
- Glomerulus: Site of high-pressure filtration.
- Loop of Henle: Concentrates urine.

- **Ultrafiltration:**

Blood enters the glomerulus under high pressure. The walls of the Bowman's capsule act as filters, removing water, glucose, ions, and urea from the blood to form filtrate.

19. Cellular Respiration:

- **Glycolysis:** Occurs in the cytoplasm, does not require oxygen, produces 2 ATP.
- **Krebs Cycle:** Occurs in mitochondria, requires oxygen, produces 28 ATP.
- **Total ATP Yield:** 30 ATP per glucose molecule.

20. Importance of Cartilage in Joints:

- Reduces friction between bones.
- Acts as a cushion to absorb shocks.
- Examples: Found at the tips of ribs, in knees, elbows, and between vertebrae.