



FINAL EXAMINATION MARKING SCHEME 2024-25
BIOLOGY (044)

Class: XI

Duration: 3 Hr

SECTION – A

1. c) Hominidae 1
2. d) They require presence of water for fertilization. 1
3. c) anisogamous 1
4. A. a)-iii, b)-iv, c)-ii, d)-i 1
5. b) Bronchioles and fallopian tube 1
6. c) pre-existing cells 1
7. d) Competition between malonate and succinate for succinic dehydrogenase. 1
8. c) DNA in the cell does not replicate 1
9. c) C4 Plants 1
10. b) Mitochondria synthesise ATP. 1
11. b) *Rana tigrina*. 1
12. b) Ctenophora 1
13. A. Both A and R are true and R is the correct explanation of A. 1
14. B. Both A and R are true and R is not the correct explanation of A. 1
15. B. Both A and R are true and R is not the correct explanation of A. 1
16. D. A is False but R is true. 1

SECTION – B

17. The pancreas is termed a composite gland because it has both exocrine and endocrine functions: 1+1

The pancreas secretes digestive enzymes such as amylase, lipase, and proteases into the duodenum through the pancreatic duct.

Endocrine Function: The endocrine part consists of the Islets of Langerhans, which secrete hormones directly into the bloodstream.

OR

The thymus gland is a primary lymphoid organ essential for the development of the immune system, particularly during childhood. The thymus is the site where T-lymphocytes (T-cells) mature and differentiate. T-cells are crucial for adaptive immunity.

18. When blood pressure increases, the afferent arterioles constrict to reduce blood flow to the glomerulus, preventing an excessive increase in GFR. 2
Conversely, when blood pressure decreases, the afferent arterioles dilate to maintain adequate blood flow and GFR.
19. Dissolution in Plasma :A small amount of CO₂ is directly dissolved in the plasma. 2
CO₂ binds with haemoglobin and other proteins to form carbamino compounds. The binding occurs at the amino groups of proteins (mainly haemoglobin), forming carbaminohaemoglobin.
20. The sigmoid growth curve, also known as the S-shaped curve, describes the growth of a population or organism over time, and is typically characterized by three distinct phases: Lag Phase, growth phase and stationary phase. 2
21. a) Quiescent stage: a phase in the cell cycle where a cell is in a resting or inactive state. It is often associated with the G₀ phase (a resting phase outside the active cell cycle) where cells are metabolically active but not dividing. This stage can be temporary or permanent: 1+1
b) Bivalent: A bivalent is a structure formed during meiosis when homologous chromosomes pair up and undergo synapsis. It consists of two homologous chromosomes, each containing two sister chromatids, making a total of four chromatids. Bivalents are essential for crossing-over.

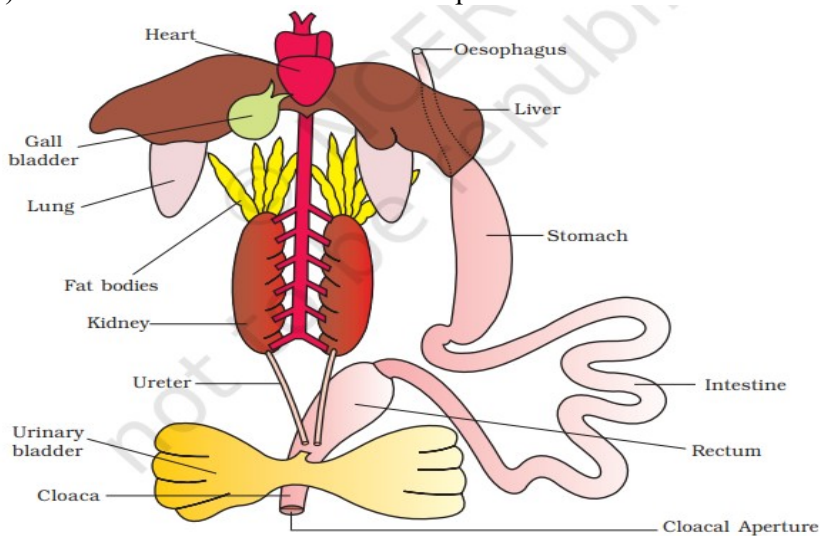
SECTION – C

22. a) C3 Pathway: CO₂ is fixed directly in the mesophyll cells by RuBisCO. 3
C4 Pathway: CO₂ is initially fixed in the mesophyll cells by PEP carboxylase and then transported to bundle sheath cells.
b) Cyclic Photophosphorylation: Electrons are recycled within Photosystem I (PSI), producing only ATP.
Non-Cyclic Photophosphorylation: Electrons flow from water to NADP⁺, producing both ATP and NADPH.
c) Anatomy of Leaf in C3 and C4 Plants: C3 Plants: The mesophyll cells are loosely arranged, and CO₂ fixation occurs directly in these cells.
C4 Plants: The leaf has Kranz anatomy, with bundle sheath cells surrounding the vascular bundles and a distinct arrangement of mesophyll cells.
23. A mesosome is a folded invagination of the plasma membrane found in prokaryotic cells (such as bacteria). It was once thought to be an organelle but is now considered a structural feature involved in various cellular functions. 3

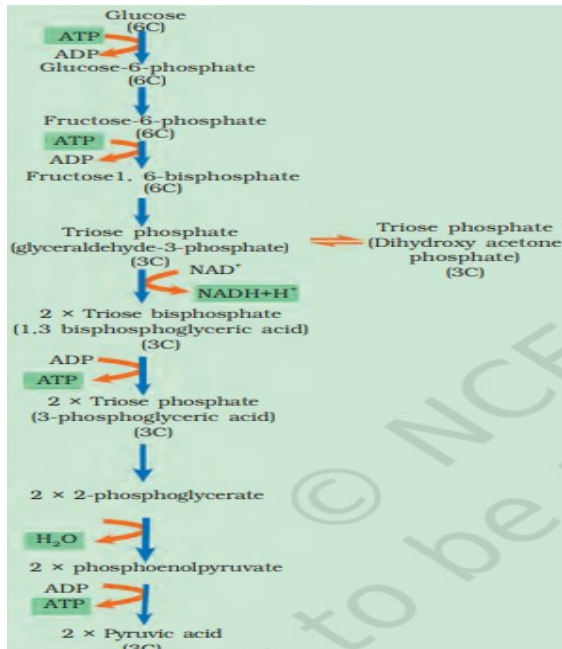
OR

The Endoplasmic Reticulum (ER) is a network of membrane-bound sacs and tubules in eukaryotic cells, involved in the synthesis and transport of biomolecules. It exists in two forms: Rough ER (RER): Studded with ribosomes, involved in protein synthesis and modification. Smooth ER (SER): Lacks ribosomes, involved in lipid synthesis.

24. a) Neurospora: Used in genetic research to study mutations and biochemical pathways. 3
b) Penicillium: Source of penicillin, an antibiotic used to treat bacterial infections.
c) Yeast: Used in fermentation for the production of alcohol and in bread-making.
25. 3



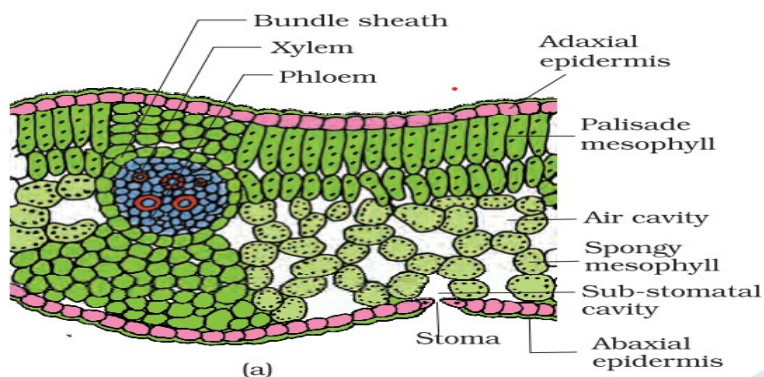
26.



3

27. a) Aestivation: It refers to the arrangement of sepals and petals in a flower bud before it opens. 3
 b) Actinomorphic: It describes flowers that are radially symmetrical and can be divided into equal halves along multiple planes.
 c) Zygomorphic: It refers to flowers that are bilaterally symmetrical and can be divided into equal halves along only one plane.
28. Stomatal Apparatus: 3
 It consists of stomata (pores), guard cells, and subsidiary cells, controlling gas exchange and transpiration in plants.

T.S. of Dicot Leaf:



SECTION - D

Q.no 29 and 30 are case based questions. Each question has subparts with internal choice in one subpart.

29. i) In insects (e.g., cockroaches): Malpighian tubules. In crustaceans (e.g., prawns): Antennal glands or green glands. 4
 ii) Osmoregulation: The regulation of water and ion balance in the body to maintain homeostasis.
- Liver: Converts ammonia into urea and detoxifies substances.
 - Skin: Excretes sweat, which removes water, salts, and small amounts of urea.
30. i) Incomplete Double Circulation: 4
 It occurs in amphibians and reptiles, where oxygenated and deoxygenated blood mix partially

in a three-chambered heart due to a single ventricle.

ii) Open Circulatory System: Blood flows freely in body cavities; no blood vessels (e.g., arthropods).

Closed Circulatory System: Blood flows within vessels; more efficient (e.g., vertebrates).

iii) No Mixing of Blood in Mammals and Birds:

They have a four-chambered heart that completely separates oxygenated and deoxygenated blood, ensuring efficient oxygen supply.

iv) Blood as Connective Tissue: It connects body systems by transporting nutrients, oxygen, and waste products, and contains cells embedded in plasma (a fluid matrix).

Heart as Myogenic: The heartbeat is initiated and regulated by the heart's own muscles (sinoatrial node), independent of nervous input.

SECTION-E

31. Mechanism of Breathing:

5

Breathing involves two phases:

1. Inhalation: The diaphragm contracts and moves downward, intercostal muscles lift the ribcage, increasing thoracic volume and drawing air into the lungs.
2. Exhalation: The diaphragm relaxes and moves upward, intercostal muscles lower the ribcage, reducing thoracic volume and expelling air.

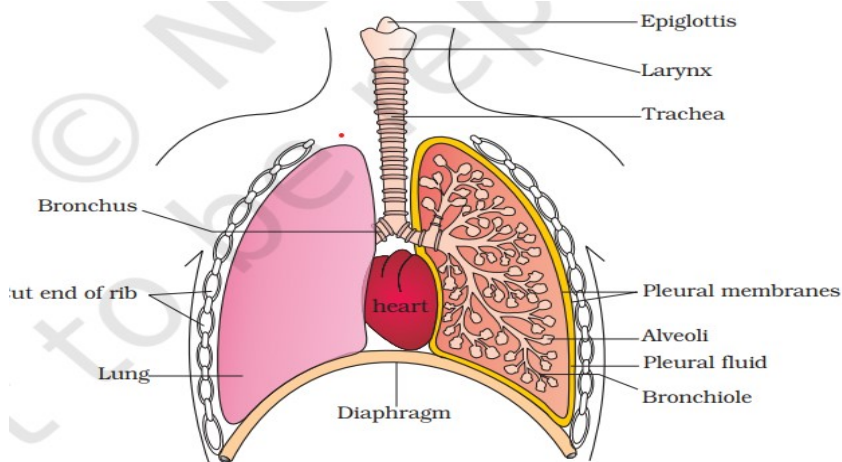
Regulation of Respiration:

Respiration is controlled by the respiratory center in the medulla oblongata and pons, which respond to CO₂ levels, O₂ levels, and pH in the blood.

Emphysema:

A chronic respiratory disease where alveolar walls are damaged, reducing the surface area for gas exchange and causing breathlessness.

OR



Oxygen Dissociation Curve:

It is a graph showing the relationship between hemoglobin saturation and partial pressure of oxygen (pO₂), illustrating how oxygen binds to and releases from hemoglobin in different tissues.

32. a. Polarisation of the Membrane of a Nerve Fibre: 5
The resting state of a nerve fibre where the inside of the membrane is negatively charged compared to the outside due to the differential distribution of ions (high Na⁺ outside, high K⁺ inside).

b. Depolarisation of the Membrane of a Nerve Fibre:
A reversal of membrane polarity occurs when Na⁺ ions rush into the neuron after stimulation, making the inside of the membrane positive.

c. Conduction of a Nerve Impulse Along a Nerve Fibre:
The action potential generated by depolarisation propagates along the axon, with ion exchanges at successive nodes of Ranvier in myelinated fibres.

d. Transmission of a Nerve Impulse Across a Chemical Synapse:
The impulse triggers the release of neurotransmitters from the presynaptic terminal, which diffuse across the synaptic cleft and bind to receptors on the postsynaptic membrane, causing depolarisation.

OR

a. Neural Coordination:
It is the process by which the nervous system integrates sensory inputs and motor responses to maintain body functions and adapt to the environment.

b. Forebrain:
The largest part of the brain, consisting of the cerebrum, thalamus, and hypothalamus, responsible for higher cognitive functions, sensory interpretation, and regulation of homeostasis.

c. Midbrain:
A small part of the brainstem that connects the forebrain and hindbrain, controlling reflexes and visual/auditory responses.

d. Hindbrain:
The lower part of the brain that includes the medulla oblongata, pons, and cerebellum, responsible for vital functions like breathing, balance, and coordination.

33. Mechanism of Muscle Contraction: 5

1. Signal Transmission: A nerve impulse triggers the release of calcium ions (Ca²⁺) from the sarcoplasmic reticulum into the sarcoplasm.
2. Cross-Bridge Formation: Ca²⁺ binds to troponin, causing tropomyosin to move and expose myosin-binding sites on actin filaments.
3. Power Stroke: Myosin heads bind to actin, utilizing ATP, and pull the actin filaments inward, shortening the sarcomere (contraction).
4. Detachment: ATP binds to myosin, releasing it from actin, and the cycle repeats as long as Ca²⁺ and ATP are available.
5. Relaxation: Ca²⁺ is pumped back into the sarcoplasmic reticulum, and the muscle relaxes.

Structure of Contractile Proteins:

- Actin: Thin filament with binding sites for myosin, associated with regulatory proteins troponin and tropomyosin.
- Myosin: Thick filament with globular heads that form cross-bridges with actin during contraction.

