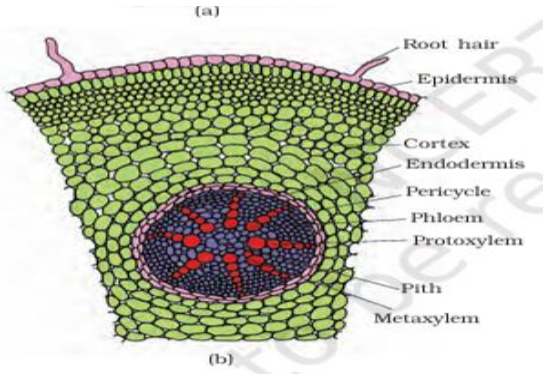
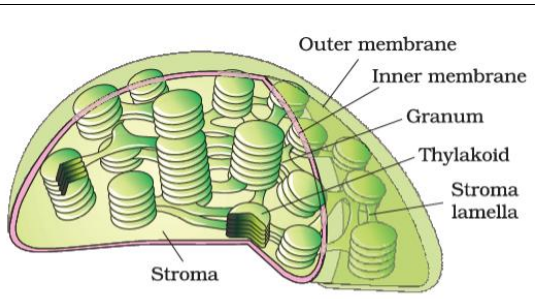
INDIAN SCHOOL AL WADI AL KABIR

ASSESSMENT 2 (2025- 26) ANSWER KEY
SET I1
CLASS XI
BIOLOGY

Section-A		
Q.No.	Questions	Marks
1.	C. Closed and scattered	
2.	B. Endodermis	
3.	C. Nucleated red blood cells	
4.	D. Graph (d)	
5.	B. N = 20, C = 4C	
6.	C. pO_2 ↑, pCO_2 ↓, H^+ ↓, Temperature ↓	
7.	3–Pulmonary artery	
8.	B. (i)-A, (ii)-B, (iii)-C, (iv)-D	
9.	D. C7 T12 L5 S1 C1	
10.	D. ii and iv	
11.	B. Neuronal cell body	
12.	C. FSH and LH from anterior pituitary	
13.	a) Both A and R are true and R is the correct explanation of A.	
14.	c) A is true but R is false.	
15.	d) A is false but R is true.	
16.	c) A is true but R is false.	
Section-B		
17.	(i) A = Metaphase 1 B = Anaphase 1 (ii) Kinetochores: Disc-shaped protein structures on centromere where spindle fibers attach for chromosome movement.	1+1

	OR Two basic phases: 1. Interphase (longer duration) 2. M phase Significance of S-phase: DNA replication occurs, chromosome number remains same, DNA doubles (2C → 4C).	
18.	An active site of an enzyme is a crevice or pocket into which the substrate fits. Thus enzymes, through their active site, catalyse reactions at a high rate. Active sites are formed by the enzyme's tertiary structure, the chain criss-crosses itself and hence, many crevices or pockets are made. OR Competitive inhibition: Inhibitor resembles substrate and competes for active site. Example: Malonate inhibits succinate dehydrogenase.	2
19.	a) Black lung disease/Occupational respiratory disorder b) Dust masks, ventilation, water spraying, health checkups c) Causes: Coal dust inhalation Symptoms: Chronic cough, breathing difficulty, lung fibrosis.	1+1
20.	Renal corpuscle = Glomerulus + Bowman's capsule/correct identification Two disorders detected via urine: Diabetes mellitus, proteinuria, ketonuria, uremia (any two)	1+1
21.	Neuron is polarized due to Na^+ high outside and K^+ high inside with negatively charged proteins; resting potential (OR) Sodium–Potassium pump 3 Na^+ pumped out, 2 K^+ pumped in → maintains resting potential & membrane polarity.	1+1

Section-C		
22.	 (Draw simple corolla diagrams) Twisted: petals overlapping successively in one direction Vexillary : in a flower bud where a large **posterior petal (standard)** overlaps two **lateral petals** Valvate: petals meet at the margin, no overlap	1+1+1
23.	• Epidermis (Piliferous layer) → outermost protective layer, with root hairs. • Cortex → many parenchyma layers for storage. • Endodermis → single layer with Casparian strips. • Pericycle → lateral roots originate from here. • Vascular bundles → polyarch xylem (many xylem patches). Labels required: Epidermis, Cortex, Endodermis, Pericycle, Phloem, Xylem  .	1+1+1
24.	A chloroplast is a double membrane, semiautonomous organelle found in green plant cells. Chloroplasts are double-membrane bound organelles found in plant cells. They contain stroma filled with enzymes, DNA, and 70S ribosomes. Inside the stroma are thylakoids arranged in stacks called grana, interconnected by stroma lamellae. Grana carry out the light reaction, and the stroma performs the dark reaction of photosynthesis.	2+1

<table>
<tr><td></td><td> 

Function: Performs photosynthesis:
Light reaction → in grana
Dark (Calvin cycle) → in stroma</td><td></td></tr>
<tr><td>25.</td><td>Definition:
Graph showing relationship between partial pressure of oxygen (pO_2) and percentage saturation of hemoglobin (Hb) with oxygen.
Shape: Sigmoidal (S-shaped) because of cooperative binding—binding of one O_2 increases affinity for next O_2.
Residual air after forceful expiration:
Residual Volume (RV) = ~1100–1200 mL remains in lungs.</td><td>2+1</td></tr>
<tr><td>26.</td><td>True ribs:
First 7 pairs of ribs directly attached to sternum by costal cartilage.

Rib cage function: protects lungs & plays role in pressure changes for ventilation

Mechanism of breathing:

<table>
<tr><th>Process</th><th>Muscles involved</th><th>Effect</th></tr>
<tr><td>Inhalation</td><td>External intercostal muscles contract, diaphragm contracts & flattens</td><td>Thoracic cavity expands, air enters lungs</td></tr>
<tr><td>Exhalation</td><td>Internal intercostal muscles contract, diaphragm relaxes</td><td>Thoracic cavity reduces, air is expelled</td></tr>
</table></td><td>2+1</td></tr>
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27.

(i) Ureotelism vs Uricotelism

Ureotelism	Uricotelism
Excretes **urea**	Excretes **uric acid**
Less water needed for excretion	Minimum water loss
Mammals, adult amphibians	Birds, reptiles, land snails

(ii) Tubular secretion vs Tubular reabsorption

Tubular Secretion	Tubular Reabsorption
Materials secreted from **blood to filtrate**	Materials returned from **filtrate to blood**
K^+, H^+, NH_4^+, drugs, toxins	Glucose, amino acids, ions, water
Occurs in DCT and collecting duct	Occurs mostly in PCT

(iii) Ascending vs Descending limb of Henle's loop

Descending limb	Ascending limb
Permeable to water	Impermeable to water
No NaCl transport	Actively transports NaCl
Concentrates filtrate	Dilutes filtrate

1+1+1

28.

Meninges: Protective membranes covering brain & spinal cord

Layer	Feature
Dura mater	Outer tough layer
Arachnoid membrane	Middle, web-like, CSF present below it
Pia mater	Inner vascular layer, nourishes CNS

1+1+1

Nerve conduction

Myelinated neuron	Non-myelinated neuron
Has myelin sheath	Lacks myelin
Impulse jumps at **Nodes of Ranvier** (saltatory conduction)	Continuous conduction
Faster (120 m/s)	Slower

29.

A. Basis of modern taxonomy: — 1
Uses evidence from morphology, anatomy, embryology, cytology, molecular biology, biochemistry and evolutionary relationships (phylogeny).

B. Taxonomical hierarchy example (Mango – *Mangifera indica*): — 2
Kingdom → Plantae
Division → Angiosperms
Class → Dicotyledonae
Order → Sapindales
Family → Anacardiaceae
Genus → Mangifera
Species → indica

Difference (Taxonomy vs Systematics):

Taxonomy	Systematics
Identification, classification, naming of organisms	Includes taxonomy + evolutionary and genetic relationships

— 1

OR:

Although both belong to the genus *Solanum*, they differ in:((any two) — 1

- Chromosome number
- Flower/fruit morphology
- Reproductive incompatibility
- Genetic makeup (DNA differences)

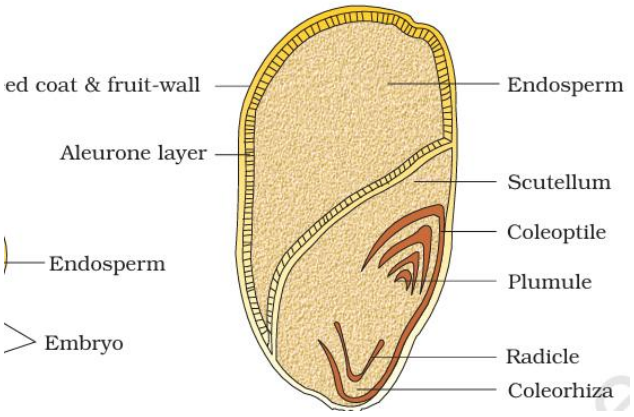
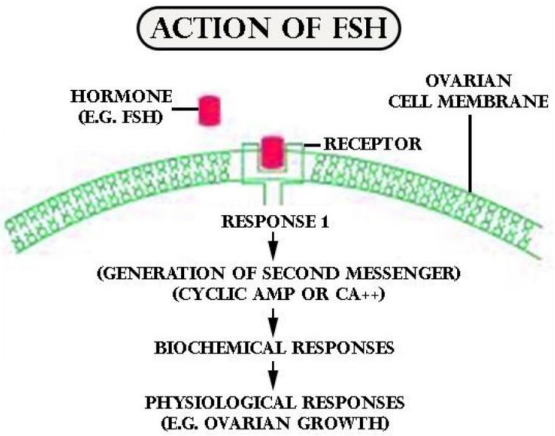
Thus, they are different species.

30.

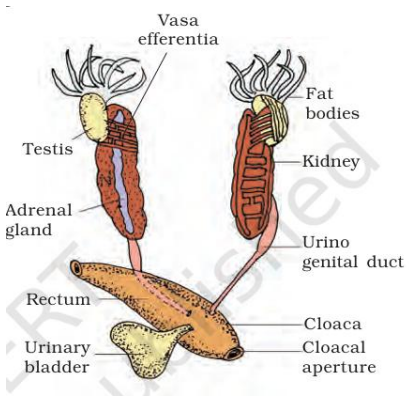
A. Gases transported in dissolved form: — 1

- Oxygen dissolved ≈ 3%
- Carbon dioxide dissolved ≈ 7%

	B. Surface antigens determining ABO group: Antigen A and Antigen B present on RBC membrane. C. Two lymphocytes: T-lymphocytes and B-lymphocytes Difference from basophils: Lymphocytes → specific immunity (antibody production, cell-mediated response) Basophils → release histamine and heparin, function in inflammation & allergy. OR D. Neutrophils and monocytes (6-8 per cent) are phagocytic cells which destroy foreign organisms entering the body. Basophils secrete histamine, serotonin, heparin, etc., and are involved in inflammatory reactions. Eosinophils (2-3 per cent) resist infections and are also associated with allergic reactions.	1 2
31.	Floral formula meaning: ⚥ → Bisexual ⊕ → Actinomorphic K(5) → 5 united sepals C(5) → 5 united petals A5 → 5 stamens, epipetalous G(2) → Bicarpellary ovary, superior, axile placentation Floral diagram includes: Calyx, corolla, stamens, bicarpellary ovary (axile placenta).  (f) **Economic Importance** Many plants belonging to this family are source of food (tomato, brinjal, potato), spice (chilli); medicine (belladonna, *ashwagandha*); fumigatory (tobacco); ornamentals (petunia).	3 2

32	OR  i)	2
	In some seeds such as castor the endosperm formed as a result of double fertilisation, is a food storing tissue and called endospermic seeds.	1
	iii) **pinnately compound leaf** a number of leaflets are present on a common axis, the rachis, which represents the midrib of the leaf as in neem. In **palmately** compound leaves, the leaflets are attached at a common point, i.e., at the tip of petiole, as in silk cotton	2
	 i)	1+1+1
	FSH is a protein hormone and is not soluble in lipid part of the membrane.so it binds to a membrane bound recepter and forms a hormone-receptor complex.The complex does not enter the cell but stimulates the production of second messanger.The second messanger brings about biochemical responses.eg. growth of ovarian follicles.	1 1
	ii) i) Gastrin Target organ: Stomach (gastric glands, especially parietal cells)	2

32.	Functions: 1. Stimulates secretion of HCl from parietal cells. 2. Increases gastric motility and mixing of food. 3. Promotes growth of gastric mucosa. 4. Enhances secretion of pepsinogen from chief cells. ii) Secretin Target organs: Pancreas, Liver, Stomach Functions: 1. Stimulates pancreas to release bicarbonate-rich pancreatic juice which neutralizes acidic chyme. 2. Increases bile secretion from liver. 3. Inhibits gastric acid secretion and delays gastric emptying. 4. Helps maintain optimal pH for action of intestinal enzymes. iii) Cholecystokinin (CCK) Target organs: Gall bladder, Pancreas, Stomach Functions: 1. Stimulates contraction of gall bladder and release of bile into duodenum. 2. Stimulates pancreas to release digestive enzymes (lipase, proteases, amylase). 3. Slows gastric emptying, promoting proper digestion. 4. Plays a role in satiety, reducing hunger. OR Glucagon is called a hyperglycemic hormone because it increases blood glucose concentration. It is secreted by α-cells of pancreas when blood glucose decreases. Actions that increase blood glucose: 1. Glycogenolysis: Breakdown of liver glycogen → glucose 2. Gluconeogenesis: Formation of new glucose from amino acids/fats 3. Lipolysis: Breakdown of fats to provide energy and spare glucose Therefore, glucagon raises blood sugar and maintains normal glucose homeostasis. ii) Target cells of Insulin Insulin acts mainly on: 1. Liver cells (hepatocytes) – promotes glycogenesis 2. Skeletal muscle cells – increases glucose uptake 3. Adipose tissue – increases fat storage 4. Also affects most body cells by increasing glucose transport into cells.	1+1=

	iii) Diabetes mellitus involves high blood sugar due to insulin problems, while diabetes insipidus involves excessive urination of dilute urine due to a problem with the hormone vasopressin (ADH). Diabetes mellitus affects glucose metabolism, whereas diabetes insipidus affects the body's ability to balance water, leading to increased thirst and urination, but without high blood sugar levels. .	
33.	 (i) Why alimentary canal is short? Frogs are carnivorous and proteins are easier to digest than cellulose → shorter gut required. (ii) Two accessory digestive glands: Liver and Pancreas (iii) Absorption in intestine assisted by: • Villi & microvilli increase surface area • Intestinal glands secrete enzymes • Rich blood & lymph supply for transportation of nutrients OR: i)The nervous system is organised into a central nervous system (brain and spinal cord), a peripheral nervous system (cranial and spinal nerves) and an autonomic nervous system (sympathetic and parasympathetic). There are ten pairs of cranial nerves arising from the brain. Brain is enclosed in a bony structure called brain box (cranium). The brain is divided into fore-brain, mid-brain and hind-brain. Forebrain includes olfactory lobes, paired cerebral hemispheres and unpaired diencephalon. The midbrain is characterised by a pair of optic lobes. Hind-brain consists of cerebellum and medulla oblongata. The medulla oblongata passes out through the foramen magnum and continues into spinal cord, which is enclosed in the vertebral column. ii) Ureters function as urino-genital ducts:	2 3 2 1

	They carry both urine & sperm in males. Two venous portal systems in frog: 1. Hepatic portal system – gut → liver 2. Renal portal system – hind limbs → kidneys Special venous connection between liver and intestine as well as the kidney and lower parts of the body are present in frogs. The former is called hepatic portal system and the latter is called renal portal system.	2