

Sample Question Paper - I (Botany)

Answer Key

1		B	1	1
2		D	1	1
3		<ul style="list-style-type: none"> • Rhizobium bacteria contact a susceptible root hair and divide. • The root hair curl and bacteria invade into it. • Infection thread carries bacteria into the cortex and pericycle. • Division and growth of cortical and pericycle cells lead to nodule formation. <p style="text-align: center;">or</p> <p>Diagrammatic representation of steps involved in the formation of root nodules give full score</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
4		<p>1) Pyruvic acid / pyruvate 2) Citric acid / citrate 3) Succinic acid/succinate 4) Oxaloacetic acid/OAA</p> <p style="text-align: center;">or</p> <pre> graph TD Pyruvic acid --> Acetyl CoA Acetyl CoA --> Citric acid Citric acid --> alpha-ketoglutaric acid alpha-ketoglutaric acid --> Succinic acid Succinic acid --> Malic acid Malic acid --> Oxaloacetic acid Oxaloacetic acid --> Citric acid </pre>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
5		<p>Gametophyte of Moss</p> <ul style="list-style-type: none"> • Protonema /creeping, green branched, frequently filamentous structure/its diagram • Secondary protonema/upright axis with spirally arranged leaves and multicellular branched rhizoids/ its diagram <p>Gametophyte of Fern</p> <ul style="list-style-type: none"> • Prothallus • Inconspicuous, multicellular, free living, photosynthetic thallus with male and female sex organs/ Diagram of prothallus 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
6		A) Plasmolysis/Exosmosis	$\frac{1}{2}$	

A		<p>When the cell is placed in hypertonic solution, water moves out of the cell and cell shrinks/Explanation of plasmolysis</p> <p>B) Turgid cell/Endosmosis</p> <p>When the cell is placed in hypotonic solution water diffuses into the cell causing turgor pressure and cell becomes turgid / Explanation of endosmosis.</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
OR B.		<ul style="list-style-type: none"> Glucose prepared at the source end by photosynthesis is converted to sucrose which is transported to phloem sieve tube cells by active transport Phloem becomes hypertonic, water from adjacent xylem moves into it by osmosis Osmotic pressure increases, phloem sap moves to area of lower osmotic pressure - sink. When sugar is removed osmotic pressure decreases and water moves out of phloem. 	OR $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	OR 2
7.	i) ii)	$RQ = \frac{6CO_2}{6O_2} = 1$ glucose is the substrate $RQ = \frac{102CO_2}{145O_2} = 0.7$ fat is the substrate	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
8	a) b)	A. Solanaceae Floral features : bisexual, actinomorphic, five sepals, gamosepalous, valvate, five petals, gamopetalous, valvate aestivation, 5 stamens - epipetalous, bicarpellary, syncarpous superior ovary with axile placentation (any four floral features) / floral formula give $1\frac{1}{2}$ score $\oplus \underset{+}{\overset{\uparrow}{O}} K_{(5)} \overset{\frown}{C}_{(5)} A_5 G_{(2)}$	1 $\frac{1}{2} \times 4$	3
9	a) b)	A. Centromere split and chromatids separate Metaphase <ul style="list-style-type: none"> Spindle fibres attach to kinetochore of chromosomes Chromosomes are moved to spindle equator (any one) or diagrammatic representation Telophase <ul style="list-style-type: none"> Chromosomes cluster at opposite spindle poles Reappearance of nuclear membrane around the chromosome cluster (any one) or Diagrammatic representation 	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3

10	a	Cambium/Intrafascicular cambium	1	3					
	b	• Process of formation of cambial ring	1						
		• Activity of cambial ring and formation of secondary xylem, secondary phloem, secondary medullary rays.	1/2						
		• Formation of annual rings with heart wood and sap wood. (any four sequential steps) or labelled diagram-give 2 score	1/2						
11	a.	B. Mitochondria	1	3					
	b.	Similarities							
		• Double membrane bounded organelle							
		• Matrix with enzymes	1/2						
		• Single circular DNA molecule	1/2						
		• 70S ribosomes (any two)							
		Differences							
		<table><tr><th>Mitochondria</th><th>Chloroplast</th></tr><tr><td>• Presence of cristae/infoldings of innermembrane</td><td>• Presence of pigment containing thylakoids /grana and stroma lamellae</td></tr><tr><td>• Enzymes for aerobic respiration</td><td>• Enzymes for synthesis of carbohydrates</td></tr></table>	Mitochondria	Chloroplast	• Presence of cristae/infoldings of innermembrane	• Presence of pigment containing thylakoids /grana and stroma lamellae	• Enzymes for aerobic respiration	• Enzymes for synthesis of carbohydrates	1/2
Mitochondria	Chloroplast								
• Presence of cristae/infoldings of innermembrane	• Presence of pigment containing thylakoids /grana and stroma lamellae								
• Enzymes for aerobic respiration	• Enzymes for synthesis of carbohydrates								
		(any two) or Diagrams of the two with labelled parts give 2 score	1/2						
12.		Auxin <ul style="list-style-type: none">• Initiate rooting in stem cuttings• Flowering in pineapple• Prevent fruit and leaf drop• Used as herbicides Gibberellins <ul style="list-style-type: none">• Increase the length of stem in sugarcane crop.• Bolting in rosette plants Cytokinin <ul style="list-style-type: none">• Delay of senescence Ethylene <ul style="list-style-type: none">• Initiate flowering in pineapple• Hastens fruit ripening in tomatoes, apples• Promotes female flowers in cucurbits	1/2 x 6	3					

		Absciscic acid <ul style="list-style-type: none"> • Induce seed dormancy • Closure of stomata (any six practical applications of plant growth regulators)		
13 A		C ₄ pathway/Hatch and Slack pathway. <ul style="list-style-type: none"> • PEP in mesophyll cells accept CO₂ by PEPcase and formation of OAA in mesophyll cells. • Formation of malic acid and transportation of C₄ acid into the bundle sheath. • Break down of malic acid and release of CO₂ and C₃ acid-Pyruvate. • CO₂ in bundle sheath cells enters in C₃ cycle. • C₃ acid transported into the mesophyll cells and convert into PEP. or Schematic representation of C ₄ Pathway - Give 2½ score or Reasons for increasing biomass productivity <ul style="list-style-type: none"> • Kranz anatomy • No photorespiration • Breaking down of C₄ acid and release of CO₂ • Increase CO₂ concentration in bundle sheath cells • RuBisCO functions as carboxylase in bundle sheath cells (give 2½ score) 	½ ½ x 5	3
OR B		<ul style="list-style-type: none"> • Splitting of water takes place at the inner side of the thylakoid membrane, protons accumulate in the lumen of thylakoid. • Movement of electrons from photosystems, protons are transported across the membrane of thylakoid. • While transporting electrons, protons are removed from stroma into the innerside of lumen. • Protons are removed from stroma for the reduction of NADP to NADPH • Decrease in number of protons in the stroma and creates higher proton gradient in the lumen. • Proton gradient broken down due to the movement of protons across the membrane to the stroma through Fo of ATPase and release energy to activate ATPase catalyse the formation of ATP from ADP. 	½ ½ ½ ½ ½	3
		Total Score	30	30

Sample Question Paper - I (Zoology)
Answer Key

1		Panthera	1	1
2		Blood	1	1
3		Fig 1: salivary amylase in saliva convert starch to maltose Fig 2: salivary amylase is destroyed at high temperature/Enzyme destroyed at high temperature/ No conversion of starch PH/temperature/substrate concentration (any two)	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	1 1
4		Food enters trachea causing hiccups	1	1
5		a. Vertebrata b. Insect /Name of insect c. Skin d. Lungs	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
6		B - Nucleotide, Adenylic acid	1 1	2
7		Vestigial Organ	1	1
8		X : Chondrichthyes Y : Osteichthyes Chondrichthyes - Cartilaginous endoskeleton Osteichthyes - bony endoskelton (<i>any difference</i>)	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
9		Red fibre : Myoglobin content high, plenty of mitochondria, large amount of O ₂ , Aerobic muscle (any 2) White fibre : less quantity of myoglobin A few mitochondria less amount of O ₂ Anaerobic muscle (any 2)	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	2
10		a. Echinodermata b. Platyhelminthes	1 1	2
11		Insulin - Converts glucose to glycogen Glucagon - Converts glycogen to glucose	1 1	2
12		Chordates : Notochord present/Heart ventral/ post anal tail present/Gill - slits present/ central nervous system hollow, single (any 2) Non chordates: Notochord absent/Heart dorsal/post anal tail absent/Gill - slits absent/ central nervous ventral,solid, double (any two)	1 1	2

Answer Key

13		a. Haemodialysis b. Kidney transplantation	1 1	2
14		Mosaic Vision receive several images of an object, more sensitivity	1 1	2
15		(A) Stimulus→ Receptor→Afferent Neuron→Dorsal root ganglion→ CNS→ efferent neuron →effector eg : knee jerk reflex OR (B) Light rays → retina →dissociation of photo pigments →Action potential → Visual cortex → Image		3 OR 3
16		(A) - Rh Incompatibility : Rh -ve blood forms antibodies if exposed to Rh +ve blood. Erythroblastosis foetalis. Administer Rh antibodies to mother after 1 st delivery OR (B) SAN - initiate and maintain action potential - Pacemaker AVN, AV bundle, purkinje fibres.	1 1 1 1 1 1	3 3