Federal Board SSC-I Examination
Biology Model Question Paper
(Curriculum 2022-2023)

Section - A (Marks 12)

Time Allowed: 20 minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/ overwriting is not allowed. *Do not use lead pencil*.

ROLL NUMBER					
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
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Version No.			
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1	1	1	1
2	2	2	2
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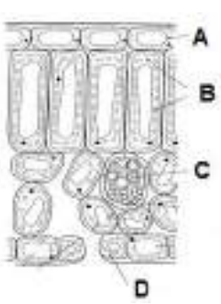
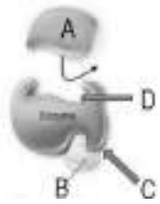
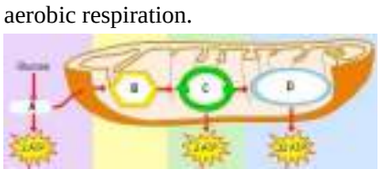
8	8	8	8
9	9	9	9

Candidate Sign._____ **Invigilator Sign**. _____

Q1. **Fill the relevant bubble against each question**. **Each part carries one mark.**

S #	Question	(A)	(B)	(C)	(D)	(A)	(B)	(C)	(D)
(i)	Which of the following organelle is NOT present in plant cell?	Centriole	Golgi body	Mitochondria	Ribosomes	○	○	○	○
(ii)	The statement on the basis of observations is called:	Hypothesis	Deduction	Theory	Law	○	○	○	○
(iii)	Identify the correctly matched pair in a cell cycle.	G_1- Preparation for cell division	G_2 - Increase in cell size	S-DNA replication	G_0 – Cell divides into two	○	○	○	○
(iv)	The scientific study of organisms and their evolutionary relationship is called:	Classification	Taxonomy	Systematics	Binomial nomenclature	○	○	○	○
(v)	The diagram shows cells in part of the leaf of a green plant. Which region  contains cells which are responsible a for the transport of water?	A	B	C	D	○	○	○	○

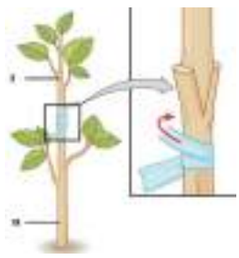
(vi)	Non-competitive inhibitors inactivate the enzyme. Identify non-competitive inhibitor in this figure. 	A	B	C	D	○ ○ ○ ○
(vii)	If tissue level is not developed in the level of organization, which next level will not form?	Molecular level	Atomic level	Organ level	Organelle level	○ ○ ○ ○
(viii)	Identify the column given in table that contains correct substances related to lipids?	<table><tr><td>Substances</td><td></td><td></td><td></td><td></td></tr><tr><td>Amino acid</td><td></td><td></td><td></td><td></td></tr><tr><td>Glucose</td><td></td><td></td><td></td><td></td></tr><tr><td>Fatty acid</td><td></td><td></td><td></td><td></td></tr><tr><td>Glycerol</td><td></td><td></td><td></td><td></td></tr></table>				○ ○ ○ ○
(ix)	Which one of the following is NOT the part of embryo in a seed?	Radicle	Plumule	Endosperm	Cotyledon	○ ○ ○ ○
(x)	The diagram shows an overview of aerobic respiration.  Which labelled process produces carbon dioxide?	A	B	C	D	○ ○ ○ ○
(xi)	The example of vestigial organ is:	Wing of a bird	Flipper of a whale	Arm of man	Appendix in human	○ ○ ○ ○
(xii)	The nitrogenous bases between two DNA strands are held together by:	Ionic Bonds	Hydrogen Bonds	Covalent Bonds	Peptide Bonds	○ ○ ○ ○

Federal Board SSC-I
Examination Model Question
Paper Biology (Curriculum 2022-23)

Time allowed: 2.40 hours Total Marks: 53

Note: Answer all parts from Section 'B' and all questions from Section 'C' on the **E-sheet**. Write your answers on the allotted /given spaces.

SECTION–B (Marks 33)

<table>
<tr><td>Q. 2</td><td colspan="5">Attempt the following questions (11x3 = 33)</td></tr>
<tr><td>(i)</td><td>Complete the following table by matching the branch of biology with the aspect of living things it describes.
<table><tr><th>Branch of biology</th><th>Aspect of living things described</th></tr><tr><td>Pharmacology</td><td></td></tr><tr><td></td><td>Defense against pathogens</td></tr><tr><td>Physiology</td><td></td></tr><tr><td></td><td>Classification and naming</td></tr><tr><td></td><td>Relations between organisms and environment</td></tr><tr><td>Pathology</td><td></td></tr></table></td><td>0.5x6</td><td>OR</td><td>Show the complete taxonomic classification of human beings.</td><td>3</td></tr>
<tr><td>(ii)</td><td>List the key points of Darwin's theory of natural selection.</td><td>3</td><td>OR</td><td>A method of vegetative propagation in plants is shown here.
 
a. Name the parts labelled as I and II.
b. Name the type of vegetative propagation shown and its benefits.
c. Give any two examples of plants in which this method is applied.</td><td>0.5+0.5
0.5+0.5
0.5+0.5</td></tr>
<tr><td>(iii)</td><td>Compare DNA and RNA in a tabular manner for at least six features</td><td>0.5x6</td><td>OR</td><td>Draw the chemical structure of a typical amino acid labelling its components</td><td>3</td></tr>
<tr><td>(iv)</td><td>Describe the role of ATP as energy currency for living systems.</td><td>3</td><td>OR</td><td>The given flow chart illustrates the cellular respiration. Answer the questions related to it:</td><td>0.5x6</td></tr>
</table>

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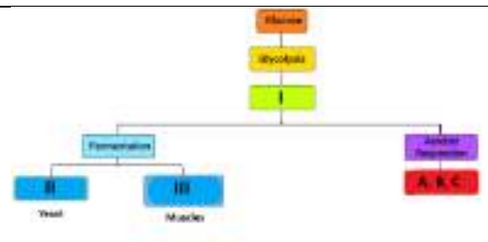
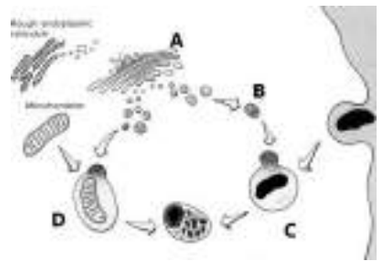
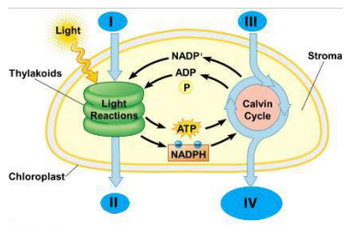
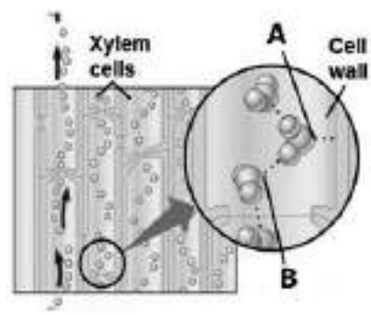
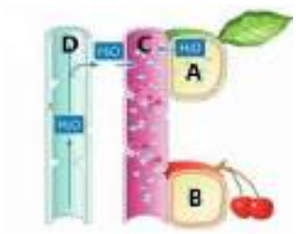
<td>

<table>
<tr><td>(a) Name the phases of aerobic respiration</td><td>(b) Label the products</td></tr>
<tr><td>A.</td><td>I</td></tr>
<tr><td>B.</td><td>II</td></tr>
<tr><td>C.</td><td>III</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>(v)</td>
<td>Name three distinct domains of living organisms with one distinguishing feature of each?</td>
<td>3</td>
<td>OR</td>
<td>Carefully observe the following diagram.
 

a. Correctly name the organelles A and B.
b. Name and define the processes labelled as C and D.</td>
<td>0.5+0.5
1+1</td>
</tr>
<tr>
<td>(vi)</td>
<td>How kidneys are involved in homeostasis. Give two functions</td>
<td>1.5
+
1.5</td>
<td>OR</td>
<td>What is the difference between cytokinesis of an animal cell and a plant cell?</td>
<td>3</td>
</tr>
<tr>
<td>(vii)</td>
<td>Give two reasons how meiosis is useful.</td>
<td>3</td>
<td>OR</td>
<td>The diagram shows an overview of photosynthesis.
 

Write the names of molecules shown as I, II, III and IV and mention which one is organic?</td>
<td>2+1</td>
</tr>
<tr>
<td>(viii)</td>
<td>Why multiple organs are needed to develop an organ system?</td>
<td>3</td>
<td>OR</td>
<td>The figure given below shows part of the mechanism for the movement of water through xylem.
 
</td>
<td></td>
</tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td>a. Identify forces A and B.

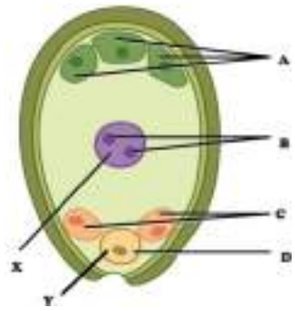
b. Despite the gravitational force, how the upward movement of water takes place through xylem.</td><td>0.5+0.5

2</td></tr>
<tr><td>(ix)</td><td>List the osmotic adaptations found in hydrophytes.</td><td>3</td><td>OR</td><td>The diagram shows pressure flow mechanism through phloem.
 

a. Name the parts labelled as A, B, C and D.

b. Name the carbohydrates that is mainly transported through C.</td><td>

(02)

(01)</td></tr>
<tr><td>(x)</td><td>Following is the diagram of female gametophyte of flowering plant.
 

a. Correctly name the parts labelled as A, B, C and D.

b. What is the fate of X and Y after fertilization?</td><td>

(02)

(01)</td><td>OR</td><td>Give any three sources of variation that can lead to evolution.</td><td>(3)</td></tr>
<tr><td>(xi)</td><td>Three types of muscle cells are depicted in the following figure.
 

a. Correctly name the types of cells labeled as A, B and C.

b. Mention the location of these cell types in the body.</td><td>

1.5
+
1.5</td><td>OR</td><td>Complete the following table for union of biology with other sciences.

<table><tr><th>Interdisciplinary science</th><th>Aspect of living organisms</th></tr><tr><td></td><td>Analysis of data related to organisms</td></tr><tr><td>Biochemistry</td><td></td></tr><tr><td></td><td>Cost and benefit analysis of organisms</td></tr><tr><td>Computational biology</td><td></td></tr><tr><td></td><td>Distribution of organisms in geographic regions</td></tr><tr><td>Biophysics</td><td></td></tr></table></td><td>0.5x6</td></tr>
</table>

SECTION– C(Marks20)

$(4 \times 5 = 20)$

Note: Attempt all questions. Marks of each question are given along with each question.

Q.3	How biological method may help to find the cause of any infectious disease?	5	**OR**	Describe different ways of excretion in plants.	5
Q.4	What are enzymes? List their characteristics.	1+4	**OR**	Describe the internal structure of a typical leaf focusing on all tissue types found in it. Also draw its diagram.	4+1
Q.5	Describe structural advantages of animal cells.	5	**OR**	Compare vegetative propagation and artificial propagation. Which one is better for rapid propagation?	4+1
Q.6	Differentiate between mitosis and meiosis.	5	**OR**	Explain the properties and chemical composition of disaccharides.	2+3

Federal Board SSC-I Examination
Biology Model Question Paper
(Curriculum 2022-2023)
Alignment of Questions with Student Learning Outcomes

Sr No	Section: Q. No. (Part no.)	Content Domain / Area	Student Learning Outcomes	Cognitive Level *	Allocated Marks in Model Paper
1.	A: Q1(1)	B	[SLO: B-09-D-1] Describe cell as the basic unit of life	K	1
2.	A: Q1(2)	A	SLO: B-09-A-08] Describe the steps of the scientific method that is: Recognition Observation Hypothesis Deduction Experiments Results	K	1
3.	A: Q1(3)	D	[SLO: B-09-D-08] Describe Cell cycle	K	1
4.	A: Q1(4)	B	SLO: B-09-B-07] Define biodiversity and classification	K	1
5.	A: Q1(5)	E	[SLO: B-09-E-08] Explain plant physiology in terms of structures and roles of various plant organs	K	1
6.	A: Q1(6)	F	[SLO: B-09-F-05] Describe competitive, and non-competitive inhibition	U	1
7.	A: Q1(7)	E	[SLO: B-09-E-1] Distinguish between tissues, organs and system with examples from animals and plants	U	1
8.	A: Q1(8)	C	[SLO: B-09-C-4] Outline the structure, function and sources of lipids	A	1
9.	A: Q1(9)	Q	[SLO: B-09-Q-21] Explain sexual reproduction in plants	K	1
10.	A: Q1(10)	F	[SLO: B-09-F-08] Explain aerobic respiration and anaerobic respiration	U	1
11.	A: Q1(11)	B	[SLO: B-09-B-06] Describe evidence of evolution with regards to the following - Palaeontology (fossil record) - Comparative anatomy (homologous structures, vestigial structures) - Selective breeding	K	1
12.	A: Q1(12)	C	[SLO: B-09-C-07] Describe briefly the structure of DNA as a double helix macromolecule made of nucleotides with base pairing in between the two helices through complementary base pairing	K	1
13.	B: Q 2 (i)	A B	[SLO: B-09-A-04] Define with examples that biology has many sub-fields. (Cytology) (Embryology) (Genetics) (Molecular Biology) (Pathology) (Ecology) (Marine Biology) (Immunology) (Morphology) (Anatomy) (Histology) (Physiology) (Taxonomy) (Palaeontology) (Pharmacology) OR [SLO: B-09-B-11] List the taxonomic ranks of classification	K	3
14.	B: Q 2 (ii)	B Q	[SLO: B-09-B-01] Explain the theory of evolution by natural selection with example OR [SLO: B-09-Q-18] Describe the two methods of artificial vegetative propagation (stem cuttings and grafting)	U	3
15.	B: Q 2 (iii)	C C	[SLO: B-09-C-07] Describe briefly the structure of DNA as a double helix macromolecule made of nucleotides with base pairing in between the two helices through complementary base pairing & Describe briefly the structure of RNA as single stranded macromolecule made of nucleotides with nitrogenous base overhangs OR [SLO: B-09-C-03] Outline the structure and function and sources of proteins with structure of amino acids	A	3
16.	B: Q 2 (iv)	F F	[SLO: B-09- F -06] Discuss the role of ATP as energy currency OR [SLO: B-09- F -08] Explain aerobic respiration and anaerobic respiration	U	3
17.	B: Q 2 (v)	B D	[SLO: B-09-B-10] List the three distinct domains into which living organisms are broadly classified into OR [SLO: B-09-D-03] Sketch different sub-cellular organelles (nucleus, mitochondria, cell membranes, etc.) and outline their roles	K	3

18.	B: Q 2 (vi)	E D	[SLO: B-09-E-07] Discuss the various organs and systems of the human body work to maintain homeostasis OR [SLO: B-09-D-09] Explain mitosis, meiosis and stages of mitosis, meiosis (by use of sketch and diagrams)	U	3
19.	B: Q 2 (vii)	D F	[SLO: B-09-D-12] Outline the significance of mitosis and meiosis OR [SLO: B-09- F-07] Describe photosynthesis in plants	U	3
20.	B: Q 2 (viii)	E Q	[SLO: B-09- E-02] Describe the concept of emergent properties as gain in functionalities and how it applies to the following going from sub-cellular organelles to cells - going from cells to tissues - going from tissues to organs - going from organs to systems - going from systems to living organisms OR [SLO: B-09- Q-09] Describe the mechanism of transport of water and salt in plants	A	3
21.	B: Q 2 (ix)	Q Q	[SLO: B-09- Q-14] Explain osmotic adjustments in plants OR [SLO: B-09- Q-10] Explain the mechanism of food translocation by, the theory of Pressure Flow Mechanism	U	3
22.	B: Q 2 (x)	Q B	[SLO: B-09- Q-21] Explain sexual reproduction in plants OR [SLO: B-09- B-05] Describe sources of variation which can lead to speciation and evolution	K	3
23.	B: Q 2 (xi)	D A	[SLO: B-09- D-05] Identify different types of cells (mesophyll cell, epidermal cell, neurons, muscle, red blood cell, liver cell) and sketch their structures OR [SLO: B-09- A-05] Relate that biology connects with other natural sciences. Students should be able to distinguish in terms of the broad subject matter the below fields: (Biophysics) (Biochemistry) (Computational Biology) (Biogeography) (Biostatistics) (Biotechnology) (Bio economics)	K	3
24.	C: Q3	A Q	[SLO: B-09- A-08] Describe the steps of the scientific method that is: Recognition Observation Hypothesis Deduction Experiments Results OR [SLO: B-09- Q-13] Describe the mechanism adaptations in plants for the excretion	U	5
25.	C: Q4	F	[SLO: B-09- F -02] Define Enzymes and describe their characteristics OR [SLO: B-09- E -04] Discuss the different types of tissue come together to form the leaf	U	5
26.	C: Q5	D Q	[SLO: B-09- D -04] Outline structural advantages of plant and animal cells OR [SLO: B-09- Q -16] Distinguish between vegetative propagation and artificial propagation	A	5
27.	C: Q6	D C	[SLO: B-09- D-11] Compare the processes of mitosis and meiosis OR [SLO: B-09- C -06] Identify carbohydrates as monosaccharides, disaccharides and polysaccharides	U	5

Table of specifications (ToS)
Model Paper Biology Grade IX (SSC I)

Content Domains/ Area	Domain A: Nature of Science in Biology	Domain B: Evolution and Biodiversity Classification	Domain D: Cells and Sub cells		Domain E: Tissue, Organ and Systems	Domain C: Molecular Biology	Domain F: Metabolism	Domain Q: Plants		Domain B: Evolution and Biodiversity Classification		
Assessment Objectives	**Unit 1: The science of biology (A1-A9)**	**Unit 2: Biodiversity (B7-B13)**	**Unit 3: Cell (D1-D7, D13)**	**Unit 4: Cell cycle (D8-D12)**	**Unit 5: Tissues, organs & organ system (E1-E8)**	**Unit 6: Molecular biology (C1-C11)**	**Unit 7: Metabolism (F1-F8)**	**Unit 8: Plant physiology (Q1-Q14)**	**Unit 9: Plant reproduction (Q15-Q21)**	**Unit 10: Evolution (B1-B6)**	**Total Marks**	**Percentage**
K (Knowledge)	Q1(ii) 1 Q2 (i/f) 3 Q2 (xi/s) 3	Q1 (iv) 1 Q2 (i/s) 3 Q2 (v/f) 3	Q1 (i) 1 Q2 (v/s) 3 Q2 (xi/f) 3	Q1 (iii) 1	Q1 (v) 1	Q1 (xii) 1			Q1 (ix) 1 Q2 (x/f) 3	Q1 (xi) 1 Q2 (x/s) 3	32	27.3%
U (Understanding)	Q3 (f) 5			Q2 (vi/s) 3 Q2 (vii/f) 3 Q6 (f) 5	Q1 (vii) 1 Q2 (vi/f) 3 Q4 (s) 5	Q6 (s) 5	Q1. (vi) 1 Q1 (x) 1 Q2 (iv/f) 3 Q2 (iv/s) 3 Q2 (vii/s) 3 Q4 (f) 5	Q2 (ix/f) 3 Q2 (ix/s) 3 Q3 (s) 5	Q2 (ii/s) 3	Q2 (ii/f) 3	63	53.3%
A (Application)			Q5 (f) 5		Q2 (viii/f) 3	Q1 (viii) 1 Q2 (iii/f) 3 Q2 (iii/s) 3		Q2 (viii/s) 3	Q5 (s) 5		23	19.4%
Total Marks	12	7	12	12	13	13	16	14	12	7	118	
Total Percentage	10%	6%)	10%	10%	11%	11%	14%	12%	10%	6%		100%

Note:

1 This ToS does not reflect policy, but it is particular to this model question paper.

2 Proportionate / equitable representation of the content areas may be ensured.

3 The percentage of cognitive Level is 30%, 50%, and 20% for knowledge, understanding, and application, respectively with **± 5%** variation.

4 While selecting alternative questions for Short Response Questions (SRQs) and Extended Response Questions (ERQs), it must be kept in mind that:

- Difficulty levels of two alternative questions of the internal choice will be same
- SLOs of the two alternative questions of the internal choice must be different

Key: Question Number (part/ first choice) marks. Example: **Q2 (i/f) 3**, Question Number (part/second choice) marks. Example: **Q2 (i/s) 3**