ASSESSMENT FRAMEWORK AND MODEL QUESTION PAPER

BIOLOGY

Grade X

NATIONAL CURRICULUM OF PAKISTAN
2022-23

SCHEME OF STUDIES 2006

FEDERAL BOARD
OF INTERMEDIATE AND SECONDARY
EDUCATION, ISLAMABAD

WE WORK FOR
EXCELLENCE

FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION

H-8/4, ISLAMABAD

ASSESSMENT FRAMEWORK

FOR

BIOLOGY GRADE-X

CURRICULUM 2022-23

SCHEME OF STUDIES 2006

ACKNOWLEDGEMENT

It is a great honour that we, at the Federal Board of Intermediate and Secondary Education, have developed the Assessment Framework (AF) for the subject of Biology for Grade-X. The primary objective of the AF is to optimize the current curriculum 2022-23. This comprehensive framework has been crafted meticulously by subject matter and assessment experts who conducted an in-depth review of all learning outcomes for Grade-X Biology curriculum. They evaluated these outcomes in terms of their scope, cognitive level, and progression across the grade.

This significant undertaking was the result of a series of extensive meetings and collaborative efforts of the subject and assessment experts. Their dedication and expertise have been instrumental in bringing this framework to fruition.

The Assessment Framework will serve as a guiding document for students, teachers and paper setters. Students will receive clear directions for preparing themselves for the annual examination. Similarly, teachers will use it as a guide to understand what to teach in class and to prepare students for the final examinations accordingly. Similarly paper setters will also seek guidance from this document.

Following subject as well as assessment experts/committee members remained constantly engaged in the development of the AF:

1. Dr. Muhammad Ilyas, Associate Professor, Islamabad Model College for Boys, G-10/4, Islamabad
2. Ms. Ruqayya Shaikh, Associate Professor, Islamabad Model College for Girls, F-6/2, Islamabad
3. Dr. Kashif Ali, Associate Professor, Islamabad Model College for Boys, F-7/3, Islamabad
4. Mrs. Samina Tahira, Associate Professor, Islamabad Model College for Girls, I-8/4, IBD
5. Dr. Abid Ali Mughal, Associate Professor, Islamabad Model College for Boys, H-9, Islamabad
6. Ms. Saima Aftab, Section Head, Army Public School & College Pasban Rawalpindi

The whole work was successfully accomplished under the able supervision and guidance of Dr. Ikram Ali Malik, Chairman, FBISE and due to the hard work and dedication of the staff of Research Section of FBISE, in particular, Syed Zulfiqar Shah, Deputy Secretary, Research and Academics who played a pivotal and leading role in finalizing the Assessment Framework.

MIRZA ALI
Director (Test Development)
FBISE, Islamabad

ASSESSMENT FRAMEWORK FOR BIOLOGY GRADE-X, CURRICULUM 2022-23

To ensure clarity and precision in assessment, the learning outcomes have been categorized into two distinct groups: formative and summative. This classification helps in effectively measuring student progress and understanding. Each Student learning outcome (SLO) has been carefully marked as either formative or summative within the newly developed Assessment Framework. SLOs of Summative Assessment Format will be part of the Final Examination while SLOs of Formative Assessment will although be part of the teaching-learning activity but they will **NOT** be part of Final Examinations. Estimated cognitive levels i.e Knowledge (K), Understanding (U) and Application (A) of all the SLOs have also been indicated. It may be noted that all the higher cognitive levels have been collectively accumulated in the cognitive level of 'Application'. In subjects involving Practicals (Lab work), it has been mentioned categorically whether an SLO is summative for theory or summative for Practical Based Assessment (PBA). If an SLO is summative for PBA, it means that Laboratory work is required in the teaching-learning activity and it will be part of the Practical Examination/ Practical Based Assessment.

The Assessment Framework will act as a comprehensive guide for students, teachers and paper setters. Students will have clear instructions on how to prepare for the annual examinations. Teachers will use the framework to understand the curriculum and effectively prepare their students for the final examination. Additionally, paper setters will refer to this document for guidance in setting examination papers.

A model question paper has also been developed to provide a clear structure and format for upcoming examinations. The model question paper ensures consistency and fairness, offering students a comprehensive understanding of what to expect in their examinations. By aligning the paper with the Student Learning Outcomes (SLOs) of the curriculum, we ensured that the questions accurately reflect the skills and knowledge that students are expected to acquire.

A detailed Table of Specifications (ToS) has been created to ensure equitable coverage of cognitive levels and content domains in order to generate a balanced question paper. The ToS serves as drawing scale and action plan for the question paper, ensuring that all important areas of the curriculum are adequately and proportionately assessed.

FORMATIVE ASSESSMENT: AN ESSENTIAL COMPONENT OF EFFECTIVE LEARNING

Formative assessment is a pivotal element in the educational process, distinguished by its role in providing ongoing feedback to both students and educators. Unlike summative assessments, which evaluate student learning at the end of an instructional period, formative assessments are integrated into the learning process to monitor student understanding and guide instructional decisions.

The primary objective of formative assessment is to identify learning gaps and misunderstandings as they occur, enabling timely interventions. This dynamic approach allows teachers to adjust their teaching strategies to better meet the needs of their students. For instance, if a teacher notices through a quick quiz or class discussion that a significant portion of the class struggles with a particular concept, they can revisit that topic, providing additional explanations or alternative methods of instruction. This adaptability is crucial for fostering a deeper understanding of the material.

Formative assessments come in various forms, ranging from informal methods like classroom discussions, observations, and questioning, to more structured approaches such as quizzes, peer assessments, and self-reflections. These methods are not limited to paper-and-pencil tasks but can include digital tools that provide instant feedback. The versatility of formative assessments allows educators to cater to diverse learning styles and preferences, ensuring that all students are engaged and supported in their learning journey.

Formative assessment plays a significant role in creating a supportive classroom environment. It shifts the focus from merely achieving grades to understanding the learning process. This approach reduces the pressure on students, as they perceive assessments not as a final judgment of their abilities but as a part of their learning journey. Consequently, formative assessment can lead to increased student motivation and engagement.

In conclusion, formative assessment is a powerful tool that, when effectively implemented, can significantly enhance the learning experience. It provides invaluable insights for both teachers and students, promotes a growth-oriented learning environment, and supports the continuous development of essential skills. As education evolves, the role of formative assessment will undoubtedly continue to be central in fostering successful and meaningful learning experiences.

SUMMATIVE ASSESSMENT: EVALUATING LEARNING OUTCOMES IN THE FORM OF TERMINAL/FINAL EXAMINATION

Summative assessment is a fundamental component of the educational process, designed to evaluate student learning at the conclusion of an instructional period. Unlike formative assessment, which provides ongoing feedback during the learning process, summative assessment serves as a final measure of what students have learned. Typically administered at the end of a unit, course, or academic year. Summative assessment aims to determine the extent to which educational objectives have been achieved.

The primary purpose of summative assessment is to assess the overall effectiveness of instruction and learning. It provides a conclusive evaluation of student performance, often in the form of tests, final projects, or standardized exams. These assessments generate grades or scores that reflect a student's achievement in a given subject area over a specific period or time duration.

Summative assessment is often used to make critical decisions regarding student progression, certification, or placement in subsequent educational levels. Additionally, summative assessments provide valuable data that inform curriculum development and instructional strategies. By analyzing summative assessment results, educators can identify trends, strengths, and weaknesses within their instructional approaches, allowing for improvements in future teaching.

In conclusion, summative assessment plays a critical role in the educational process by providing a final evaluation of student learning. While it differs from formative assessment in its focus and application, it is an essential tool for measuring academic achievement. When balanced with formative assessments, summative assessments contribute to a well-rounded and effective approach to evaluating and supporting student learning.

National Curriculum of Pakistan 2022-23

Assessment Framework Biology Grade-X (SSC-II)

Details of Content Areas/ SLOs

Domain Title/ Content area	Chapter Title	SLO No./ Description	Form of Assessment	Cognitive domain (Knowledge, Understanding, Application)	Remarks	Number of periods required (1period = 40 min)
G: Nervous system	Coordination	[SLO: B-10-G-01] Describe the nervous system and its role.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	30 periods
		[SLO: B-10-G-02] Discuss the central nervous system and the peripheral nervous system.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-03] Outline the types of neurons with diagrams.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-04] Define a stimulus with examples.	Summative for theory	Knowledge	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-05] State that nerve impulses are electrical signals that travel across neurons.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-06] Define and sketch synapses.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-07] Introduce neurotransmitters.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-08] Explain through sketching a diagram the involvement of the nervous system when a person accidentally touches something painfully hot and withdraws their hands as a reflex.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-09] Explain the Endocrine system.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-G-10] Identify the major endocrine glands and hormones with their functions.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
H: Reproduction and Inheritance	Reproduction	[SLO: B-10-H-01] Describe the role of hormones in both male and female sexual development.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	20 periods

		[SLO: B-10-H-02] Describe the process of gametogenesis and fertilization.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-H-03] Describe asexual reproduction and sexual reproduction mechanisms with examples (plants and animals).	Summative for theory	Application	Question(s) will be asked in annual examination. Plants reproductions discussed in grade IX.	
	Inheritance	[SLO: B-10-H-04] Describe sex determination in humans.	**Summative for PBA**	Understanding	Lab work- will be assessed in PBA	
		[SLO: B-10-H-05] Sketch the structure of chromosomes.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-H-06] Define genotype and phenotype, allele, homozygous, heterozygous, dominant, and recessive.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-H-07] Illustrate Mendelian inheritance laws through monohybrid and dihybrid cross.	Summative for theory	Application	Question(s) will be asked in annual examination.	
I: Disease and immunity	Diseases	[SLO: B-10-I-01] Define disease, illness and infection and pathogen.	Summative for theory	Knowledge	Question(s) will be asked in annual examination.	20 period
		[SLO: B-10-I-02] List the 4 different types of pathogens (Viruses, Bacteria, Plasmodium, Fungi), and list their common diseases.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
	Immunity	[SLO: B-10-I-03] Discuss antibiotics.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-04] Discuss the development of resistance in bacteria.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-05] Define immunity and list the roles of the immune system.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-06] Describe the components of the immune system (Lymphatic system (lymph nodes), Types of immune cells and their roles, Innate immunity, adaptive immunity, and the three lines of defence)	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-07] Describe the process of blood clotting.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	

		[SLO: B-10-I-08] State the function of adaptive immunity.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-09] Discuss that vaccines help boost immunity with examples.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-10] Describe the discovery of penicillin.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
	Diseases	[SLO: B-10-I-11] Define Diabetes and its subtypes and explain the effects on the human body.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-12] Discuss cancer and its effects on the human body.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-13] Narrate Covid 19 and list the harmful effects on the human body.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-14] Discuss that HIV compromises the immune system and over times leads to development of Acquired Immune Deficiency Syndrome (AIDS).	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-I-15] Explain plant diseases commonly present in Pakistan, in terms of their effect on plant health and yield and their treatment. (Rust, smut, red rot of sugar cane)	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
J:Biotechnology	Biotechnology	[SLO: B-10-J-01] Introduce biotechnology.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	20 periods
		[SLO: B-10-J-02] Explain with examples that food biotechnology has advanced agriculture especially inside Pakistan.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-J-03] Explain with examples that medical biotechnology has advanced healthcare in diabetes and cancer.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-J-04] Stated the potential advantages that genetic editing provides with examples in the context of medicine and agriculture.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-J-05] Describe with examples the benefits of marine biotechnology.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	

		[SLO: B-10-J-06] Describe that bioremediation can help us in taking better care of our environment with an example.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-J-07] Explain the concept and application of industrial biotechnology with examples.	Summative for theory	Application	Question(s) will be asked in annual examination.	
K:Biostatistics and Data Handling	Biostatistics and data handling	[SLO: B-10-K-01] Define biostatistics and its use.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	10 period
		[SLO: B-10-K-02] Define and calculate mean, medianand mode,	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-K-03] Sketch a bar chart for a given set of biological data.	**Summative for PBA**	Application	Lab work- will be assessed in PBA	
R: Human Physiology	Digestion	[SLO: B-10-R-01] Describe the needs of ingestion, digestion, absorption, assimilation and egestion.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	45 periods
		[SLO: B-10-R-02] Identify and describe the structures of the main regions of the alimentary canal and the associated organs.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-03] Describe swallowing and peristalsis.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO:B-10-R-04] Sort out the action of enzymes in specific regions of alimentary canal, with respect to their substrates and products.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10R-05] State the role of the liver.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO:B-10-R-06] Describe the structure of a villus, including the roles of capillaries and lacteals.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-07] State the signs and symptoms, causes, treatments and preventions of the disorders of gut i.e. diarrhea, constipation, and ulcer.	Summative for theory	Application	Question(s) will be asked in annual examination.	
	Circulation	[SLO: B-10-R-08] Describe how the blood is circulated inside the human body.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-09] Explain how blood is used to transport materials throughout the human body.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	

		[SLO: B-10-R-10] Identify the different types of organs connected to the blood system and their roles.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-11] Identify the different components that make up the blood	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-12] Name the cell types found in blood and their roles.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-13] Explain the structure of the heart with a diagram.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-14] Explain common heart diseases. (Coronary Heart Disease, Myocardial Infarction, Angina)	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-15] Explain the harmful effects of smoking related to heart diseases	Summative for theory	Application	Question(s) will be asked in annual examination.	
	Urinary system	[SLO: B-10-R-16] Identify the different organs of urinary system.	Summative for theory	Knowledge	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-17] Relate the structure of the kidney with its function.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-18] State that nephron is the excretory unit of kidney.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-19] Locate the different parts of nephrons and relate them with their function.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-20] State that main role of the kidney is urine formation.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-21] Describe that urine formation involves three processes i.e. filtration, reabsorption and secretion.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-22] Explain that the kidney plays an important role in osmoregulation. Identify the causes and treatment of kidney stones.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-23] Outline the causes of kidney failure and treatments.	Summative for theory	Application	Question(s) will be asked in annual examination.	
	Respiratory system	[SLO: B-10-R-24] Describe the roles of the parts of the air passageway and lungs.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-25] Describe the mechanism of breathing in terms of movements ribs and diaphragm.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	

		[SLO: B-10-R-26] Differentiate between the composition of inspired and expired air.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-27] Discuss briefly diseases related to respiratory system like bronchitis, emphysema, pneumonia, asthma, and lung cancer.	Summative for theory	Application	Question(s) will be asked in annual examination.	
	Diseases	[SLO: B-10-R-28] Describe infectious and non-infectious diseases and their types with examples.	Summative for theory	Application	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-29] Define zoonotic diseases and give their types.	Summative for theory	Knowledge	Question(s) will be asked in annual examination.	
		[SLO: B-10-R-30] Describe vector borne diseases with examples.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	
	Immunity	[SLO: B-10-R-31] Enlist allergies with some common types.	Summative for theory	Understanding	Question(s) will be asked in annual examination.	

Federal Board SSC-II Examination
Biology Model Question Paper

(Curriculum 2022-2023— Scheme of Studies 2006)

ROLL NUMBER					
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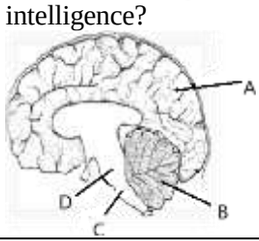
Section - A (Marks 12)

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.*

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

Q. 1 Fill the relevant bubble for each part. All parts carry one mark.

S.No	Question	A	B	C	D	A	B	C	D
(i)	The part of the neuron which receives electrical signals and transmits them toward the cell body is:	Axon	Dendrite	Myelin sheath	Node of Ranvier	○	○	○	○
(ii)	Which one is the modified form of sexual reproduction?	Parthenogenesis	Fragmentation	Budding	Binary fission	○	○	○	○
(iii)	A hospital observes that a common bacterial infection is no longer responding to the previously effective antibiotic. What would be the best strategy to address this issue?	Increase the antibiotic dosage indefinitely	Use a combination of different antibiotics	Stop prescribing antibiotics altogether	Switch to painkillers instead	○	○	○	○
(iv)	Which of the labelled part in diagram controls conscious thoughts and intelligence? 	A	B	C	D	○	○	○	○
(v)	Which one is the most suitable role of biotechnology in medicine?	Using ocean water to treat infections	Producing artificial fish for food	Using marine plants to clean oil spills	Developing new drugs from marine organisms	○	○	○	○
(vi)	Urine flows from the kidneys to the bladder by:	Renal pelvis	Ureter	Urethra	Urinary bladder	○	○	○	○
(vii)	Which function is NOT related to nasal cavity?	Filter dust particles	Moisten the incoming air	Gaseous exchange	Warm incoming air	○	○	○	○
	During a long-distance	Liver	Stomach	Small intestine	Large	○	○	○	○

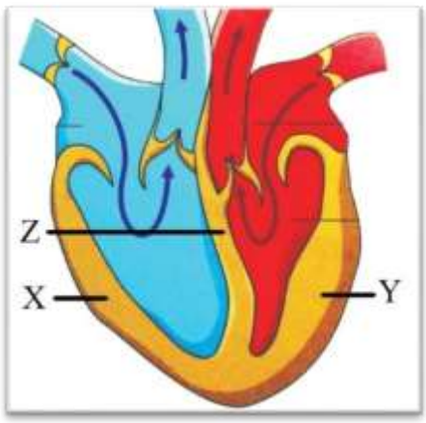
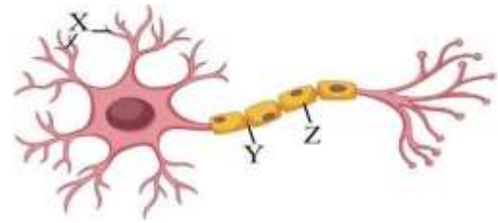
(viii)	race, a runner's body needs a continuous supply of energy. Which part of the digestive system plays the most significant role in ensuring glucose is absorbed into the bloodstream to meet this energy demand?				intestine	
(ix)	Which bacterial disease is zoonotic?	Malaria	Rabies	Anthrax	Ringworm	○ ○ ○ ○
(x)	Most relevant example of biostatistics is:	Studying the effects of a new medicine	Writing a medical book	Treating a patient in a hospital	Drawing pictures of bacteria	○ ○ ○ ○
(xi)	Pathogens:	Keep the body healthy	Cause diseases	Help in digestion	Protect from infections	○ ○ ○ ○
(xii)	Which ONE is called emergency hormone?	Insulin	Adrenaline	Prolactin	Oxytocin	○ ○ ○ ○

Federal Board SSC-II Examination
Model Question Paper Biology
(Curriculum 2022-23) Scheme of Studies 2006

Time allowed: 2:40Hours **Total Marks Section B & C: 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)

Q. 2	Attempt the following questions. (11 × 3 = 33)				
(i)	Narrate the series of events that take place during swallowing of food.	**3**	OR	How does a kidney transplant help a patient with kidney failure?	**3**
(ii)	How myocardial infarction is life threatening?	**3**	OR	What would happen if a chromosome lacked kinetochore during cell division?	**3**
(iii)	Compare the composition of inspired air and expired air in tabular manner.	**3**	**OR**	Compare main types of Diabetes.	**3**
(iv)	List the components of reflex arc.	**3**	**OR**	Complete the following table by giving at least one response in each box **Endocrine gland** / **Hormone** / **Function** Thyroid Ovary Parathyroid	**1+1 +1**
(v)	While focusing on the labeled parts of the following diagram of heart, answer the questions relevant to it.  A. What is the physiological significance of the fact that "Y" is thicker than "X"? B. What would you expect to happen if there was a pore left in "Z"?	**1.5 + 1.5**	**OR**	Answer the questions related to the diagram.  A. Identify the type of neuron in the diagram. B. Why are "Y" important for neuron communication? C. If the "Z" is damaged, how would this affect nerve function?	**1+ 1+ 1**
(vi)	What are the benefits of internal fertilization in land animals?	**1x3**	**OR**	Name and give roles of components of gastric juice which help in digestion of different materials.	**1+2**
(vii)	List any three traits of pea plant with their contrasting phenotypes studied by Mendel.	**1x3**	OR	Complete the following table related to diseases. **Pathogen** / **Example** / **Disease** *Salmonella typhi* Ringworm Protozoa	**1+1 +1**
(viii)	Why do some vaccines require booster shots after some time?	**3**	OR	What is Bt cotton, and why is it important in Pakistan?	**1+2**
(ix)	How does biostatistics help in management of public health?	**3**	OR	Draw flow sheet to show how sperms are formed, labeling all the stages and types of cells involved.	**3**

(x)	What is adaptive immunity? How it helps to defend body against infections?	**1+2**	**OR**	Which characteristics of alveoli make them most suitable structure for gaseous exchange?	**1x3**
(xi)	Why do veins have valves but arteries do not?	**3**	**OR**	Differentiate between In-situ and Ex-situ bioremediation.	**3**

SECTION – C (Marks 20)

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

<table>
<tr><td>Q. 3</td><td>Describe the types of white blood cells highlighting the role of each type.</td><td>5</td><td>OR</td><td>Relate the structure of Nephron with urine formation in human kidney.</td><td>2+3</td></tr>
<tr><td>Q. 4</td><td>Write about the structure of a villus. How they are involved in absorption of food in small intestine?</td><td>1.5+3.5</td><td>OR</td><td>State the concerned law and explain the inheritance pattern in a dihybrid cross by taking example of seed shape and colour in pea plant.</td><td>1+2+2</td></tr>
<tr><td>Q. 5</td><td>How did biotechnology help in improvement of food crops and dairy livestock in Pakistan?</td><td>2.5+2.5</td><td>OR</td><td>Interpret the changes which occur during inhalation and exhalation</td><td>2.5+2.5</td></tr>
<tr><td>Q. 6</td><td>Explain the transmission of nerve impulse through neuron with the help of diagram.</td><td>3+2</td><td>OR</td><td>Define mean and mode. Calculate the mean and mode of the given data.
Score of students in a game:
<table><tr><td>Name of student</td><td>Score</td></tr><tr><td>A</td><td>5</td></tr><tr><td>B</td><td>10</td></tr><tr><td>C</td><td>4</td></tr><tr><td>D</td><td>8</td></tr><tr><td>E</td><td>11</td></tr><tr><td>F</td><td>4</td></tr><tr><td>G</td><td>7</td></tr></table></td><td>2+3</td></tr>
</table>

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

Alignment of Questions with Student Learning Outcomes

Sr No	Section: Q. No. (Part no.)	Student Learning Outcomes	Cognitive Domain	Allocated Marks in Model Paper
1.	A: Q1(i)	[SLO: B-10-G-03] Outline the types of neurons with diagrams.	k	1
2.	A: Q1(ii)	[SLO: B-10-H-03] Describe asexual reproduction and sexual reproduction mechanisms with examples (plants and animals).	K	1
3.	A: Q1(iii)	[SLO: B-10-I-04] Discuss the development of resistance in bacteria.	A	1
4.	A: Q1(iv)	[SLO: B-10-G-02] Discuss the central nervous system and the peripheral nervous system	A	1
5.	A: Q1(v)	[SLO: B-10-J-03]Explain with examples that medical biotechnology has advanced healthcare in diabetes and cancer.	U	1
6.	A: Q1(vi)	[SLO: B-10-R-16]Identify the different organs of urinary system.	K	1
7.	A: Q1(vii)	[SLO: B-10-R-24] Describe the roles of the parts of the air passageway and lungs.	U	1
8.	A: Q1(viii)	[SLO: B-10-R-02]Identify and describe the structures of the main regions of the alimentary canal and the associated organs	A	1
9.	A: Q1(ix)	[SLO: B-10-R-29] Define zoonotic diseases and give their types.	K	1
10.	A: Q1(x)	[SLO: B-12-K-01] Define biostatistics and its use.	U	1
11.	A: Q1(xi)	[SLO: B-10-I-01] Define disease, illness and infection and pathogen.	K	1
12.	A: Q1(xii)	[SLO: B-10-G-10] Identify the major endocrine glands and hormones with their functions.	K	1
13.	B: Q 2 (i)	[SLO: B-10-R-03] Describe swallowing and peristalsis. OR SLO: B-10-R-23] Outline the causes of kidney failure and treatments.	U	3
14.	B: Q 2 (ii)	[SLO: B-10-R-14] Explain common heart diseases. (Coronary Heart Disease, Myocardial Infarction, Angina) OR [SLO: B-10-H-05] Sketch the structure of chromosomes.	A	3
15.	B: Q 2 (iii)	[SLO: B-10-R-26] Differentiate between the composition of inspired and expired air. OR [SLO: B-10-I-11] Define Diabetes and its subtypes and explain the effects on the human body.	K	3
16.	B: Q 2 (iv)	[SLO: B-10-G-08] Explain through sketching a diagram the involvement of the nervous system when a person accidentally touches something painfully hot and withdraws their hands as a reflex. OR [SLO: B-10-G-10] Identify the major endocrine glands and hormones with their functions.	K	3
17.	B: Q 2 (v)	[SLO: B-10-R-13] Explain the structure of the heart with a	A	3

		diagram. OR [SLO: B-10-G-03] Outline the types of neurons with diagrams.		
18.	B: Q 2 (vi)	[SLO: B-10-H-02] Describe the process of gametogenesis and fertilization. OR [SLO:B-10-R-04] Sort out the action of enzymes in specific regions of alimentary canal, with respect to their substrates and products.	K	3
19.	B: Q 2 (vii)	[SLO: B-10-H-07] Illustrate Mendelian inheritance laws through monohybrid and dihybrid cross. OR [SLO: B-10-I-02] List the 4 different types of pathogens (Viruses, Bacteria, Plasmodium, Fungi), and list their common diseases.	K	3
20.	B: Q 2 (viii)	[SLO: B-10-I-09] Discuss that vaccines help boost immunity with examples. OR [SLO: B-10-J-02] Explain with examples that food biotechnology has advanced agriculture especially inside Pakistan.	A	3
21.	B: Q 2 (ix)	[SLO: B-12-K-01] Define biostatistics and its use. OR [SLO: B-10-H-02] Describe the process of gametogenesis and fertilization.	U	3
22.	B: Q 2 (x)	[SLO: B-10-I-08] State the function of adaptive immunity. OR [SLO: B-10-R-24] Describe the roles of the parts of the air passageway and lungs.	**U**	3
23.	B: Q 2 (xi)	[SLO: B-10-R-13] Explain the structure of the heart with a diagram. OR [SLO: B-10-J-06] Describe that bioremediation can help us in taking better care of our environment with an example.	**A**	3
24	C: Q 3	[SLO: B-10-R-12] Name the cell types found in blood and their roles. OR [SLO: B-10-R-19] Locate the different parts of nephrons and relate them with their function	U	5
25.	C: Q 4	[SLO:B-10-R-06] Describe the structure of a villus, including the roles of capillaries and lacteals. OR [SLO: B-10-H-07] Illustrate Mendelian inheritance laws through monohybrid and dihybrid cross.	U	5
26.	C: Q 5	[SLO: B-10-J-02] Explain with examples that food biotechnology has advanced agriculture especially inside Pakistan. OR [SLO: B-10-R-25] Describe the mechanism of breathing in terms of movements of ribs and diaphragm	**U**	**5**
27.	C: Q6	[SLO: B-10-G-05] State that nerve impulses are electrical signals that travel across neurons. OR [SLO: B-10-K-02] Define and calculate mean, median and mode.	**A**	**5**

Table of specifications (ToS)
Model Paper Biology SSC II
CURRICULUM 2023

DOMAIN	G	H		I		J	K	R					
Chapters	Coordination	Reproduction	Inheritance	Diseases	Immunity	Biotechnology	Biostatistics &Data analysis	Digestive system	Circulatory system	Respiratory system	Urinary system	Marks	Percentage
Knowledge	Q1(i)1 Q1(xii)1 Q2(iv/f)3 Q2(iv/s)3	Q1(ii)1 Q2(vi/f)3	Q2(vii/f)3	Q1(ix)1 Q1(xi)1 Q2(vii/s)3 Q2(iii/s)3				Q2(vi/s)3		Q2(iii/f)3	Q1(vi)1	30	25%
Understanding	Q6(f)5	Q2(ix/s)3	Q4(s)5		Q2(x/f)3.	Q1(v)1 Q5(f)5	Q1(x)1 Q2(ix/f)3 Q6(s)5	Q2(i/f)3 Q4(f)5	Q3(f)5	Q1(vii)1 Q2(x/s)3 Q5(s)5	Q2(i/s)3 Q3(s)5	61	52%
Application	Q1(iv)1 Q2(v/s)3		Q2(ii/s)3		Q1(iii)1 Q2(viii/f)3	Q2(viii/s)3 Q2(xi/s)3		Q1(viii)1	Q2(ii/f)3 Q2(v/f)3 Q2(xi/)3			27	23%
Total	17	7	11	8	7	12	9	12	14	12	9	118	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**

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