

**RUBRICS: HSSC 1<sup>ST</sup> ANNUAL EXAMINATION 2023**  
**SUBJECT: BIOLOGY-II (Hard Area)**

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)
2(i)	Parts of human respiratory system	Correct names of four parts like: <b>A= Larynx</b> <b>B= Trachea</b> <b>C= Alveoli</b> <b>D= Diaphragm (2)</b>	Correct names of any three parts (1.5)	Correct names of any two parts (1)	Correct name of any one part (0.5)	Wrong answer (0)
	Functions of labelled parts	Correct relevant functions of parts C & D like: <b>C= Exchange of gases</b> <b>D= Breathing movement/Inhalation &amp; Exhalation/ventilation (1)</b>	Correct function of anyone part (0.5)	Wrong answer (0)		
2(ii)	Symptoms of sinusitis	Any two correct symptoms like: fever, nasal obstruction, raspy voice, pus-like (purulent) nasal discharge, loss of sense of smell, facial pain, or headache (1)	Any one correct symptom (0.5)	Wrong answer (0)		
	Divisions of autonomic nervous system	Correct names of two divisions and one function of each i.e., <b>Sympathetic Division= Prepares for fight or flight/ emergency/stress etc.</b> <b>Parasympathetic division= normalize the body from emergency/ control involuntary functions during rest. (2)</b>	Any one missing name or functions of both divisions (1.5)	Correct name and function of any one division <b>OR</b> Correct names of both divisions <b>OR</b> correct functions of both divisions (1)	Some relevant information (0.5)	Wrong answer (0)
2(iii)	Role of Na <sup>+</sup> & K <sup>+</sup> ions	Correct description of Na <sup>+</sup> & K <sup>+</sup> ion concentration, in and out movement of Na <sup>+</sup> & K <sup>+</sup> ions, difference in charges across the membrane. (3)	Correct description of any two criteria (2)	Correct description of any one criterion (1)	Some relevant information (0.5)	Wrong answer (0)

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)
2(iv)	Problems leading to female infertility	Correct description of any three problems like Failure to ovulate, Blocked oviduct, Uterus damage, Cervical mucus defect, Endometriosis etc. (3)	Correct description of any two problems (2)	Correct description of any one problem (1)	Some relevant information (0.5)	Wrong answer (0)
2(v)	Habituation	Correct description of habituation mentioning any two terms like: harmless stimulus, repeated exposure to a stimulus, diminished response etc. (1)	Some relevant information (0.5)	Wrong answer (0)		
	Example of habituation	Correct description of habituation with example of squirrel (2)	Partially correct description (1)	Some relevant information (0.5)	Wrong answer (0)	
2(vi)	Methods of regulation of gene expression	Correct description of any two criteria of both: <b>positive gene regulation</b> (mentioning quantitatively increased expression, activator as regulatory protein, switch on status of gene etc.) and <b>negative gene regulation</b> (mentioning quantitatively decreased expression, repressor as regulatory protein, switch off status of gene etc.) (3)	Correct description of anyone criterion of both positive and negative gene regulation (2)	Correct description of anyone method of gene regulation (1)	Some relevant information (0.5)	Wrong answer (0)
2(vii)	Non-conventional energy sources	Correct description of non-conventional energy sources mentioning unusual sources, new sources, uncommon in use (1)	Partially correct description of non-conventional energy resources (0.5)	Wrong answer (0)		
	List of three Non-conventional energy	Mentioning any three correct non-conventional energy sources like Solar power, Hydro-electric power, Wind power, Tidal power, Ocean wave power, Geothermal power etc. (1)	Mentioning at least any one correct non-conventional energy sources (0.5)	Wrong answer (0)		

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)
	Advantage	Mentioning anyone correct advantage non-conventional energy resources like abundance in nature, pollution free eco-friendly, renewed with minimum effort. (1)	Some relevant information (0.5)	Wrong answer (0)		
2(viii)	Structure and functions of uterine layers	Correct name and description of structure and functions of three layers i.e., ( <b>Endometrium</b> = composed of blood vessels help in implantation, <b>Myometrium</b> = composed of smooth muscles, involve in labour contraction etc., <b>Perimetrium</b> = composed of connective tissues, provides protection (3)	Correct description of structure and functions of any two layers. (2)	Correct description of structure and functions of any one layer OR names of all three layers OR functions of any two layers. (1)	Some relevant information (0.5)	Wrong answer (0)
2(ix)	Role of foetal hormones	Correct role of two foetal hormones like: <b>Oxytocin</b> = play a role in exciting the uterine contraction etc. <b>ACTH</b> = stimulates the foetal adrenal gland to release corticosteroids etc. <b>Corticosteroids</b> = influence the placenta and cause a decrease in progesterone. (3)	Correct role of any one foetal hormone (1.5)	Correct names of any two foetal hormones (1)	Some relevant information (0.5)	Wrong answer (0)
2(x)	Blood group genotypes of parents and offspring	Correct cross showing <b>genotypes of parents</b> (Father= I <sup>A</sup> I <sup>B</sup> , Mother= ii) Correct genotypes of offspring (I <sup>A</sup> i, I <sup>B</sup> i) (3)	Any three correct genotypes (2)	Any two correct genotypes (1)	Some relevant information (0.5)	Wrong answer (0)
2(xi)	XY-XX Sex determination	Correct description/diagram of XY-XX pattern of sex determination mentioning male heterogametic/	Correct description/diagram of XY-XX pattern of	Some relevant information (0.5)		

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)
		female homogametic, sex determination by male/sperm (2)	sex determination mentioning any two criteria (1)			
	Example of XY-XX Sex determination	Anyone correct example like human, Drosophila etc. (1)	Wrong answer (0)			
2(xii)	Factors that change allelic frequency	Correct description of any three factors like Migration/gene flow, Mutation, Non-random mating, and selection. (3)	Correct description of any two factors (2)	Correct description of any one factor (1)	Some relevant information (0.5)	Wrong answer (0)
2(xiii)	Convergent evolution	Correct description mentioning any two characters like different ancestry, adapt in similar ways to similar environment/habitat, analogous organ/organs with different structures but similar function etc. (2)	Correct description mentioning anyone character (1)	Some relevant information (0.5)	Wrong answer (0)	
	Example of convergent evolution	Anyone example like wings of birds and insects. etc. (1)	Wrong answer (0)			
2(xiv)	Theory of evolution shown in the diagram	Correct name of theory i.e., Lamarckism/Lamarck's theory and scientist= J.B. de Lamarck. (1)	Correct name of theory OR name of scientist (0.5)	Wrong answer (0)		
	Main points of the theory	Mentioning two correct points i.e. <b>use and disuse of organs</b> and <b>inheritance of acquired characteristics</b> (2)	Mentioning anyone correct point explained (1)	Some relevant information (0.5)	Wrong answer (0)	
2(xv)	Methods of Nitrogen fixation	Correct description/flow chart/diagram with three types of Nitrogen fixation i.e. <b>Biological</b> (Symbiotic/ Non-symbiotic), <b>Industrial</b> and <b>Atmospheric</b> (3)	Correct description/flow chart/diagram of any two types (2)	Correct description/flow chart/diagram of any one type (1)	Some relevant information (0.5)	Wrong answer (0)
2(xvi)	Three causes of acid rain	Mentioning any three causes like sulphur and nitrogen oxides produced during volcanic	Mentioning of any two correct causes (1)	Mentioning of any one correct cause (0.5)	Wrong answer (0)	

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)
		eruptions, burning coal in electricity generating plants, industrial boilers and large smelters and emission from automobiles etc. (1.5)				
	Three effects of acid rain	Mentioning any three correct effects like increasing soil acidity, damaging life of farms/forests, killing aquatic organisms and preventing their reproduction, increasing the concentration of certain toxic metals, damaging buildings/stone cancer, affecting nervous, respiratory, and digestive systems etc. (1.5)	Mentioning any two correct effects (1)	Mentioning any one correct effect (0.5)	Wrong answer (0)	
2(xvii)	Characteristics of vectors	Any two properties like origin of replication site, antibiotic resistance genes and restriction sites of different genes (2)	Anyone correct property (1)	Some relevant information (0.5)	Wrong answer (0)	
	Use of vectors in genetic engineering	Correct use of vector i.e., vehicles for carrying foreign DNA into a host cell. (1)	Some relevant information (0.5)	Wrong answer (0)		
2(xviii)	Role of vaccination for Hepatitis	Use of different agents as vaccine like: inactivated virus in Hepatitis A, recombinant DNA in Hepatitis B, surface proteins etc, no vaccine for hepatitis C <b>OR</b> Correct description of mode of action of vaccine. (3)	Partially correct description (2)	Some relevant information (1)	Wrong answer (0)	
2(xix)	Role of Hybridization	Correct description mentioning any three roles like attaining desirable traits of two species into single offspring, hybrid vigor/ heterosis, Developing high yielding crops etc. (1.5)	Correct mention of any two roles (1)	Correct mention of any one role (0.5)	Wrong answer (0)	
	Role of Back cross	Correctly mentioning any three roles of back cross for achieving	Correct mention of any two criterion (1)	Correct mention of any one role (0.5)	Wrong answer (0)	

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)
		offspring genetically identical closer to that of the parent. Used in horticulture, animal breeding and in production of gene knockout organisms. (1.5)				
2(xx)	Steps of Polymerase Chain Reaction	Brief correct description of the three steps i.e. Denaturation, Primer annealing and Extension/Polymerization <b>OR</b> correct labelled diagram of PCR (3)	Correct description of two steps <b>OR</b> Diagram without labelling (2)	Some relevant information (1)	Wrong answer (0)	
3(a)	Names of pituitary hormones	Correct names of two pituitary hormone involved in growth and metabolism like: GH/STH TSH (2)	Correct names of any one hormone (1)	Wrong answer (0)		
	Functions of <b>GH/STH</b>	Any two correct functions of GH/STH (Effects growth and development, stimulates cell division and cell growth, stimulate uptake of amino acids and protein synthesis.) (2)	Any one correct function of <b>GH/STH</b> (1)	Some relevant information (0.5)	Wrong answer (0)	
	Functions of <b>TSH</b>	Any two correct functions of TSH (stimulate thyroid gland enhance thyroxin secretions, promotes metabolism, growth and development.) (2)	Any three correct functions of <b>TSH</b> (1)	Some relevant information (0.5)	Wrong answer (0)	
	Problems related to abnormal secretion of GH/STH and TSH	Correct description of any three problems like Gigantism, dwarfism, acromegaly, hyperthyroidism, hypothyroidism etc. (3)	Correct description of any two problems (2)	Correct description of any one problem (1)	Some relevant information (0.5)	Wrong answer (0)
3(b)	Ammonia as excretory product	Correct description of any two criteria like: Ammonia as highly toxic waste, affect pH, need more water, highly soluble,	Correct description of any one criterion (1)	Some relevant information (0.5)	Wrong answer (0)	

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	
		ammonotelic. Only Aquatic organisms e.g fishes, protozoans, sponges etc. (2)					
	Urea as excretory product	Correct description of any two criteria like: Urea as less toxic waste, affect pH, need less water, relatively less soluble, ureotelic. Mammals etc. (2)	Correct description of any one criterion (1)	Some relevant information (0.5)	Wrong answer (0)		
4 (a)	Sanger's method name reasoning	Correct reasoning of dideoxy name (1)	Some relevant information (0.5)	Wrong answer (0)			
	Procedure of Sangar's method	Correct procedure mentioning four criteria/terms like Denaturation and tagging of target DNA, Production of different size fragments of target, DNA separation of target DNA/gel electrophoresis, reading a sequence from the gel, diagram etc. (4)	Correct procedure mentioning any three criteria/terms (3)	Correct procedure mentioning any two criteria/terms (2)	Correct procedure mentioning anyone criterion/term (1)	Wrong answer (0)	
4 (b)	(i) Labelling and function of part A, B, C, D, and E	Correct labeling i.e. A= amnion B= umbilical cord/ Allantois C= Chorion D= Placenta E= Yolk sac and relevant functions of each labelling (5)	Correct labeling and relevant functions of any four labelling (4)	Correct labeling and relevant functions of any three labelling (3)	Correct labeling and relevant functions of any two labelling (2)	Correct labeling and relevant functions of any one labelling (1)	Wrong answer (0)
	(ii) formation of Part D and its role	Correct description of placenta formation and its role (2)	Partially correct description of placenta formation and its role/ Only structure/ Only function (1)	Some relevant information (0.5)	Wrong answer (0)		
	(iii) Names of blood vessels in Part B	umbilical veins and umbilical arteries (1)	Some relevant information (0.5)	Wrong answer (0)			

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	
5 (a)	Post transcriptional modification of mRNA	Correction description of post transcriptional modifications mentioning any four criteria like: addition of cap, addition of tail, RNA Splicing, removal of intron, spliceosome, ligation of exon fragments, diagram (4)	Correction description of post transcriptional modifications mentioning any three criteria (3)	Correction description of post transcriptional modifications mentioning any two criteria (2)	Correction description of post transcriptional modifications mentioning any one criterion (1)	Some relevant information (0.5)	Wrong answer (0)
	Reason for modification for mRNA	Correct description of any two reasons like: Protection from cytoplasmic enzymes/phosphatases/nucleases, removal of introns etc. (3)	Correct description of any one reason (1.5)	Some relevant information (1)	Wrong answer (0)		
5 (b)	Steps of bone repair	Correct description of bone repair process mentioning four criteria like hematoma formation, fibrocartilaginous callus formation, Bony callus formation or callus ossification, bone remodeling (6)	Correct description of any three criteria of bone repair (4.5)	Correct description of any two criteria of bone repair (3)	Correct description of any one criterion of bone repair OR Diagram (1.5)	Some relevant information (0.5)	Wrong answer (0)

**Note: All the markers must know the solutions of all the questions item of the question paper before starting the marking**