Version No.			

ROLL NUMBER						

Answer Sheet No._____

Sign. of Candidate _____

Sign. of Invigilator _____

BIOLOGY HSSC–I (2nd Set)

SECTION – A (Marks 17)

Time allowed: 25 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.**

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

(1) The disease caused by viroid is:

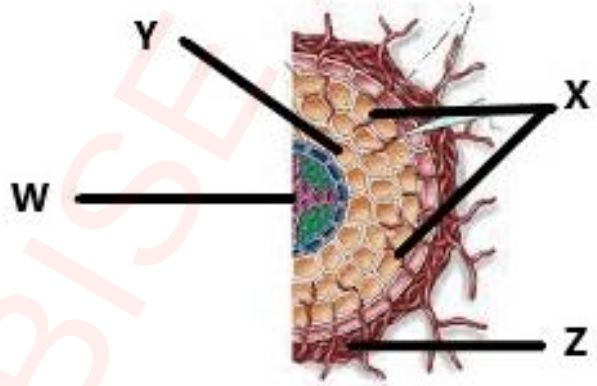
A. Hepatitis A ◯ B. Hepatitis D ◯

C. Hepatitis E ◯ D. Hepatitis B ◯

(2) Identify the actin protein on the basis of following features

	Shape	Nature	Solubility	
A	Filamentous	Inelastic	Soluble in aqueous medium	◯
B	Globular	Inelastic	Soluble in aqueous medium	◯
C	Filamentous	Elastic	Insoluble in aqueous medium	◯
D	Globular	Elastic	Insoluble in aqueous medium	◯

(3) Figure shown is section of plant root invaded with Ectomycorrhizae. Choose the option showing the correct labelling



	W	X	Y	Z	
A	Phloem	Cortex	Fungal hyphae	Ectomycorrhizal sheath	◯
B	Xylem	Fungal hyphae	Ectomycorrhizal sheath	Cortex	◯
C	Phloem	Ectomycorrhizal sheath	Cortex	Fungal hyphae	◯
D	Xylem	Fungal hyphae	Cortex	Ectomycorrhizal sheath	◯

(4) Guess the technique used to separate the chloroplast and mitochondria:

A. Chromatography ◯ B. Spectrophotometry ◯
C. Electrophoresis ◯ D. Differential configuration ◯

(5) In C4 pathway the first compound produced consisting of four carbons after fixation of carbon dioxide is

A. Succinate ◯ B. Oxaloacetate ◯
C. Malate ◯ D. Fumarate ◯

(6) $CO_2+2H_2S \longrightarrow (CH_2O)n+H_2O+2S$

Indicate the type of bacteria in which the above reaction takes place?

A. Chemoautotrophic ◯ B. Parasitic ◯
C. Saprotrophic ◯ D. Photoautotrophic ◯

(7) Choose the incorrect pair:

A. Nematode/ Pseudocoelom ◯
B. Platyhelminthes/ Metamorphosis ◯
C. Mollusca/ Trocophore larva ◯
D. Reptile/ Anamniote ◯

(8) Identify the characters of birds:

	Syrinx	**Semisolid urine**	**Urinary bladder**	**Sinus venosus**	
A	✓	✓	✓	×	◯
B	✓	×	✓	✓	◯
C	✓	✓	×	×	◯
D	✓	×	×	✓	◯

(9) Identify the tissue on the basis of following characteristics

i.	Extracellular deposition at corners
ii.	Mechanical tissue
iii.	Provides support to herbaceous parts of plants
iv.	No role in secondary growth
v.	Living cells

A. Sclerenchyma ◯ B. Collenchyma ◯
C. Xylem ◯ D. Epidermis ◯

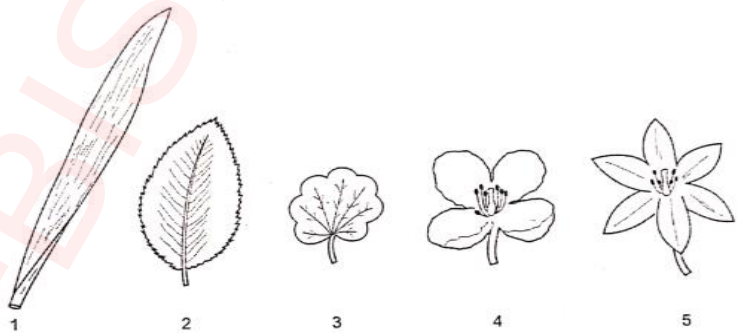
(10) Select the one which is **NOT** the function of liver:

A. Albumin synthesis ◯ B. Vitamin A synthesis ◯
C. RBC destruction ◯ D. Biotin synthesis ◯

(11) Seed remain dormant in plants facing stress conditions due to the release of:

A. Auxin ◯ B. Cytokinins ◯
C. Gibberellins ◯ D. Abscisic acid ◯

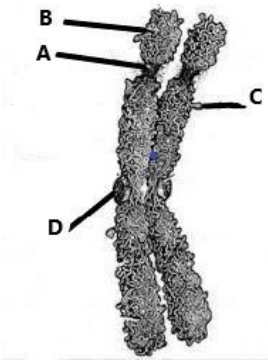
(12) Diagram shows leaves and flowers of different plants.



Which are from monocotyledons?

A. 1 &5 ◯ B. 3 & 4 ◯
C. 2 & 4 ◯ D. 2 & 5 ◯

(13) The given figure represents the pair of chromosomes. Choose the structure responsible for giving rise to nucleoli during interphase:

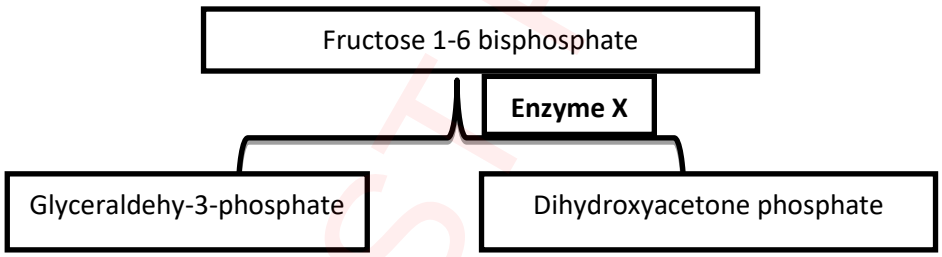


A. ◯ B. ◯
C. ◯ D. ◯

(14) If hair protein is composed of 6 amino acids. Select the possible numbers of nucleotide in mRNA specific for this protein:

A. 12 ◯ B. 18 ◯
C. 24 ◯ D. 9 ◯

(15) The following reaction taking place in presence of enzyme X without utilizing the water, is of glycolysis. The group to which the enzyme X belongs is



A. Oxidoreductase ◯ B. Hydrolase ◯
C. Transferase ◯ D. Lyases ◯

(16) The cardiac pacemaker in a patient fails to function properly. The doctor finds that an artificial pacemaker needs to be implanted in him. It is likely that electrodes of pacemaker will be implanted at the site of:

A. Atrioventricular bundle ◯ B. Purkinji fibers ◯
C. Sinoatrial node ◯ D. Atrioventricular node ◯

(17) What will happen when a child is vaccinated against tuberculosis?

	Type of immunity	**Production of antibody**	
A	Active	No	◯
B	Active	Yes	◯
C	Passive	No	◯
D	Passive	Yes	◯

Federal Board HSSC-I Examination
Biology Model Question Paper
(Curriculum 2006)

Time allowed: 2.35 hours Total Marks: 68

Note: Answer any fourteen parts from Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Write your answers neatly and legibly.

SECTION – B (Marks 42)

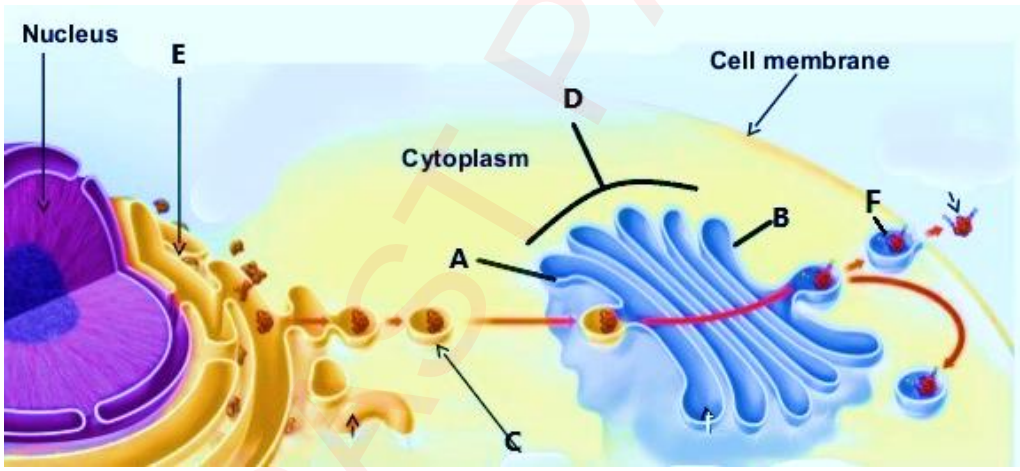
Q.2 Attempt any **FOURTEEN** parts from the following. All parts carry equal marks. (14 × 3 = 42)

i. Write down the role of any three plasma membrane proteins.

ii. Justify the endospore formation in bacteria to withstand unfavorable conditions.

iii. How bacteriophage get absorbed and penetrated into its host cell? Summarize the steps.

iv. In the following figure a part of cell is shown.



a. Name the labelled sides A and B of Golgi apparatus. Identify C and F as well. (1)

b. Why A and B are named so? (1)

c. Predict the fate of C and F by relating the functioning of both organelles.(1)

v. Sketch and compare the absorption spectra of chlorophyll a and b. (1+2)

vi. Compare the evolutionary adaptations of the given phyla: (0.5×6=3)

S#	Characteristics	Annelida	Echinodermata	Arthropoda
a	Excretion			
b	Transport			

vii. (a) The diagram shows a marine animal. Look carefully at the animal and classify according to (1)

A	Number of germ layers	
B	Type of body symmetry	

(b) Describe the unifying feature which distinguishes the metatheria and eutheria? (2)

viii. Distinctive characteristics of two plant groups are given below. Identify these groups of plants. Also describe two more characteristics of each group?
a. Forked green stem with no leaves (0.5+1)
b. Circinate venation (0.5+1)

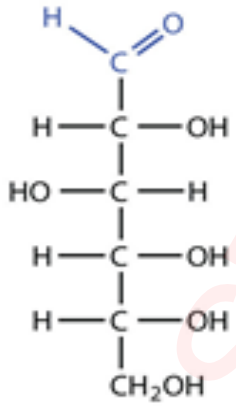
ix. How the evolution of pollen tube took place? Explain its importance. (3)

x. Complete the following table related to diseases (0.5×6=3)

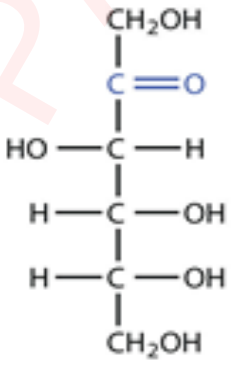
S#	Disease	Cause	Symptom
a		Begomovirus	
b	Food poisoning		
c		Deposition of cholesterol in arteries	

xi. How the fluctuation in blood pressure is regulated by baroreceptors? Discuss their role. (1.5+1.5)

xii. You are given structural formula of glucose and fructose. Make ring structure of sucrose with help of these.



Glucose
(an aldohexose)



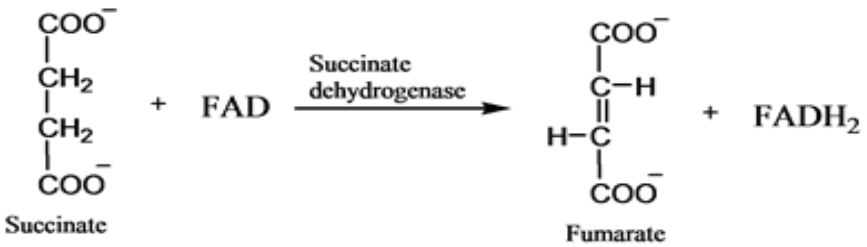
Fructose
(a ketohexose)

xiii. Some members of protists show unique features. Identify the group of protists on the basis of given hints. (6×0.5=3)

S#	Features	Group	S#	Features	Group
A	Macro and micronuclei		D	Pseudopodia	
B	Sleeping sickness		E	Parasitic protozoa	
C	Red tide		F	White rusts	

xiv. Temperature usually drops to below freezing point in northern areas during winter. Which physiological adaptations would enable the plant to survive in that stressful condition?

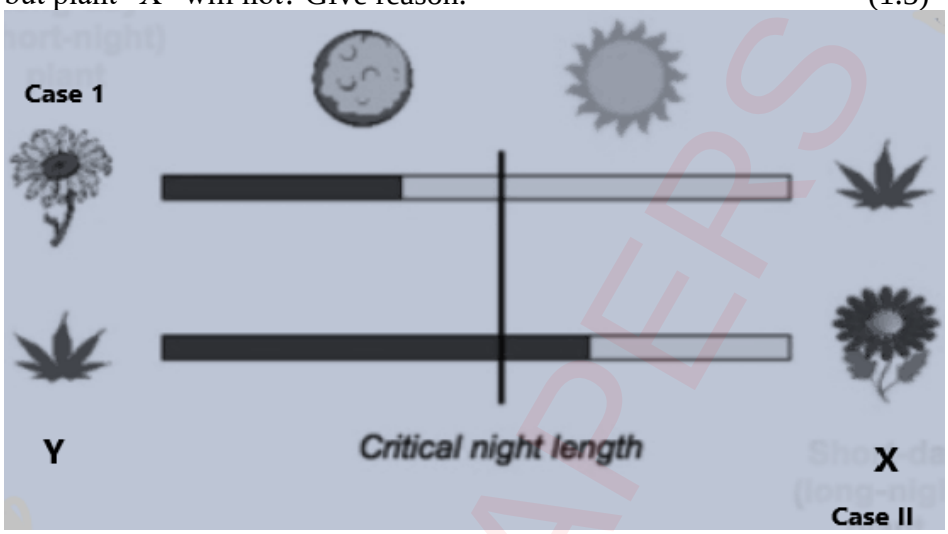
xv. (a) In the following reaction succinate is converted to fumarate in presence of succinate dehydrogenase. How the reaction will take place if we add melonate in the given reaction? (1.5)



Succinate Fumarate

(b) If the concentration of succinate will be 50 times more than the melonate, will the product be formed or not? Give reason. (1.5)

xvi. a) If dark period is interrupted with flash of red light, Plant "Y" will flower but plant "X" will not? Give reason. (1.5)

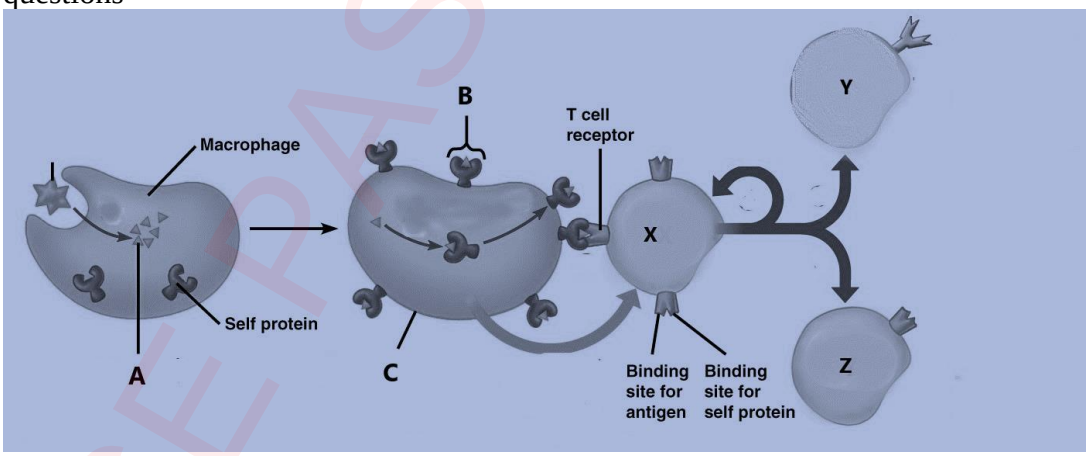


b) In case II if dark period is interrupted with flash of red light and after a time interval by far red light, what would be the effect on plant "X"? Give reason. (1.5)

xvii. (a) A woman is diagnosed with tumor at early stage. Investigate the mechanism the cell of immune system will use to kill the cancerous cell?(2)

(b) How oil glands within the epidermis inhibit the growth and also kill microorganisms? (1)

xviii. Keeping in mind the cell mediated immune response. Answer the following questions

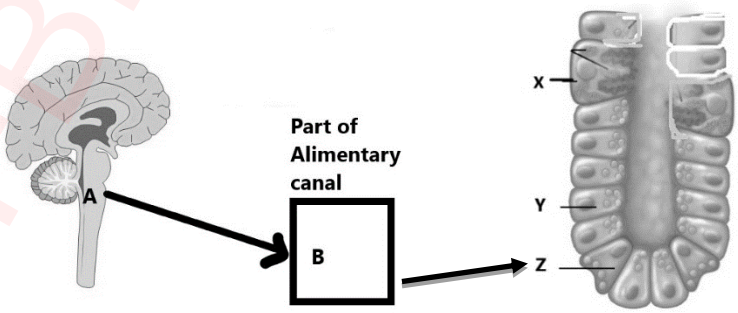


a. Identify the structures A,B & C. (1.5)

b. Recognize the cell responsible for producing antibody? (0.5)

c. How the role of Y and Z is different from each other? (1)

xix. The diagram shows the relation between our nervous and digestive system.



a. Identify the parts A, B, X and Y. (1)
b. After being stimulated by sight of food what would be the effect of Part A on part B. (1)
c. Evaluate the effect of part Z secretion on X. (1)

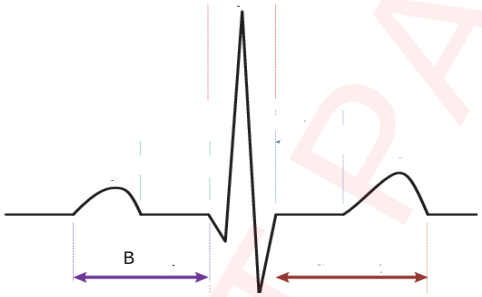
xx. Trace the path through which lymph becomes the part of circulatory system.(3)

SECTION – C (Marks 26)

Note: Attempt any **TWO** questions. All questions carry equal marks. (2×13 = 26)

Q.3 a. Draw and explain the life cycle of Zygomycota? (2+5)
b. Lipids are major constituents of fluid matrix of cell. Draw chemical structure and describe the properties of major membrane lipid? (1+5)

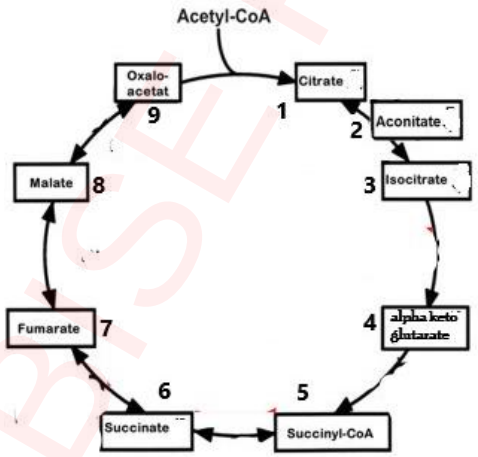
Q.4 a. Describe the structure of villus. Relate it with absorption of fats present in your diet. (2+2=4)
b. Answer the questions related to ECG



i. Label and explain P wave. (1)
ii. Predict the situation of ventricle during P wave. (0.5)
iii. Identify Part B in graph. What does it indicate? (1)
iv. Label part of ECG representing the ejection of blood from ventricle.(0.5)
v. Label and explain T wave. (1)

c. How would you relate the opening and closing of stomata with potassium ion? Explain. (5)

Q.5 a. Identify and analyse the steps of oxidative decarboxylation and substrate level phosphorylation in the given Krebs's cycle? (3)



b. How the reduced co-enzymes once produced in mitochondrial matrix are involved in ATP synthesis? Construct and outline the mechanism. (2+4)
c. Gram negative bacteria are resistant to antibiotics. Justify the statement by sketching and elaborating the characteristics of its cell wall. (1+3)

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BIOLOGY HSSC-I (2nd Set)
Student Learning Outcomes Alignment Chart
(Curriculum 2006)

SECTION – A

Q.1

(1) List the diseases caused by prions and viroids.
(2) Classify proteins as globular and fibrous proteins.
(3) Explain the mutualism established in mycorrhizae and lichen associations.
(4) List the principles and identify the apparatus used in the techniques of fractionation, differential staining, centrifugation, microdissection, tissue culture, chromatography, electrophoresis and spectrophotometry
(5) Outline the process of C4 photosynthesis as an adaptation evolved in some plants to deal with the problem of photorespiration.
(6) Describe autotrophic and heterotrophic nutrition in bacteria
(7) Describe the general characteristics, importance and examples of sponges, cnidarians, Platyhelminthes, aschelminths (nematodes), mollusks, annelids, arthropods and echinoderms.
(8) Describe the general characteristics of amphibians, reptiles, birds and mammals.
(9) Describe the structure of supporting tissues in plants.
(10) Explain the storage and metabolic role of liver
(11) Explain the role of important plant growth regulators.
(12) Define angiosperms and explain the difference between monocots and dicots
(13) Describe the structure, chemical composition and function of chromosome.
(14) Distinguish in term of structures and roles, the three types of RNA.
(15) Classify enzymes on the basis of the reactions catalyzed (oxido-reductases, transferases, hydrolases, hydrolyases, isomerases, and ligases).
(16) Explain the role of SA node, AV node and Purkinji fibers in controlling the heartbeat.
(17) Identify the process of vaccination as a means to develop active acquired immunity.

_____

SECTION – B

Q.2

i. Relate the lipid foundation and the variety of proteins of the membrane structure with their roles
ii. Justify the endospore formation in bacteria to withstand unfavorable conditions.
iii. Describe the Lytic and Lysogenic life cycles of a virus.
iv. Distinguish between smooth and rough endoplasmic reticulum in terms of their structures and functions. Describe the structure and functions of the Golgi complex.
v. Differentiate between the absorption spectra of chlorophyll ‘a’ and ‘b’.
vi. Describe the evolutionary adaptations in the concerned phyla for digestion, gas exchange, transport, excretion, and coordination

vii. a) Differentiate the diploblastic and triploblastic levels of organization. Describe the types of symmetry found in animals.
b) Differentiate among monotremes, marsupials, and placental.

viii. List the characters of seedless vascular plants with examples of whisk ferns, club mosses, horsetails and ferns.

ix. Describe the evolution of seed.

x. Describe the causative agent, symptoms, treatment and prevention of the following viral diseases: hepatitis, herpes, polio and leaf curl virus disease of cotton. Describe the causes, prevention, and treatment of the following disorders; ulcer, food poisoning, dyspepsia. Identify the factors causing atherosclerosis and arteriosclerosis.

xi. State the role of baroreceptors and volume receptors in regulating the blood pressure.

xii. Distinguish the properties and roles of disaccharides and describe glycosidic bond in the transport disaccharides.

xiii. Describe the salient features with examples of protozoa, algae, myxomycota and oomycota as the major groups of protists

xiv. List the adaptations in plants to cope with low and high temperatures.

xv. (a & b) Categorize inhibitors into competitive and non-competitive inhibitors.

xvi. (a & b) Describe the mechanism of photoperiodism with reference to the mode of action of phytochrome.

xvii. (a) Explain how the Natural Killer (NK) cells kill the cells that are infected by microbes and also kill cancer cells.
(b) Explain how oil and sweat glands within the epidermis inhibit the growth and also kill microorganisms.

xviii. Describe the roles of T-cells in cell-mediated immunity

xix. Explain the role of nervous system and gastrin hormone on the secretion of gastric juice

xx. State the structure and role of lymph capillaries, lymph vessels and lymph trunks.

SECTION – C

Q.3 a. Classify fungi into zygomycota, ascomycota and basidiomycota and give the diagnostic features of each group.

b. Define lipids and describe the properties and roles of acylglycerols, phospholipids, terpenes and waxes. Illustrate the molecular structure (making and breaking) of an acylglycerol, a phospholipid and a terpene

Q.4 a. Explain the absorption of digested products from the small intestine lumen to the blood capillaries and lacteals of the villi.

b. List the principles and uses of Electrocardiogram.

c. Describe the mechanisms involved in the opening and closing of stomata.

Q.5 a. Outline (naming the reactants and products of each step of) the steps of Krebs cycle.

b. Describe chemiosmosis and relate it with electron transport chain

c. Compare cell wall differences in Gram-positive and Gram-negative bacteria.

BIOLOGY HSSC I (2nd Set)

Table of Specifications

Assessment Objectives	Unit 1: Cell structure & function	Unit 2: Biological Molecules	Unit 3: Enzymes	Unit 4: Bioenergetics	Unit 5: Acellular Life	Unit 6: Prokaryotes	Unit 7: Protists And Fungi	Unit 8: Diversity among Plants	Unit 9: Diversity among Animals	Unit 10: Form & Function in Plants	Unit 11: Digestion	Unit 12: Circulation	Unit 13: Immunity	Total Marks	%age
K (Knowledge)	2(i)3				1(1)1 2(iii)3	1(6)1 2(ii)3	3(a)7	2(ix)3		1(11)1 4(c)5	Q.4a(4)			31	27
U (Understanding)	1(4)1 2(iv)3	1(2)1 2(xii)3 3(b)6		1(5)1 2(v)3 5(b)6	2(x-a)1	5(c)4	1(3)1 2(xiii)3	2(viii a & b)1.5+1.5	1(7)1 1(8)1 2(vi)3 2(vii-b)2	1(9)1 2(xiv)3	1(10)1 2(x.b)1	2(x-c)1 2(xi)3 2(xx-)3	2(xvii.b)1 2(xviii)3	60	51
A (Application)	1(13)1	1(14)1	1(15)1 2(xv a,b)3	5(a)3				1(12)1	2(vii-a)1	2(xvi a & b)3	2(xix)3	1(16)1 4(b)4	1(17)1 2 (xvii-a)2	25	22
Total Marks	8	11	4	13	5	8	11	7	8	13	9	12	7	116	100%

KEY:

1(1)(01)
Question No (Part No.) (Allocated Marks)

Note: (i) The policy of FBISE for knowledge based questions, understanding based questions and application based questions is approximately as follows:

a) 30% knowledge based.
b) 50% understanding based.
c) 20% application based.

(ii) The total marks specified for each unit/content in the table of specification is only related to this model question paper.

(iii) The level of difficulty of the paper is approximately as follows:

a) 40% easy
b) 40% moderate
c) 20% difficult