BIOLOGY

Paper – 1

(THEORY)

(Botany and Zoology)

Three hours and a quarter

(The first 15 minutes of the examination are for reading the paper only.

Candidates must NOT start writing during this time).

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*Answer **all** questions in Part I and **five** questions from Part II, choosing **three** questions from Section A and **two** questions from Section B.*

All workings, including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer.

The intended marks for questions are given in brackets [ ].

PART I (40 marks)

*Answer **all** questions.*

Question 1.

(a) Read the following questions carefully. For each question there are four alternatives A, B, C and D. Choose the correct alternative and write it in your answer sheet. **[5]**

(i) Which of the following is 'ODD'?

A axon

B actin

C cyton

D dendron

(ii) In some organisms growth occurs as a result of increase in size of their cells. This type of growth is best described as

A multiplicative.

B accretionary.

C exponential.

D auxetic.

(iii) When a seed is sown, it does not become bigger but grows into a seedling because

A growth is accompanied by differentiation.

B all the cells in a plant have same genetic structure.

C growth takes place by cell division and cell enlargement.

D internal cellular mechanism inhibits the expression of certain genes.

(iv) 'Replacement of lost part or repair of damaged body organ is called restorative regeneration'. This type of regeneration occurs in

A crabs.

B leeches.

C earthworms.

D salamanders.

(v) Thin walled undifferentiated, isodiametric cells capable of division are

A permanent cell.

B collenchyma cells.

C meristematic cells.

D sclerenchyma cells.

(vi) The best pair of micronutrients is

A Mg and Mn.

B Ca and Mn.

C Zn and Cu.

D S and Mo.

(vii) The function of auxin in agriculture is to

A break seed dormancy.

B cause delay in senescence.

C stimulate the growth of lateral buds.

D prevent premature drop of fruits and flowers.

(viii) Select the correct pair.

A monocytes: oval or kidney shaped nucleus

B basophils: polymorphic nucleus

C heterophils: s-shaped nucleus

D eosinophils: spherical nucleus

(ix) The hormone responsible for child birth is

A progesterone.

B androsteron.

C estrogen.

D relaxin.

(x) Semicircular canals occur in the

A ears.

B eyes.

C heart.

D kidney.

(b) Match each item of Column A with the most appropriate item of Column B. Rewrite the correct matching pairs in your answer sheet. **[5]**

Column A	Column B
i) Phenyl mercuric acetate	a. R + Fr + R
ii) Wall of ovary	b. weed control
iii) Germination of seed	c. tyloses
iv) Ethyl ethane sulphonate	d. pericarp
v) Manganes	e. anti transpirant
vi) Covering of muscle cells	f. meninges
vii) Acromegaly	g. chemical mutagen
viii)Duramater	h. mottled leaves
ix) Blockage of xylem	i. Fr + R + Fr
x) 2-4 dichlorophenoxy acetic acid	j. growth hormone
	k. plasmalemma
	l. sarcolemma
	m. cylosis

(c) Fill-in-the-blanks with appropriate words. Write only the correct answers in your answer sheet. Donot copy the whole sentence.

(i) ……. is the membrane surrounding the vacuole.

(ii) The entry of pollen tube through micropyle is called ……..

(iii) …….. is the method of inducing early flowering in plants by pretreatment of their seeds at low temperature.

(iv) Hypothyrodism in children causes ……..

(v) The pigment iodopsin is produced by …….. cells.

(vi) ……... is the exchange of parts between two non homologous chromosome.

(vii) The successful entry and multiplication of pathogenic microorganism inside the host body is ……..

(viii) According to Neo Darwinism, new species develop through mutation with ……..

(ix) The tough membranous covering of the bone is ……..

(x) The point of attachment of the body of the ovule to the funicle is known as ……..

(d) Expand the following: **[2]**

(i) OAA

(ii) PNS

(iii) HCG

(iv) IBA

(e) Write one contribution of the following scientist: **[2]**

(i) Hugo-De Vries

(ii) Robert Koch

(iii) Nawaschin

(iv) Ruben and Kumen

(f) ***Mention the most significant function of the following:*** **[ ]**

(i) Aerenchyma

(ii) Pyloric sphincter

(iii) Epiglottis

(iv) Seminal vesicles

(v) Abductors

(g) ***Write one difference between each of the following:*** **[3]**

(i) Chesard and echard

(ii) Phototropism and photoperiodism

(iii) Depressant and stimulant

(h) ***Give reasons for the following:*** **[4]**

(i) 'LUB' sound

(ii) Efferent arteriole is narrower than the afferent arteriole

(iii) Photorespiration is negligible in C_4 plants

(iv) Free floating hydrophytes have stomata only on the upper surface of leaves

(i) ***Correct the following statements by changing only the bold words.***
You must rewrite the complete sentences. **[5]**

(i) Inflammation of tongue due to deficiency of riboflavin is **cheilosis**.

(ii) Vasoconstriction is caused by **heparin.**

(iii) An acrosme is formed from **distal centriole** of the spermatid.

(iv) Presence of bile pigments in urine indicates **glycosuria**.

(v) The breakdown of nitrogenous organic compound in absence of air is **decay**.

(j) ***Give the scientific names of the following:*** **[4]**

(i) Internal softening of plant tissues due to their disintegration.

(ii) Antibodies that neutralize toxins entering the body from outside.

(iii) A group of cells or individual derived from a single cell or parent through asexual reproduction.

(iv) A cold and spinning cloudy mass of cosmic dust and gases.

PART II

SECTION A (30 marks)

Answer any three questions.

Question 2.

(a) (i) Define mass meristem. **[1]**

(ii) Describe the structure of amphivasal and radial vascular bundle with the help of diagrams. **[2]**

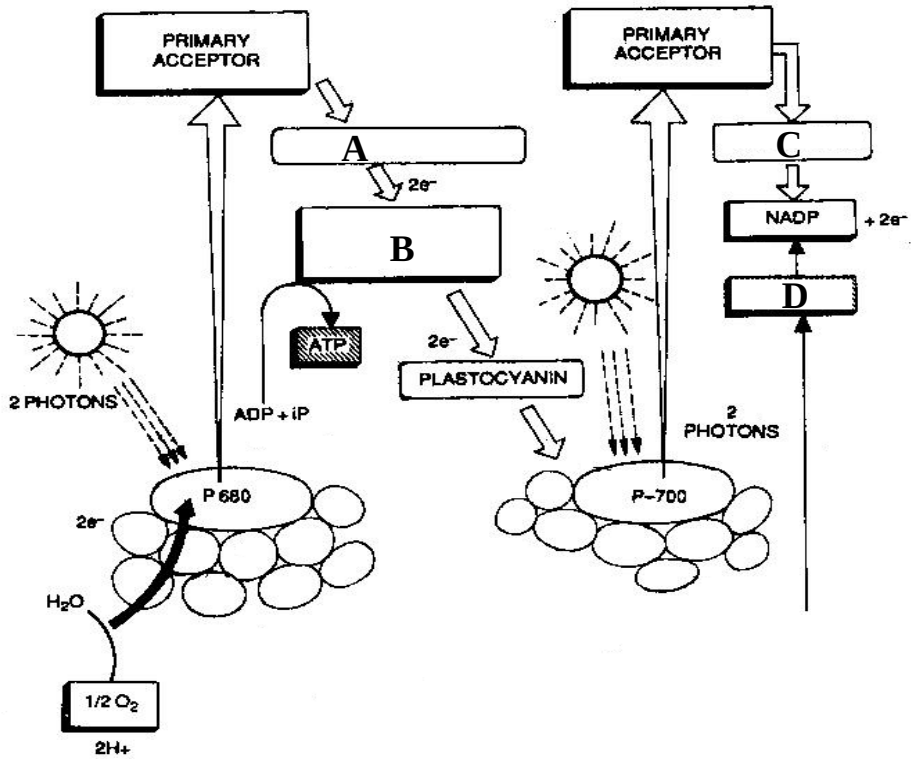
(b) Explain the carbonic acid exchange theory of uptake of mineral nutrients by plants. **[2]**

(c) Classify animal tissue on the basis of their functions. **[2]**

(d) Explain the mechanism of inspiration in human. **[3]**

Question 3.

(a) Given below is the pathway of electron in non-cyclic photophosphorylation. Complete the pathway by labelling A, B, C and D. **[2]**



(b) Compare hydrotropism, chemotropism and haptotropism with examples. **[2]**

(c) Explain the structure of an embryo sac with the help of a diagram.

(d) Differentiate between photorespiration and aerobic respiration with regard to substrate involved and end product. **[2]**

Question 4.

(a) Summarize the effect of quality of light on photoperiodism. **[2]**

(b) (i) Give reasons for the following: **[2]**

A. adrenal virilisim

B. polyuria

(ii) Write the effect of the following: **[2]**

A. hypersecretion of thyroid hormone on bones.

B. hyposecretion of insulin.

(c) Distinguish between isotonic and isometric contraction. **[2]**

(d) Describe counter current mechanism of urine concentration in Henle's loop. **[2]**

Question 5.

(a) Explain the conduction of heart beat in human with the help of a diagram. **[3]**

(b) From the multiplicative phase of oogenesis, trace the changes that take place from germinal epithelium before ovulation in an adult female. **[3]**

(c) Compare the removal of nitrogenous waste in ureotelic and uricotelic animals. **[2]**

(d) Given below are the names of some digestive enzymes. Select ***four*** enzymes secreted in the small intestine for the digestion of carbohydrates. **[2]**

sucrase, dipeptidase, maltase, proteases, lactase, chemotrypsin, entrokinase, limit dextrase

Question 6.

(a) Give ***two*** evidences in support of cohesion tension and transpiration pull theory. **[2]**

(b) Give reasons for the following: **[2]**

(i) Salt is added for preservation.

(ii) During a hot midday, plants wilt but recover in the evening.

(c) What happens to the, **]**

(i) osmotic pressure of a solution when solute is added to it?

(ii) DPD of a cell, when sugar is converted into starch?

(d) Distinguish between the following: **[2]**

(i) glycogenolysis and glycogenesis.

(ii) proenzyme and engyme.

(e) (i) Explain the following terms: **[2]**

A. Synaptic delay

B. Synaptic fatigue

(ii) Conditioned reflex may be lost with time. Why? **[1]**

SECTION B (30 marks)

Answer any two questions.

Question 7.

(a) What is biogenesis? **[1]**

(b) Explain recapitulation theory with an example. **[2]**

(c) (i) How does natural selection help to increase the number of DDT Resistant mosquitoes? **[2]**

(ii) Describe Lamarckism. **[1]**

(d) Wild characters are dominant over mutant characters. Why? **[2]**

(e) (i) Compare domestication of plant and plant introduction. **[1]**

(ii) What will be the effect if self pollination takes place continuously? **[1]**

(f) (i) How is DNA finger printing useful in day to day life? **[2]**

(ii) Differentiate between laparoscope and gastroscope. **[2]**

(g) Mention ***two*** purposes of mutation in agriculture. **[1]**

Question 8.

(a) Dragon fly and bat use wings for flying. Are these two organs analogous or homologous? Support your answer.

(b) Interpret Natural Selection in your own words. **[3]**

(c) 'Somatic mutation cannot be inherited'. Comment. **[2]**

(d) (i) Define energy cropping and gasification. **[2]**

(ii) How does insitu conservation help in agriculture? Write any ***two*** points. **[1]**

(iii) Write an important use of haploid plants. **[1]**

(e) (i) Genetically modified food should be released to the market after appropriate test. Why? Give ***two*** reasons. **[2]**

(ii) 'Weed control gives better yield of crops'. Why? **[2]**

Question 9.

(a) (i) List down the energy sources for evolution of life on primitive earth. **[2]**

(ii) Suggest ***two*** measures to control AIDS? **[1]**

(b) Write short notes on the following: **[3]**

(i) Allopatric speciation

(ii) Heidelbergman

(iii) Parapithecus.

(c) (i) Give ***two*** consequences of using excess pesticides. **[2]**

(ii) Explain how cancer may spread in the body? **[2]**

(iii) 'Colour blindness occurs more often in males than in the females'. Justify. **[2]**

(d) (i) What will happen if a person with Rh+ donates blood to a Rh- person for the second time? **[1]**

(ii) If an alcoholic person wants to quit alcohol, what are the practices the person should follow ? **[2]**

Question 10.

(a) (i) Give ***two*** reasons why Lamarck's theory of evolution is rejected by most of the biologists.

(ii) Explain immunology. **[1]**

(iii) 'Alcohol and Barbiturates taken together prove to be more dangerous Than when taken separately'. Justify. **[1]**

(b) (i) Suggest ***two*** methods for the development of livestock products in Bhutan. **[2]**

(ii) Skin forms the first line of defense of the body. Why? **[2]**

(c) (i) 'Recombinant DNA technology is a boon'. Justify the statement. **[2]**

(ii) Copy and complete the following table: **[1]**

Types of drugs	**Example**	**Effects**
Narcotic	Morphin	***A……..***
B……..	Nicotine	Insominia

(d) Discuss the advantages of artificial insemination. **[2]**

(e) Mention ***one*** significant function of the following: **[2]**

(i) suppressor cells

(ii) mast cells.