B. ANALYSIS OF PERFORMANCE

PART I (20 Marks)

Answer **all** *questions.*

Question 1

(a) Give *one* significant difference between each of the following: **[5]**

(i) Implantation and Parturition.

(ii) Active absorption and passive absorption.

(iii) Haemodialysis and Peritoneal dialysis.

(iv) Simple fruit and Aggregate fruit.

(v) Auricles and Ventricles.

(b) Explain what would happen if: **[5]**

(i) Excess fertilizers are added to soil.

(ii) Blood clots in the coronary artery.

(iii) Beta cells in the islets of langerhans are damaged.

(iv) Silicon emulsion is applied over the surface of leaves.

(v) Magnesium element is deficient in the soil.

(c) Each of the following questions / statements have four suggested answers. Rewrite the correct answer in each case: **[3]**

(i) The cell division in the tunica region of shoot apex is:

(A) Periclinal

(B) Horizontal

(C) Anticlinal

(D) Radial

(ii) The dark coloured dead wood present in the central region of old trees is:

(A) Spring wood

(B) Heart wood

(C) Sap wood

(D) Cambium

(iii) Dwarfism accompanied with mental retardation is due to hypo-secretion of:

(A) Growth hormone

(B) Thyroxine hormone

(C) Parathormone

(D) Adrenalin hormone

(iv) Oxygen is released in photosynthesis by:

(A) Photophosphorylation

(B) Photolysis of water

(C) Photorespiration

(D) Photons

(v) The spinal nerve is:

(A) A mixed nerve

(B) A sensory nerve

(C) A motor nerve

(D) A cranial nerve

(vi) The cells of the areolar tissue which produce heparin are:

(A) Fibrocytes

(B) Mast cells

(C) Macrophages

(D) Chondriocytes

(d) Mention the most significant function of the following: **[3]**

(i) Semi circular canals

(ii) Bowman's capsule

(iii) Parenchyma

(iv) Leg haemoglobin

(v) Guard cells

(vi) Alveoli

(e) State the best known contribution of: **[2]**

(i) Munch

(ii) Ronald Ross

(iii) Marshall Hall

(iv) Huxley

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

(i) ABA

(ii) FSH

(iii) AIDS

(iv) DDT

Comments of Examiners

(a) (i) Instead of blastocyst/embryo, some candidates used words like, zygote, foetus, egg, ovule, etc. Some candidates confused implantation with implants; under parturition, some candidates wrote – 'expelling the child' instead of 'full term foetus'.

(ii) Most of the candidates answered this part correctly. Some wrote opposite answers. A few candidates interpreted the question in terms of water absorption but made no mention of the role of root cells except that roots are 'involved' and 'not involved'.

(iii) Majority of the candidates attempted 'Hemodialysis' correctly but failed to attempt 'Peritoneal Dialysis'.

(iv) Some candidates explained the difference between true and false fruit. The expected single carpel / multi carpellary syncarpous ovary was not mentioned in many answers; in some cases, 'aggregate fruits' were confused with 'multiple fruits'.

(v) Majority of the candidates wrote the answer correctly.

(b) (i) Most of the candidates wrote in terms of toxicity and pollution instead of tonicity. Several candidates wrote 'endosmosis' instead of 'exosmosis'.

(ii) The common term 'heart attack' was used by a number of candidates. Some candidates just wrote that blood supply to the heart stops whereas, reference to supply of blood to the heart muscles was important as the question clearly mentioned 'coronary artery'. Some candidates only wrote, 'heart will stop working', without giving a proper explanation.

(iii) Some candidates wrote the function of α cell instead of β cells. Hence wrote about glucagon instead of insulin.

(iv) Many candidates attempted this question correctly. A few some did not know that silicon emulsion acts as an antitranspirant. They wrote vague answers like, photosynthesis will stop or to increase soil fertility.

(v) Most of the candidates could write this answer correctly; however, very few wrote the technical terms i.e. chlorosis.

Suggestions for teachers

- Stress upon using key words in answers.
- Go through the syllabus and scope every year and pay special attention to the topics which have been newly introduced.
- Importance must be given to giving compatible differences.
- The types of fruits and their development should be compared in tabular form.
- The structure of the Heart must be explained with the help of a model or diagrams so that the students have a clear concept of the chambers of the Heart. Auricles are thin walled and ventricles are thick walled – this must be explained with reasoning.
- The concept of coronary artery supplying blood to the Heart muscles should be made clear - technical terms like coronary thrombosis, myocardial infarction should be discussed.
- Fertilisers act as salts which make the soil hypertonic. This should be explained when teaching osmotic relations in a plant cell.
- Different types of Hormones, their source and their functions should be discussed in a tabular form.
- Role and deficiency of elements must be discussed while teaching Mineral Nutrition.
- Photolysis, Photorespiration and Photophosphorylation must be clearly explained along with comparison and differentiation.

(c) (i) Many candidates answered this part correctly.
(ii) This part was generally attempted correctly by most of the candidates. A few candidates got confused with 'sap wood'.
(iii) A few candidates got confused between 'growth hormone' and 'thyroxine'.
(iv) Most of the candidates answered this part correctly.
(v) A few candidates chose 'sensory nerve' instead of 'mixed nerve'.
(vi) Many candidates wrote 'macrophages' instead of 'mast cells'.

(d) (i) A few candidates wrote 'hearing' as the function. Some candidates wrote 'static balance' instead of 'dynamic balance'.
(ii) Some wrote 'excretion/ urine information' instead of 'ultrafiltration'. Some only wrote 'glomerular filtration'.
(iii) This part was generally well attempted. A few candidates wrote about sclerenchyma instead of parenchyma.
(iv) Most of the candidates answered this part correctly. Some confused 'leg haemoglobin' with 'haemoglobin' and wrote anemia.
(v) Some candidates only mentioned the shape and turgid condition, but did not mention the role of Guard cells.
(vi) Most of the candidates attempted this part correctly. Some candidates gave the answer as 'respiration' instead of 'exchange of respiratory gases'.

- Functions of different parts of the ear must be explained clearly. Difference between static balance and dynamic balance must be highlighted.
- Functions of individual parts of the nephron should be discussed separately.
- Parenchyma and their types should be discussed along with their functions.
- The process of nitrogen fixation should be discussed in detail mentioning the role of different microbes. Importance of leghemoglobin should be discussed as oxygen scavenger for action of nitrogenase enzyme.
- Importance of correct spellings should be emphasised.

(e) (i) Most of the candidates wrote the role correctly. Some wrote the answer as 'Munch Hypothesis' instead of 'Mass flow Hypothesis'.
(ii) Most candidates were able to attempt this part correctly.
(iii) This part was mostly answered correctly. A few candidates wrote 'reflex arc' instead of 'reflex action'.
(iv) Most of the candidates were able to attempt this part correctly.

(f) (i) Spelling errors were made by several candidates while expanding the abbreviation
(ii) Some candidates mentioned 'Follicular' instead of 'Follicle' and 'Stimulation' instead of 'Stimulating'.
(iii) Some candidates made mistakes and spelling errors in expansion.
(iv) DDT was expanded as 'tetra- chloro' and as 'ethene' or 'ethylene' by some candidates.

MARKING SCHEME

Question 1.

(a)	(i)	Implantation – After 7 days/1 week of fertilisation – Attachment of blastocyst/embryo to the uterine wall/endometrium	Parturition – After 280 days / 40 weeks of fertilisation – Act of expelling the full term young one at the end of gestation/ child birth/ delivery of foetus
	(ii)	Active absorption – Requires carrier molecules – Against concentration gradient/ Low concentration to high conc. / Energy required/ ATP required – Slow transpiring – Forces activity of root	Passive absorption – Does not require carrier molecules – Along concentration gradient/ High conc. to low conc./ Energy not required – Fast transpiring – Forces activity of shoot
	(iii)	Hemodialysis – Man-made membrane / dialiser to filter wastes and remove extra fluid from the blood/ artificial kidney. – Needs hospitalization.	Peristoneal dialysis – Uses the lining of abdominal cavity / Peritoneal membrane and a solution dialysate to remove wastes and extra fluid. – Does not need hospitalization.
	(iv)	Simple fruit – From a single carpel or more than one fused carpels / multicarpellary syncarpous flower/ ovary	Aggregate fruit – From many carpels / multicarpellary apocarpous ovary
	(v)	Auricles – Thin walled – Receiving chambers – Upper chamber of heart	Ventricles – Thick walled – Distributing chambers – Lower chamber of heart

(b) (i) Root hair will be killed due to exosmosis/plasmolysis/flaccid/soil becomes hypertonic/loses osmotic balance.

(ii) Coronary thrombosis/heart attack/myocardial infarc/ ischemia.

(iii) Diabetes mellitus/no insulin/sugar in urine and blood/hyperglycemia/glycosuria.

(iv) Silicon emulsion application reduces the rate of transpiration (acts as antitranspirant) and hence the leaves remain distended and their cells are turgid for a long time.

(v) Chlorosis/decrease synthesis of chlorophyll/yellowing of leaves.

(c) (i) Anticlinal

(ii) Heart wood

(iii) Thyroxin

(iv) Photolysis

(v) A mixed nerve

(vi) Mast cells

(d) (i) Balance/ dynamic equilibrium/ angular acceleration.

(ii) Ultra filtration.

(iii) Storage of food/ mechanical support/ seat of metabolic activities / conduction of water/ photosynthesis/ buoyancy.

(iv) Oxygen scavenger (action of nitrogenase enzyme)/ Nitrogen fixation/ protects nitrogenase. Maintains anaerobic conditions for nitrogenase / attachment of nitrogen.

(v) Regulate the opening and closing of stomata/regulates transpiration.

(vi) Exchange of (respiratory) gases.

(e) (i) Mass flow hypothesis/ Pressure flow hypothesis/ turgor pressure flow/ translocation of photosynthetates/food/organic solutes.

(ii) Malarial parasite (life cycle in mosquitoes)/ Malaria.

(iii) Reflex action/ simple reflex/ physiology of circulation.

(iv) Sliding filament theory/Synthetic Theory of Evolution/ protoplasm is the physical basis of life.

(f) (i) Abscissic acid

(ii) Follicle Stimulating Hormone

(iii) Acquired Immuno Deficiency Syndrome

(iv) Dichloro di phenyl tri chloro ethane.

PART II (50 Marks)

SECTION A

*Answer any **three** questions.*

Question 2

(a) Give *four* differences between *root apex* and *shoot apex*. **[4]**

(b) Explain the development of the different types of endosperms in angiosperms. **[3]**

(c) Explain briefly: **[3]**

(i) Capillary water

(ii) Osmosis

(iii) Aeroponics

Comments of Examiners

(a) Some candidates wrote very general differences like, root apex below the ground and shoot apex above the ground. Actual valid differences were missed in many answers.
(b) Several candidates mentioned the names of different types of endosperms correctly but failed to give correct explanation. Some described double fertilization. Some wrote intermediate type of endosperm which is correct for mode of development but not as a type.
(c) (i) Many candidates attempted this part correctly but some confused 'capillary water' with 'ground water'.
(ii) Many candidates went wrong in explaining 'Osmosis', as the concept of concentration was not understood clearly by them.
(iii) Many candidates wrote about 'hydroponics' instead of 'aeroponics'. Candidates did not mention about nutrient mist which is a must.

Suggestions for teachers

- Comparison between root and shoot and root apex and shoot apex should be discussed simultaneously to make the concept clear.
- Teaching should be accompanied by diagrams to give a clear understanding.
- Different types of soil water must be discussed in detail.
- That a highly concentrated solution will have less concentration of water must be explained. The importance of semipermeable membrane should also be highlighted.

MARKING SCHEME

Question 2.

(a)

Root Apex	Shoot Apex
– Sub-terminal	Terminal
– Protected by root cap	Protected by apical bud/leaf primordia/leaf appendages
– Has no nodes and internodes	Has nodes and internodes
– Does not bear any appendages	Bears lateral appendages/ leaf primordial
– Has a quiescent center	No quiescent center
– Cells non-green/ non-photosynthetic	green/photosynthetic
– No changes at the time of flowering	Changes seen
– Positively geotropic	Positively phototropic
– Not differentiated into tunica and corpus	Differentiated

(b) Nuclear Endosperm – In polypetalous dicotyledons

- First few divisions not accompanied by cell wall formation.
- Nuclei produced remain free in the cytoplasm.

(Self-explanatory diagram also accepted).

Cellular Endosperm - In gamopetalous dictoyledons

– wall formation occurs with first division of primary endosperm nucleus
– endosperm tissue cells do not show regular arrangement.

Helobial Endosperm:

– Intermediate between nuclear and cellular type.
– First division of primary endosperm nucleus accompanied by formation of transverse wall
– Divides embryo sac unequally into small chalazal chamber and large micropylar chamber.

(c) (i) Water held between soil particles by capillary force/ only water available to plants.

(ii) Movement of water molecules from their higher concentration to their lower concentration/dilute to concentrated solution through a semi-permeable membrane.

(iii) Aeroponics – plants are grown with their roots placed in nutrient mist /aerosol.

Question 3

(a) Explain the C_4 cycle of photosynthesis. **[4]**

(b) State *three* advantages and *three* disadvantages of vegetative reproduction. **[3]**

(c) Mention *one* role and *one* deficiency symptom of the following elements in plant nutrition: **[3]**

(i) Phosphorus

(ii) Iron

(iii) Chlorine

Comments of Examiners

(a) The correct sequence was not followed by some candidates. Mesophyll chloroplasts and bundle sheath chloroplasts were not specified. Reactants and co-factors eg. CO_2, $NADPH_2$ and ATP were not shown at the required steps by some candidates. In some cases, the enzymes were not mentioned.

(b) Some candidates took 'vegetative reproduction' as 'self-pollination' and mentioned differences between self and cross pollination. Many candidates did not write the disadvantages. In many answers there were repetitive points.

(c) (i) Many candidates wrote the role correctly but went wrong in writing the function.

(ii) Most of the candidates attempted this part correctly. Some candidates mentioned the use in synthesis of hemoglobin which is a respiratory pigment found in animals.

(iii) The correct role of chlorine was not mentioned by several candidates.

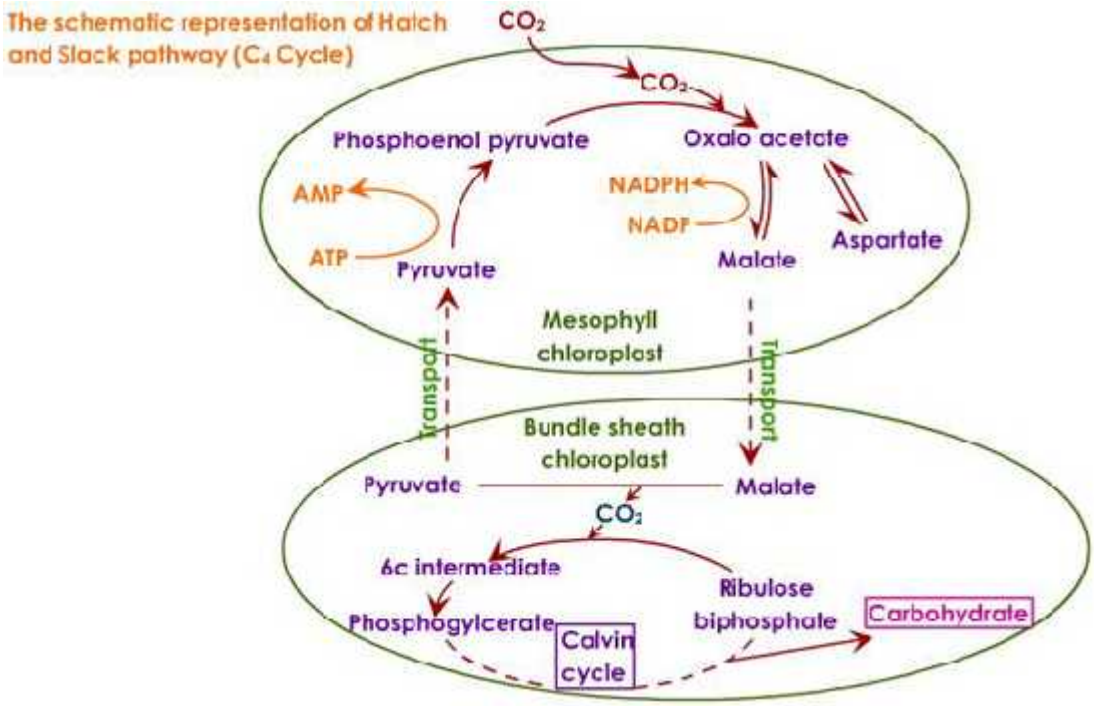
Suggestions for teachers

– The teachers should insist that students mention the site as well as the correct carbon dioxide acceptors. The correct sequence should be given importance.
– Advantages and disadvantages of vegetative reproduction as well as sexual reproduction should be compared and contrasted for clear understanding. This will help them to avoid repetitions.

MARKING SCHEME

Question 3.

(a)



(b) Advantages:

- More rapid
- Cheaper
- Preservation of desirable characteristics
- Possible to raise a large stock of selected strains
- Propagation of ornamental plants
- Sure/certain
- Plants which do not produce viable seeds can be propagated
- Mastery of their surrounding

(any three)

Disadvantages:

- Unwanted characters cannot be eliminated
- Fall in vigour and vitality due to lack of sexual stimulus
- No variations
- Low yield
- Overcrowding

(any three)

(c)			Role	Deficiency
	(i)	Phosphorus	Constituent of cell membrane / nuclear acid /nucleotides / coenzymes / ATP / nitrogen metabolism / phosphorylation of sugar in respiration	– Stunted growth / premature leaf fall – development of anthocyanin pigment /chlorosis – brown necrotic areas/necrosis – Restricted root and shoot gr. – Delayed flowering.
	(ii)	Iron	Synthesis of chlorophyll, formation of carotenoids constituent of cytochromes Electron carrier formation of ferredoxin Activates number of enzymes/ catalases.	Interveinal chlorosis Localised or generalized necrosis
	(iii)	Chlorine	Transfer of electrons from OH^- ions to photoexcited chlorophyll/ photolysis Ionic equilibrium Proper working of PS II	Wilted leaves/ stunted growth/ chlorosis/ necrosis Reduced fruiting.

Question 4

(a) What are *tropic hormones*? Describe the feedback control of tropic hormones with an example. **[4]**

(b) Explain the conduction of nerve impulse through a nerve fibre. **[3]**

(c) Draw a labelled diagram of the T.S. of bone. **[3]**

Comments of Examiners

(a) Most of the candidates failed to write that tropic hormones regulate other endocrine glands. Many candidates gave wrong examples for tropic hormones. Clear examples of positive and negative feedback were not given. After explaining positive feedback, some candidates wrote that the opposite happens in negative feedback, which was an incomplete statement.

Suggestions for teachers

– Tropic Hormones should be explained with reference to hypothalamus and pituitary. Both positive and negative feedback should be clearly explained with examples.

(b) The stages were mentioned but not discussed in proper sequence by some candidates. In some cases, wrong description was given. Most candidates mentioned - inner more negative and outer more positive.

(c) Most of the candidates drew the correct diagram but did not label correctly. Some candidates lost marks as they drew the L.S. of bone instead of T.S of bone.

- Resting Potential should be explained with reference to ionic equilibrium, axolemma permeability and the role of Na Pump. For generation of action potential threshold stimulus is a must.
- Students should be explained the difference between T.S, L.S & V.S.
- The importance of correct labelling should be stressed upon. Arrows of labels should not intersect each other.

MARKING SCHEME

Question 4.

(a) Tropic hormones – Hormones which stimulate other endocrine glands to release their hormones.

- They are subject to feedback inhibition.
- At the pituitary / hypothalamic level.
- When the blood level of Adreno cortico steroids/ sex steroids/ thyroid hormones becomes high they inhibit release of their respective tropic hormone.
- If it falls more tropic hormones are released.
- Thus maintaining level of hormones in blood.
- Role of releasing factor.

(b) In the resting state

- Na pump/normal polarized state/Na^+ ions move outside and K^+ ions move inside
- Energy supplied by ATP
- Axon membrane inside electronegative (less electropositive) and outside electropositive (more electropositive)

Reverse potential/reverse polarization

- Na pump stops/Na^+ ions from exterior into axoplasm/ Na influx
- Axon membrane gets depolarized/interior of axon becomes positive to that of outside
- When stimulus is strong depolarization spreads throughout the nerve fibre

Repolarisation

- No more Na can enter/axon membrane totally impermeable
- K^+ ions diffuse in axoplasm and Na^+ ions diffuse in interstitial fluid
- Na pump starts functioning

(c) T.S. of Bone – Diagram with correct labeling.

Question 5

(a) Explain the role of pancreas in digestion of various food materials. **[4]**

(b) Briefly describe the stages in clotting of blood. **[3]**

(c) Define: **[3]**

(i) Reparative regeneration

(ii) Capacitation

(iii) Menarchy

Comments of Examiners

(a) Most of the candidates could not write the complete reactions with correct names of substrates, enzymes and products. Very few candidates could write the end products correctly.

(b) The correct sequence was not followed by many candidates. Several candidates did not start the answer with the release of thromboplastin. Some candidates did not show the involvement of calcium ions at relevant steps.

(c) (i) Most of the candidates were able to attempt this part well. Some candidates confused 'reparative regeneration' with 'restorative regeneration'.

(ii) The question was well attempted. Some candidates confused 'capacitation' with 'spermatogenesis'. A few explained it as - changes in the uterus to accept a sperm.

(iii) Most of the candidates attempted this part correctly. Some confused 'menarche' with 'menopause'. Others defined 'puberty'.

Suggestions for teachers

- The role of pancreatic enzymes for carbohydrates, proteins and lipids digestion should be dealt with separately with reference to Substrate (enzyme, pH), Product.
- The importance of writing the correct sequence must be told to students.
- Types of regeneration should be explained with examples.
- Different terms associated with spermatogenesis and fertilisation should be explained clearly.
- The difference between menarche and menopause should be explained.

MARKING SCHEME

Question 5.

(a) Role of Pancreas in digestion of various food materials:

- Produces pancreatic juice consisting of $NaHCO_3$ and Na_2HPO_4 which makes the juice alkaline. Juice contains:
- Trypsin/ chymotrypsin/ Carboxypeptidase → converts proteins to simple peptides and AAS
- Amylase(Amylopsin) → starch to maltose
- Phospholipase/ Lipase (steapsin) → Fatty emulsions to fatty acid and glycerol.
- RNA se/DNA ase → RNA/DNA to simple nucleotides
- Elastase → elastin to AAs

(b) The stages in clotting of blood:

- Platelets release thromboplastin / F3/thrombokinase
- Acts on prothrombin in pr of Ca^{++} ions
- Converts to active thrombin
- Thrombin acts on fibrinogen
- Converts to fibrin
- Fibrin + dead cells → clot

(c) (i) Repair/healing of injuries takes place by proliferation of localized cells and migration

(ii) Changes/activation in a sperm for fertilization

(iii) Onset of menstruation.

Question 6

(a) State *four* differences between *transpiration* and *guttation*. **[4]**

(b) Give an account of the secretory phase of menstrual cycle. **[3]**

(c) Define: **[3]**

(i) Radial vascular bundle

(ii) Rigor mortis

(iii) Root pressure

Comments of Examiners

(a) This part was mostly well attempted. A few candidates could not write compatible differences. Some wrote about 'bleeding'. In some cases, points were repeated.

(b) Some candidates described vague points or wrote about the menstrual phase. Important points were missing in many answers. Several candidates could not correlate the changes in the uterus with the hormonal changes in ovary/ pituitary.

(c) (i) Most of the candidates attempted this part correctly. Some candidates confused 'radial bundle' with 'collateral bundle'.
(ii) Some candidates could not define 'rigor mortis' correctly as stiffening of muscles after death or, sustained contraction.
(iii) A few candidates did not write the complete definition. They defined 'root pressure' as 'pressure created in roots'.

Suggestions for teachers

- Transcription, guttation and bleeding should be discussed with comparison and contrast.
- Different phases of the menstrual cycle should be explained with reference to the pituitary, ovary and uterine endometrium.
- Types of vascular bundles should be explained with the help of diagrams.
- Students should be explained the difference between 'sperm' and 'rigor mortis'.
- Definitions should be taught with key words.

MARKING SCHEME

Question 6.

(a) Differences between Transpiration and Guttation

	Transpiration	Guttation – exudation of water
–	Occurs during the day	At night / early morning
–	Water lost in the form of water vapour	In the form of liquid droplets
–	Through stomata/aerial parts, lenticels and cuticle	Through hydathodes
–	Under dry conditions	Under humid conditions
–	Pure water	Dissolved salts
–	Cooling effect	Rid of excess water / No such effect
–	No root pressure	Root pressure involved

(b)
- High LH causes ovulation/rupture of follicle
- Ruptured follicle changes into corpus luteum
- Secretes progesterone
- Endometrium thickens
- Richly supplied with blood vessels
- Corkscrew shaped uterine glands / pendulus/ more active
- Uterine movements are reduced
- Uterine milk secreted
- Arteries become coiled
- Glycogen content of the endometrial epithelium increases
- If ovum is not fertilized the corpus luteum degenerates / formation of corpus albicans
- Progesterone level decreases

(c)
(i) Xylem alternates with phloem (found in roots) lying on separate radii

(ii) Stiffening of muscles after death/sustained contraction/irreversible contraction

(iii) Pressure created in the roots which takes the water into the xylem.

SECTION B

*Answer any **two** questions.*

Question 7

(a) Differentiate between *apes* and *man* with respect to the following characteristics: **[4]**

(i) Posture

(ii) Cranium

(iii) Brow ridges

(iv) Locomotion

(b) Define: **[3]**

(i) Vestigeal organs

(ii) Variations

(iii) Neo-Darwinism

(c) Give *three* differences between *Natural Selection* and *Artificial Selection*. **[3]**

Comments of Examiners

(a) (i) Most of the candidates gave correct differences.
(ii) Some candidates wrote the cranial capacity incorrectly.
(iii) Some candidates wrote 'flat face' but made no mention of 'brow ridges'. Some wrote, 'brow ridges absent in man'.
(iv) Many candidates mentioned 'arboreal' for apes but did not mention the use of the limbs for locomotion. Some wrote, 'walking with knuckles' to describe locomotion in apes.

(b) (i) Some candidates wrote incomplete definitions - e.g. Non - functional organs, without mentioning 'ancestors'.
(ii) Many candidates answered this part correctly.
(iii) Some candidates only explained 'Darwinism'.

(c) In many cases, the differences given by candidates were not compatible. Most of the candidates could write only one valid difference between natural and artificial selection.

Suggestions for teachers

- Differences and similarities between man and ape should be done under separate headings, like, anatomical, morphological and genetic.
- A collection of important definitions from each chapter should be given to students Relevant key words should be stressed upon.
- The factors responsible for and the consequences of variations should be discussed. Definitions should be learnt thoroughly.
- Darwinism and neo Darwinism should be clearly explained with examples for a proper understanding.

MARKING SCHEME

Question 7.

(a)

		Apes	Man
(i)	Posture	Slight bent/ semi erect/ stooping	Erect
(ii)	Cranium	Small/sloping/flattened/650cc or less	Large/rounded/vaulted/1450cc
(iii)	Brow Ridges	Heavy and protruded/ prominent/dense	Thin and not protruded/inconspicuous/ less dense
(iv)	Locomotion	Soles do not touch the ground/sub-plantigrade/ quadrapedal	Touch except bridge of feet/ plantigrade/bipedal.

(b) (i) Poorly developed non functional organs which were well developed and functional in ancestors.

(ii) Variations: Differences in individuals (which make them more adapted to the changing environment).

(iii) Units of evolution are not individuals but the population as a whole. It explains the role of variations/genetic drift

Population is the unit of evolution

Modified form of Darwinism.

(c)

Natural selection	Artificial selection
Only the fittest survive rest are eliminated	Selected variety and natural variety both co-exist.
Exerted by nature	Exerted by man
Random	Selective
Slow process	Fast process
Tough competition	No competition
Led to great diversity in nature	Led to evolution of a few economically important plants and animals only
Causes evolution of new species	No new species formed

Question 8

(a) State *four* characteristics of the Cromagnon man. **[4]**

(b) Explain the basic postulates of Darwinism. **[3]**

(c) *Archaeopteryx is a connecting link between reptiles and birds*. Justify the statement by giving *two* characteristics of each group. **[3]**

Comments of Examiners

(a) Majority of the candidates could score well in this part. Some candidates wrote the features of Apes instead of Cro-Magnon man.
(b) Some candidates did not seem to understand the question. Others explained the elongation of giraffe's neck as evidence in favour of Darwinism.
(c) Both avian and reptilian characteristics were expected in the answer. Some candidates wrote only avian or only reptilian characteristics, whereas some wrote general characteristics without the specific characteristics of Archaeopteryx.

Suggestions for teachers

- Features of different ancestors of present day man should be explained, showing the kind of change the ancestors have undergone during the course of evolution.
- The basic postulates of Lamarckism and Darwinism should be explained clearly and students should be asked to write them in logical sequence.
- Archaeopteryx should be explained as a connecting/ missing link between birds and reptiles. Avian features and reptilian features should be discussed separately.

MARKING SCHEME

Question 8.

(a)
- About 1.8m tall
- Head large with flat forehead
- Perfect erect posture
- Body was less hairy
- Chin prominent and nose narrow and elevated
- Face was prognathous
- Cranial capacity was 1660 cc
- Ability to make tools and ornaments
- Cave dwellers
- Lived in families
- Buried the dead
- Omnivorous
- Used fire
- Swift runner
- Intelligent hunter

– Teeth closely placed
– Wisdom tooth present
– Cave paintings
– Covered body with skin of animals

(b) – Enormous power of fertility
– Struggle for existence/competition
– Variations and heredity
– Survival of the fittest/Natural selection
– Origin of species

[*any four*]

(c) Reptilian characters:
- Presence of teeth in jaws
- Not pneumatic
- Long tail with caudal vertebra
- Weak keel less sternum
- Clawed digits *(any two)*

Avian characters:
- Feathers on the body
- Forelimbs modified into wings
- Four toes in foot adapted for perching
- Presence of beak *(any two)*

Question 9

(a) *Persons suffering from G6PD deficiency are resistant to malaria*. Explain. **[4]**

(b) Define: **[4]**

(i) Genetic Erosion

(ii) Bioinsecticides

(iii) Antigen

(iv) Psychosis

(c) Define *Biofortification*. **[2]**

Comments of Examiners

(a) Several candidates did not attempt this part correctly. Some candidates did not write the full form of G6PD. They did not mention its role in the metabolism. Very few candidates discussed natural selection with reference to G6PD deficiency. Some candidates wrote about sickle cell anemia.

(b) (i) Some candidates wrote about loss of genes but made no mention of 'gene pool' and Population.
(ii) This part was not attempted well. Candidates did not seem to have an understanding of Bioinsecticides. Vague definitions like, 'use of biological agents to kill insects' or 'use of chemicals from biological agents to kill insects', were given by candidates.
(iii) Candidates were confused between 'antigen' and 'pathogen'. Mostly candidates explained 'Antigen' as, 'disease causing agents' or as 'foreign substances which enter our body', without mentioning the stimulation of the immune system or production of antibodies.
(iv) Some candidates defined 'Psychosis' as a mental illness but the type was not mentioned. Several candidates were confused between 'psychosis' and 'neurosis'. Some simply defined it as 'madness' without giving the key words.

Suggestions for teachers
- G6PD should be discussed as an example of natural selection. Its role in the metabolism of parasite and the effect of H_2O_2 on RBC membrane should be linked.
- Key words should be given importance in definitions.
- Bio insecticides must be explained with examples.
- Types of mental illnesses should be discussed in detail describing their characteristics.

(c) 'Bio fortification' was confused with 'Bio magnification' by some candidates. It appeared that candidates were not aware of this term.

MARKING SCHEME

Question 9.

(a) Persons suffering from G6PD deficiency are resistant to Malaria because:
- G6PD – glucose 6 phosphate dehydrogenase
- Decomposes H_2O_2 formed during metabolism
- When persons suffering from malaria are given primaquin/any anti-malarial drug, causes hemolysis as H_2O_2 is not decomposed
- RBCs are deformed so malarial parasite fails to multiply
- Such people are favoured by natural selection.

(b) (i) Loss of genes from the gene pool.
(ii) The living organisms employed to destroy the undesirable organisms.
(iii) Any protein/substance that triggers the production of antibodies/stimulates the immune system.
(iv) Severe type of mental illness in which the victim forgets everything/loses touch with reality.

(c) Biofortification

It is a method of breeding/ use of recombinant DNA technology in crops to increase their nutritional value.

Question 10

(a) List the activities of Community Health Services. **[4]**

(b) Give *three* early diagnostic symptoms of cancer. **[3]**

(c) Define: **[3]**

(i) Carrying capacity

(ii) Implant

(iii) Carcinoma

Comments of Examiners

(a) A number of candidates wrote anything and everything related with Health and Community. Valid points were found to be missing in many answers.

(b) This part was attempted well by many candidates but some wrote general points like, fever and weight loss when key words were rapid/ unexplained weight loss, persistent cough, etc.

(c) (i) 'Carrying capacity' was confused with 'Population density' or 'Biotic potential' by several candidates. The word 'maximum' which was the key word was missing in many answers.

(ii) Some candidates could not differentiate between implant/ transplant/ Prosthesis and hence wrote a vague definition.

(iii) Several candidates defined 'carcinogen' instead of 'carcinoma'. Some just defined it as 'type of cancer', without specifying skin/epithelial tissue.

Suggestions for teachers

- Teachers should stress on valid points even in general topics.
- Precise symptoms need to be given. At least four correct symptoms should be learnt.
- Exact definition with key words should be given importance.
- Must insist on writing cancer of epithelial tissue/ skin.

MARKING SCHEME

Question 10.

(a)
- Maintaining sanitation of the environment by providing pure and safe drinking water/ collection of vital statistics/ proper disposal of sewage/ medical care.
- Providing facilities for prevention & control of communicable diseases.
- Providing maternity & child health services.
- Providing school education/ community health education/ nutrition education/ family welfare/ rehabilitation of drug addicts/ alcoholics.

(b)
- Lump of hard tissue in the breast or throat or any area
- Persistent cough
- Change in the nature of mole/wart
- Unexplained weight loss
- Wound does not heal

– Prolonged hoarseness
– Excess loss of blood from any open wound
– Change in bowel movement

(c) 1) Carrying capacity – it is the maximum number of individuals which the environment can support or sustain.
2) Implant – A tissue or organ/artificial device inserted surgically into the human body to replace a defective one.
3) Carcinoma – malignant growth of epithelial tissue or skin.

GENERAL COMMENTS:

(a) Topics found difficult by candidates in the Question Paper:

– Peritoneal Dialysis
– Natural and Artificial selection.
– Contribution of Ronald Ross.
– Definition of Aeroponics, Root pressure, Bio fortification.
– Feedback control of tropic hormones.
– Role of Pancreas in digestion of various food materials.
– G6PD deficiency in relation to malaria.
– Neo Darwinism.

(b) Concepts between which candidates got confused:

– Hemodialysis and Peritoneal Dialysis, Darwinism and Neo Darwinism.
– Advantages and disadvantages of Vegetative Reproduction.
– Differences between apes and man with respect to (a) brow ridges (b) locomotion
– Antigen and Pathogen.
– L.S and T.S of Bone.
– Bio fortification and Bio magnification.

(c) Suggestions for students:

– Learn definitions with the key words.
– Learn compatible differences.
– Study should be accompanied by appropriate diagrams for proper understanding.
– Answers should be precise and written in the correct sequence.
– Learning must be done on a day to day basis to avoid bulk study at the end.
– While writing abbreviations, take care of spellings.
– Read the question proper very carefully.
– Diagrams should be shaped correctly and correct labelling should be done.