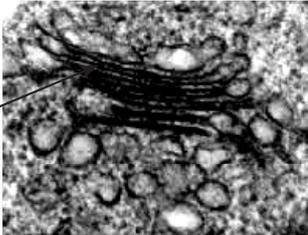


G.C.E. (A.L.) Support Seminar - 2014

Biology I

Two hours

* Answer All Questions.

- Which of the following is a polymer containing glycosidic bonds?
(1) Sucrose (2) Cutin (3) Keratin
(4) Suberin (5) Pectin
- The possible combination of nitrogenous bases in both DNA and RNA is,
(1) Adenine, Guanine and Cytosine
(2) Cytosine, Guanine and Uracil
(3) Cytosine, Thymine and Adenine
(4) Uracil, Adenine and Guanine
(5) Cytosine, Thymine and Guanine
- A function of the organelle shown by the arrow in the diagram is,
(1) Storing Ca^{+2} ions.
(2) Production of vesicles for transportation within the cell.
(3) Synthesis of simple lipids and carbohydrates.
(4) Transport residue materials out of the cell by exocytosis.
(5) Conversion of fats into carbohydrates.

- In scientific method,
(1) Only one hypothesis should be formulated to explain observations.
(2) Experiments should be planned to obtain expected observations.
(3) A control test should be carried out always.
(4) Confirming hypothesis supported by experimental evidence is not done always.
(5) Finally, a law is formulated which doesn't modify in the light of new knowledge.
- Following are few advantages of using microscopes.
(a) Ability to observe live specimens as well as non-living
(b) Ability to observe colourful images
(c) Only permanently mounted slides are observable.
(d) Ability to observe the images directly
Out of the above, what are the advantages of light microscope over electron microscope?
(1) a and b only (2) a and c only (3) a and d only
(4) a, b and c only (5) a, b and d only
- In which of the following epithelial tissue and its location in human body is matched correctly?

tissue type	location
(1) Simple squamous epithelium	lining of trachea
(2) Pseudostratified epithelium	wall of blood capillary
(3) Simple columnar epithelium	inner wall of Bowman's capsule
(4) Stratified squamous epithelium	lining of fallopian tubule
(5) Simple cuboidal epithelium	wall of proximal convoluted tubule

7. In meiosis,
- (1) In prophase I, crossing over takes place always
 - (2) Chromatids separate from each other by splitting of centromeres in the anaphase I.
 - (3) The segments of chromatids might be exchanged after the formation of synaptonemal complexes.
 - (4) First nuclear division is similar to mitosis.
 - (5) All spindle fibres are attached to Kinetochores.
8. The **incorrect** statement regarding enzymes is,
- (1) FAD is required to the occurrence of some enzyme reactions.
 - (2) Competitive inhibitors inhibit the reaction by attaching to the active sites of the enzyme.
 - (3) The rate of enzyme reaction approximately doubles for every 10°C rise of temperature upto the optimum temperature.
 - (4) Enzymes increase the activation energy of the reactions, catalyzed by them.
 - (5) Some metallic ions act as enzyme activators.
9. A physiological adaptation of plants to maximize the rate of photosynthesis is,
- (1) Presence of intercellular spaces among spongy mesophyll cells.
 - (2) Presence of an extensively diffused network of vascular tissues in leaves.
 - (3) Presence of high leaf surface area.
 - (4) Presence of efficient enzymes to fix CO₂.
 - (5) Presence of transparent cuticle and epidermis.
10. A main reason for higher efficiency of photosynthesis in C₄ plants over C₃ plants is that In C₄ plants,
- (1) The efficiency of RUBP carboxylase enzyme is higher.
 - (2) The increased efficiency of photosynthesis is even higher under high light intensities.
 - (3) Photorespiration takes place.
 - (4) Fixation of CO₂ is much efficient in RUBP than that of PEP.
 - (5) The efficiency of photosynthesis is reduced at lower CO₂ concentrations.
11. This question is based on the following data.

cellular process	site of process
A - Calvin cycle	K - Cytoplasmic matrix
B - Glycolysis	L - Granum of chloroplasts
C - Kreb's cycle	M - Stroma of chloroplasts
D - Photophosphorylation	N - Matrix of mitochondria

In which of the following combination, the sites of above A, B, C, D cellular processes are mentioned in the correct order?

- (1) N, K, M, L
 - (2) N, K, L, M
 - (3) L, K, N, M
 - (4) M, K, L, N
 - (5) M, K, N, L
12. The feature found in Domain Bacteria as well as in Domain Eukarya is,
- (1) Initiation of Protein synthesis with formyl methionine.
 - (2) Presence of several types of RNA polymerase enzymes.
 - (3) Being sensitive to antibiotics.
 - (4) Lipids of the cell membrane is unbranched.
 - (5) Presence of peptidoglycan as a cell wall component.

13. Which of the following statements regarding Algae is correct?

- (1) Chlorophyll - a is present in Chlorophytes but absent in Phaeophytes.
- (2) The storage food in Chlorophytes is starch but Rhodophytes store Laminarine.
- (3) Cellulose is the main cell wall component in Phaeophytes but Rhodophyte cell wall consists of Alginic acid too.
- (4) Flagella is present in some Rhodophyte cells but absent in cells of Phaeophytes.
- (5) Some Chlorophytes may be unicellular but unicellular members do not belong to Phaeophytes.

14. Which animal phylum feature combination is matched correctly?

- | phylum | feature |
|---------------------|--|
| (1) Platyhelminthes | - specific excretory structures are absent |
| (2) Nematoda | - external fertilization |
| (3) Annelida | - open circulatory system |
| (4) Mollusca | - incomplete digestive tract |
| (5) Arthropoda | - double ventral solid nerve cord |

15. This question is based on following information.

Essential element

absorptive form by the plant roots

- | | |
|--------|---|
| (a) B | BO_3^- , $\text{B}_4\text{O}_7^{2-}$ |
| (b) N | NO_2^- , NH_4^+ |
| (c) P | HPO_4^{3-} , H_2PO_4^- |
| (d) Fe | Fe^{2+} , Fe^{3+} |
| (e) Mo | MoO_4^{2-} |

In which combination, the absorptive forms of the given elements are correctly mentioned?

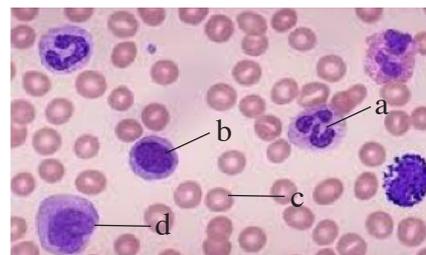
- | | | |
|-----------------|-----------------|----------------|
| (1) a, b, and d | (2) a, c, and e | (3) b, c and d |
| (4) b, d, and e | (5) a, d, and e | |

16. The correct statement regarding human digestive system is,

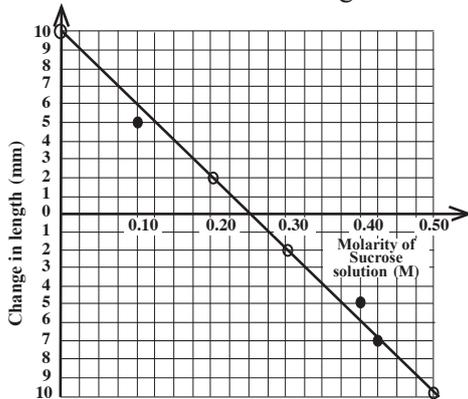
- (1) Oxygenated blood is brought to the liver by hepatic portal vein.
- (2) Secretine and enterogasterone hormones stimulate the secretion of pancreatic juice.
- (3) Intrinsic factor in gastric juice is important to absorb vitamin B_{12} .
- (4) Duodenal mucosa consists of many glands which are branched extensively.
- (5) Lymph nodules are abundant in the mucosa of large intestine.

17. The microscopic photograph of a blood smear is shown here. Which of the following cells shown involve in phagocytosis?

- (1) a and b
- (2) b and d
- (3) a and c
- (4) c and d
- (5) a and d



- 18 th and 19 th questions are based on the following graph and information. The following graph is drawn based on the experimental data of an experiment carried out to determine the water potential of potato tuber cells. The solute potentials of sucrose solutions in different molarities are also given in the table.



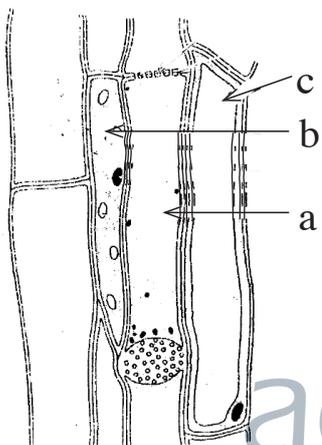
Molarity of solution (M)	Solute potential (Kpa)
0.20	-540
0.25	-680
0.30	-820
0.35	-970
0.40	-1120
0.45	-1280

18. According to the graph and given table, which of the following is the water potential of potato tuber cells?
- (1) -540 Kpa (2) -680 Kpa (3) -820 Kpa
 (4) -970 Kpa (5) -1120 Kpa
19. When another potato stripe similar in length to the one used above was immersed in a certain sucrose solution. The length of it had been increased in 0.3 cm. after one hour. The molarity of this sucrose solution may be,
- (1) 0.125 M (2) 0.150 M (3) 0.175 M (4) 0.200 M (5) 0.225 M
20. Which of the following is **not** a characteristic of a receptor of the human body?
- (1) Responding to stimuli at lesser values of threshold level.
 (2) Structure designed to receive a specific stimulus.
 (3) Structures transform one form of energy into nerve impulse.
 (4) Consist of special types of cells.
 (5) Should be connected with the nervous system always.
21. Following are few functions of human brain.
- (a) controls involuntary reflexes such as sneezing and coughing
 (b) change the size and shape of the lens in the eye.
 (c) Regulate the ventilation of lungs.
 (d) coordination of voluntary muscles and control the posture.
- In which combination the main parts of human brain which perform above functions are given in correct order?
- (1) Pons varoli, mid brain, cerebellum, medulla oblongata
 (2) mid brain, cerebellum, pons varoli, medulla oblongata
 (3) cerebellum, pons varoli, medulla oblong, mid brain
 (4) medulla oblongata, mid brain, pons varoli, cerebellum
 (5) medulla oblongata, mid brain, cerebellum, pons varoli
22. Which following statement is correct regarding the transmission of a nerve impulse along an axon?
- (1) The potential difference at either sides of axon membrane when an impulse isn't transmitted is called the action potential.
 (2) The resting membrane potential depends only on the selective permeability of plasma membrane for Na⁺ and K⁺.
 (3) The interior of the cell is positively charged relatively to the extra cellular fluid at resting membrane potential stage.
 (4) The depolarized axon membrane becomes repolarized after reaching hyperpolarized state.
 (5) Once initiated , the action potential transmit down the length of the axon as a self propagating wave.

23. In human skull,
- (1) eight cranial bones and twelve facial bones are included.
 - (2) Fontanelles are cartilaginous areas which allow slight compressions and replaced by bones later.
 - (3) The cerebro spinal fluid filled spaces located in frontal, sphenoid, ethmoid and maxillary bones are called sinuses.
 - (4) Condylloid and Coronoid processes are located on mandible whereas mastoid process is located on temporal bone.
 - (5) The zygomatic arch located on the mandible, provides the articular surface for the attachment of muscles involve in movements of lower jaw.

24. Which one is correct regarding the human nephron?
- (1) Loop of henle is long in cortical nephrons.
 - (2) Only one nephron opens to a single collecting duct.
 - (3) Cl^- , HCO_3^- , K^+ ions are passively reabsorbed in the procimal convoluted tubule of nephron.
 - (4) Glucose is actively reabsorbed at proximal and distal convoluted tubules.
 - (5) The podocytes located on the outer wall of Bowman's capsule makes the ultrafiltration efficient.

25.



Select the correct statement regarding the tissue shown in this diagram.

- (1) 'c' cells involve in Phloem unloading.
- (2) Plant growth substances, enzymes and amino acids are transported through this tissue.
- (3) storing is the main role of 'b' cells.
- (4) materials are transported through 'a' cells by mass flow.
- (5) Transpiration pull involve in the transportation of materials through this tissue.

26. Following are some functions of plant growth substances.
- | | |
|-----------------------------|--------------------------------|
| (a) initiation of flowering | (b) breaking the seed dormancy |
| (c) delaying senescence | (d) parthenocarpy |
| (e) cell division | |
- Among these, functions of auxin, gibberelline and ethylene are stated in correct order,
- (1) In d, c and a
 - (2) In d, b and a
 - (3) In b, d and a
 - (4) In d, e and a
 - (5) In a, b and e

27. The correct response regarding the structure and functions of the human male reproductive system is ,
- (1) When primary spermatocytes undergo first meiosis they become spermatids .
 - (2) The majority of seminal fluid is produced by seminal vesicles.
 - (3) Inhibin is secreted by sertoli cells if spermatogenesis occurs lower rate.
 - (4) Sertoli cells are located in the interstitial tissue among seminiferous tubules.
 - (5) About 48 days are taken for the spermatogenesis.

28. Which of the following statement is correct regarding the forests in Sri Lanka?
- (1) cycling of minerals takes place very slowly in tropical rain forests.
 - (2) Branched trunks of the trees in tropical montane forests are covered by lichens and mosses.
 - (3) majority of forests in Sri Lanka are located in the wet zone of low country.
 - (4) Prop roots are abundant in trees of dry mixed evergreen forests.
 - (5) Majority of endemic plants of Sri Lanka can be seen in dry mixed evergreen forests.

29. The correct statement regarding mutations is,
- (1) Down's syndrome is caused by reduction of the number of sex chromosomes.
 - (2) Klienfelter's syndrome is caused due to presence of an extra autosome.
 - (3) Gene mutations are caused due to errors in base pairing when DNA replication takes place.
 - (4) Albinism and Hungtingdon's diseases are mutations caused by dominant alleles.
 - (5) Presence of an extra autosome causes Turner's syndrome.
- 30th and 31st questions are based on following data.
When yellow pods, smooth seeds bearing pea plant was crossed with green pods, wrinkled seed bearing pea plant, the entire F₁ generation got yellow pods, smooth seeds. When F₁ plant was crossed with green pod, wrinkled seed bearing plant, the progeny given was as follows.
- | | | | |
|-----------------------------|----|---------------------------|----|
| yellow pods, smooth seeds | 23 | green pods, smooth seeds | 25 |
| yellow pods, wrinkled seeds | 24 | green pods wrinkled seeds | 26 |
30. Which one is the **incorrect** statement regarding above cross?
- (1) Yellow pod and smooth seed characters are dominant.
 - (2) Both characters segregate independently.
 - (3) Yellow pod and smooth seed bearing plant in F₂ progeny are homozygous.
 - (4) F₁ plants are heterozygous for both characters.
 - (5) Second cross is a test cross.
31. When a green pod, smooth seed bearing F₂ plant was crossed with yellow pod wrinkled seed bearing plant what is the possible ratio of yellow pods, wrinkled seed bearing plant in the progeny?
- (1) $\frac{1}{2}$ (2) $\frac{1}{4}$ (3) $\frac{1}{8}$ (4) $\frac{3}{4}$ (5) $\frac{1}{16}$
32. Following are some statements regarding the earth's atmosphere.
- (i) It extends up to 10 km from earth's surface.
 - (ii) The water vapour important for weather is present.
 - (iii) Dust and microscopic particles are included.
 - (iv) There is an ozone layer which absorbs UV rays.
- Which of the above statements are acceptable regarding the troposphere?
- (1) (i) and (iv) only (2) (i) and (ii) only (3) (i) and (iii) only
(4) (iii) and (iv) only (5) (i), (ii) and (iii) only
33. Select the **incorrect** statement regarding the health effects of atmospheric pollution.
- (1) Fluids might be accumulated in lungs due to Nitrogen Oxides.
 - (2) Inhalation of hydrocarbons may cause lung diseases.
 - (3) Immunity to pneumonia might be affected by ozone.
 - (4) Impaired perception of stimuli might be reduced by Carbon Monoxide.
 - (5) The oxygen carrying capacity of blood might be reduced by inhaling Sulfur Dioxide.
34. In which of the following combination does the endemic, Indigenous (native) and exotic species in Sri Lanka are mentioned respectively?
- (1) *Hevea brasiliensis*, *Garcinia quaesita*, *Ophiocephalus striatus*
 - (2) *Puntius nigrofasciatus*, *Hevea brasiliensis*, *Caryota urens*
 - (3) *Ophiocephalus striatus*, *Garcinia quaesita*, *Oreochromis mossambicus*
 - (4) *Dipterocarpus zeylanicus*, *Ophiocephalus striatus*, *Oreochromis mossambicus*
 - (5) *Loris tardigradus*, *Hevea brasiliensis*, *Caryota urens*

35. Following are some methods used in sterilization and controlling microbes.

- (a) Moist heat (b) Pasteurization
(c) Dry heat (d) Filtration

Which response depicts the methods used to sterilize and control microorganisms in petridishes, water, culture media and wine respectively?

- (1) a, b, c, d (2) c, b, d, a (3) c, d, b, a
(4) c, d, a, b (5) d, c, b, a

36. Which of the following step is **not** used in an urban water treatment plant?

- (1) Removal of microorganisms by filtering through sand.
(2) Pumping of water from large sources to holding tanks.
(3) Sterilization of water by Chlorination.
(4) Allowing the sedimentation of suspended particles and microbes in water.
(5) Adding of chlorine dosages that must be sufficient to leave a residue of 0.2 - 2.0 mg/ l in water.

37. Following are some biochemical processes important to proceed natural nitrogen cycle.

- (a) Nitrification (b) Denitrification (c) Nitrogen fixation

In which of the following combinations, the microbes involve in above a, b, c, processes are mentioned in correct order?

- (1) *Nitrosomonas, Clostridium, Azotobacter* (2) *Nitrobacter, Pseudomonas, Anabaena*
(3) *Clostridium, Thiobacillus, Nitrosomonas* (4) *Pseudomonas, Nitrobacter, Rhizobium*
(5) *Nitrobacter, Thiobacillus, Pseudomonas*

38. Following are some steps of protein synthesis take place within cells.

- (i) attachment of ribosomes onto the initiative end of the mRNA molecule.
(ii) t RNA molecules which carry amino acids reach the ribosome
(iii) Joining amino acids with each other by peptide bonds.
(iv) moving mRNA molecule to the cytoplasm.
(v) synthesis of a mRNA molecule according to base sequence of a gene.

In which of the following combination the steps of protein synthesis is mentioned respectively?

- (1) (v), (i), (ii), (iv), (iii) (2) (v), (iv), (i), (ii), (iii) (3) (v), (iv), (ii), (i), (iii)
(4) (iv), (i), (v), (ii), (iii) (5) (iv), (i), (ii), (v), (iii)

39. Following are different forms of acquired immunity related to human body.

- (a) Naturally acquired active immunity - infant gets from mother's breast milk.
(b) Naturally acquired passive immunity - by having chicken pox once.
(c) Artificially acquired active immunity - Polio vaccine
(d) Artificially acquired passive immunity - antitetanus vaccine

In which combination the type of acquired immunity and the relevant example is correctly matched?

- (1) a and b (2) b and c (3) c and d
(4) a and c (5) b and d

40. This question is based on following data.

- P - Formation of gametophyte
Q - Occurrence of meiosis
R - Formation of gametes
S - developement of sporangia
T - Formation of spores

Which of the following is the correct sequence regarding the incidents of the life cycle of *Nephorlepis*?

- (1) S, T, P, Q, R (2) S, Q, T, P, R (3) S, Q, R, P, T
(4) T, P, Q, R, S (5) T, S, Q, R, P

- For each of the question 41 to 50 one or more of the responses is/ are correct. Decide which response/ responses is/ are correct and then select the correct number.

- If only A, B and D are correct 1
- If only A, C and D are correct 2
- If only A, and B are correct 3
- If only C and D are correct 4
- If any other response or combination of responses is correct..... 5

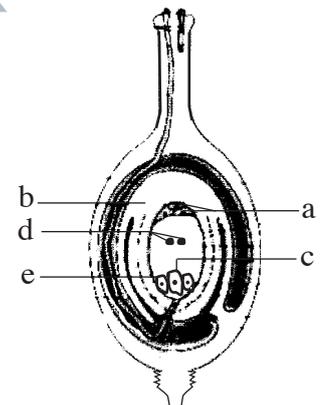
Directions summarised

1	2	3	4	5
A, B, D are correct	A, C, D are correct	A, B are correct	C, D are correct	any other response or responses are correct

41. Following are some functions of proteins in living cells.
- (i) storage function
 - (ii) contractile function
 - (iii) structural function
 - (iv) transporitive function
- In which of the following is / are in correct sequence of proteins related with above functions?
- (A) Globulin, Actin, Keratin, Myoglobin
 - (B) Albumin, Keratin, Actin, Haemoglobin
 - (C) Albumin, Myosin, Keratin, Myoglobin
 - (D) Caesin, Actin, Collagen, Haemoglobin
 - (E) Haemoglobin, Actin, Keratin, Myoglobin

42. Which statement /statements is/are correct regarding the classes of phylum Chordata?
- (A) Animals of classes Chondrichthyes and Osteichthyes consist of two chambered hearts.
 - (B) The major excretory product of Chondrichthyes animals and mammals is urea.
 - (C) Some animals of classes Reptelia and Aves show Ovoviviparity.
 - (D) Air Cavities are present in non oscified skeletons of animals in class Aves.
 - (E) External fertilization is shown by all amphibians.

43. Select the correct statement/statements regarding the labeled structures of this diagram.
- (A) 'c' and 'd' structures are used in double fertilization.
 - (B) The structure , labelled as 'b' doesn't belong to female gametophyte.
 - (C) 'a' structures are haploid and known as synergids.
 - (D) endosperm nucleus is formed by the fusion of 'd' structures.
 - (E) Structure, labelled as 'e' is produced in the meiosis of megaspore mother cell.



44. Which statement/ statements is/ are **incorrect** regarding human ear?
- (A) The vestibule and semicircular canals of inner ear are important to maintain the balance of body.
 - (B) The sensory cell masses located in utricle and sacules are important to keep the body posture and position of head relatively to the gravity.
 - (C) The middle ear which is connected to the pharynx by eustachean tube is filled with endolymph.
 - (D) Sensory cells and nerve fibres are present on the reisners memberane which is located at the base of cochlear duct.
 - (E) The vestibular canal and tympanic canals of the chochlea of the inner ear is filled with perilymph.

45. Select the correct statement/ statements regarding the nervous organizations of some animal phyla.
- (A) Longitudinal solid nerve cords and eye spots as receptors are developed in the animals of phylum Platyhelminthes.
 - (B) Animals in phylum Cnidaria possess longitudinal nerve cords consisting multipolar neurons.
 - (C) Giant nerve fibres can be seen in some animals of phylum Annelida.
 - (D) Different types of well developed receptors are present in animals of phylum Arthropoda.
 - (E) Tubular nerve cords are present in animals of phylum Echinodermata.
46. Impact/ impacts thought to be happened due to green house effect on the earth is/ are,
- (A) Spreading of tropical diseases to temperate areas.
 - (B) Degradation of biodiversity.
 - (C) Increase of absorption of heavy metals by plants.
 - (D) Alternation of limits of deserts
 - (E) Reduction of nitrifying microorganisms in soil.
47. What are the suitable steps to study the microscopic structure of the wood of a dicot stem?
- (A) cutting a thin slice of a suitable plant stem and putting it into water in a watch glass.
 - (B) staining the specimen with Aniline Sulphate.
 - (C) staining the specimen again with Methylene Blue.
 - (D) The specimen is mounted in the water on a slide and cover with a coverslip avoiding trapping of air bubbles.
 - (E) Remove excess stains with slowly running water and blotting.
48. Which statement statements are/ is correct regarding dicot woody plants?
- (A) Sap wood and heart wood are tissues included in wood.
 - (B) Tyloses are grown in xylem vessels of heartwood but not in sapwood.
 - (C) Vascular cambium is of entire secondary origin.
 - (D) A Secondary cortex is present outer to the primary cortex of a stem which underwent secondary growth.
 - (E) Tissues located outer to the cork cambium belong to the bark.
49. When evolution is considered, the feature/ features involved in the domination of seed plants over other plant groups in evolution is/ are,
- (A) Development of a cuticle on the aerial parts of the plant body to control water loss.
 - (B) Presence of efficiently pollinating mechanisms which lead to new genetic variations.
 - (C) Sporophyte being covered by the gametophyte tissues for protection.
 - (D) Presence of efficient mechanisms for fruit and seed dispersion to ensure the existence and distribution of the species.
 - (E) There is a well developed vascular tissue in the plant body to make the transportation of substances efficient
50. What is/ are the correct statement / statements regarding the process used to produce a genetically modified organism by recombinant gene technology?
- (A) Separation of DNA fragments by Agarose gel electrophoresis.
 - (B) Use of DNA ligase enzyme to cut DNA into fragments.
 - (C) Inserting recombinant plasmids into bacterial cells.
 - (D) Identification of successfully transformed organism using a DNA fragment consists of relevant marked gene.
 - (E) Use of Restriction Endonuclease enzyme to combine DNA fragments to the plasmids.

G.C.E. (A. L.) Support Seminar - 2014

Biology II

Three hours

Part A – Structured Essay

* Answer **all** the questions **on this paper** itself.

* Each question carries **10** marks.

1. (A)(i) Mention the type of monomer/ unit molecule of following organic compounds.

- (a) Cellulose -
- (a) Pectin -
- (c) Inuline -
- (d) Glycogen -

(ii) Out of the above compounds, a - d mention two types of structural and storage compounds.

Structural -

Storage -

(iii) Draw the common structural formula of the monomer molecule of proteins.

(iv) Name a simple experiment suitable to identify proteins in the laboratory and write the steps of it in order.

.....
.....
.....
.....

(v) (a) Mention the **three** structural components of the cytoskeleton.

.....
.....
.....

(b) Mention **three** functions of the cytoskeleton.

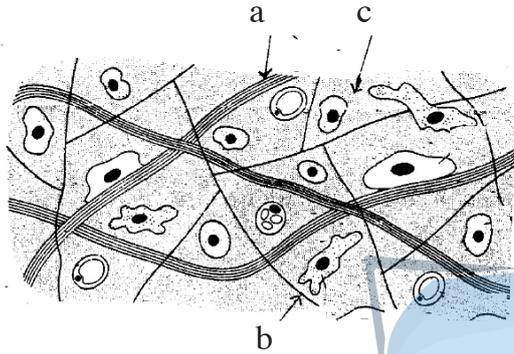
.....
.....
.....

(c) Write two functions of the cytoskeleton in the cell division of an animal cell.

.....
.....

• Following is a diagram of a tissue located in human body.

(B) Questions (i) to (iv) are based on it.



(i) What is the tissue shown in the above diagram?

.....

(ii) Label a, b and c structures.

a
b
c

(iii) Mention one location of identified tissue in B(i) in the human body.

.....

(iv) Name **three** cell types present in the above tissue identified in B(i) and mention a main function of each.

cell type	main function
.....
.....
.....

(v) State **three** structural features found in a meristematic cell of plants.

.....
.....
.....

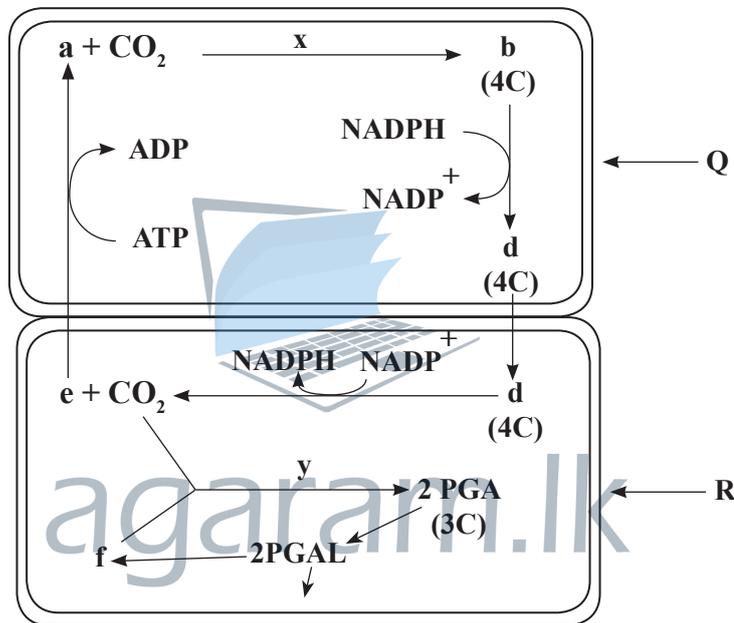
(vi) Name permanent tissues which consist of lignified cells found in plant bodies.

.....

(C) (i) What is meant by metabolism?

.....

• Following is a diagram of a metabolic process which takes place in a particular plant. Questions (ii) to (v) are based on the following diagram.



(ii) Name the above metabolic process and a plant in which the above process takes place.

Process -
 Plant -

(iii) Label a, b, d, e, f, compounds and x and y enzymes.

a **b**
d **e**
f **x**
y

(iv) Name cells labeled as Q and R.

Q
R

2.(A)(i) (a) What is meant by classification of organisms?

.....
.....

(b) Mention the main difference between artificial and natural classifications.

.....
.....

(c) Mention **three** criteria on which the present classification system is based.

.....
.....
.....

(ii) Name the domain into which the following genera of organisms belong, according to the present classification system.

(a) *Marchantia*

.....

(b) *Methanobacterium*

.....

(iii) This question is based on following groups of organisms.

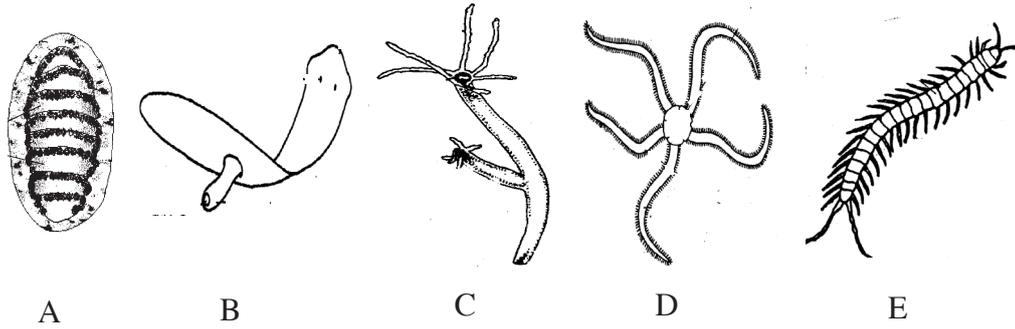
- Insecta
- Cestoda
- Mammalia
- Monocotyledonae
- Dicotyledonae
- Crustacea
- Chondrichthyes
- Pterophyta

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Select the group of organism which consists of following characteristics from the above list and mention it in front of the relevant characteristic.

- (a) Presence of tegument with microvilli
- (b) Consists of green glands and two pairs of antennae
- (c) Ventral heart and single circulation
- (d) Skin with sebaceous glands
- (e) Presence of open vascular bundles
- (f) Presence of trimerous flowers with perianth
- (g) Presence of blood circulatory systems without of respiratory pigments
- (h) Presence of monocious gametophyte

(B) This question is based on following pictures.



(i) Select the organism which possess following features and mention the symbol and Phylum of each in the given table.

feature	symbol of organism	phylum
(a) Possess cnidocytes		
(b) Possess water vascular system		
(c) Possess the radula		
(d) Chitinous exoskeleton		
(e) Possess flame cells		

(ii) Out of above mentioned animal Phyla in B (i);

(a) In which phylums specific respiratory structures are **absent**?

.....
.....

(b) In which phylums excretory structures are **absent**?

.....
.....

(c) Mention phylums consist of open circulatory systems.

.....
.....

(C)(i) Mention one invertebrate Phylum which consists of following types of skeletons.

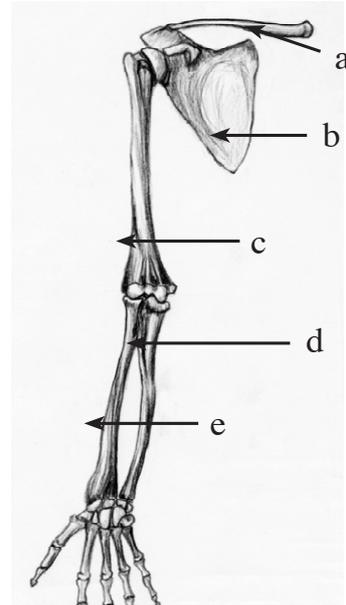
(a) Hydrostatic skeleton -

(b) Endoskeleton -

- Following is a picture of the human upper limb and associated structures as shown in the following figure. Questions (ii) to (vi) are based on it.

(ii) Label a – e structures in the figure.

- a -
- b -
- c -
- d -
- e -



(iii) Which joint of human upper limb is important in making movements over a wide range.

.....

(iv) Mention **two** types of specific grips of human hand.

.....
.....

(v) State the type of above mentioned grips used in the following occasions.

(a) Sewing with needle

(b) Tug of war

(vi) Mention **three** adaptations of human upper limb to lift weights.

.....
.....
.....

(vii) Name the bones directly participate to form following joints.

(a) Wrist Joint

.....

(b) Ankle joint

.....

3.(A)(i)(a) What is a stomata?

.....
.....
.....

(b) State **two** ways that the cells associated with stomata differ from normal epidermal cells.

.....
.....

(c) Name **two** sites of transpiration in plant body other than stomata?

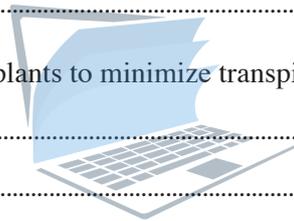
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(ii)(a) Write **two** advantages of transpiration to the plant.

.....
.....

(b) Write **four** adaptations of plants to minimize transpiration.

.....
.....
.....
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(c) Name **two** internal factors that affect transpiration.

.....
.....

(iii) What is guttation?

.....
.....

(iv) Mention **two** distinguishable features of guttation over transpiration.

.....
.....

(iv)(a) What is the assumption used when carrying out an experiment to investigate the rate of transpiration of a plant twig using the potometer?

.....
.....
.....

(b) What is the error of that assumption?

.....
.....
.....

(B) (i) Mention a suitable example to demonstrate that the phloem translocation takes place under hydrostatic pressure.

.....
.....

(ii) Define 'source' and 'sink' regarding phloem translocation.

(a) source :

(b) sink :

(iii)(a) What is meant by 'phloem loading'?

.....
.....

(b) Sucrose is the main form of organic food translocated in plant. Mention two advantages of using sucrose in translocation.

.....
.....

(iv)(a) State **two** necessities of Phloem translocation.

.....
.....

(b) What are the principles that are related with transportation of water across the membranes?

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.....
.....
.....

(v) What are the underlying principles of vertical transportation/ upward movement of water and minerals in plants?

.....
.....
.....
.....

(C) (i) Write the tissue layers of a dicot primary root from outer to inner in order.

.....
.....

(ii) Name the **meristematic tissues** contribute in the secondary growth of a dicot root and mention the secondary tissue type derive from each.

meristematic tissues **secondary tissues**

.....
.....
.....
.....

(iii) Name the tissue types of dicot stem and dicot root from which lateral branches and lateral roots arise.

- (a) lateral branches of stem -
- (b) lateral roots

(iv) Mention **two** functions of the bark of dicot stem.

.....
.....

4.(A) (i) What is meant by microorganisms?

.....

(ii) Microorganisms possess different types of modes of nutrition. mention the carbon and energy sources of microorganisms possess following modes of nutrition.

mode of nutrition **energy sources** **carbon sources**

(a) chemoautotrophic

(b) Photoheterotrophic

(iii) Name **four** physiological groups of microorganisms related to oxygen and mention one generic name as an example for each group.

group **genera**

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.....
.....

(iv) Mention **three** morphological forms found among bacteria.

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(B) (i) What is meant by 'food spoilage' ?

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(ii) Name the major chemical changes take place in food spoilage and mention **two** end products of each type.

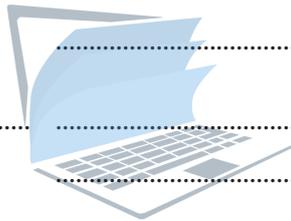
chemical change

products given in chemical change

(a)

(b)

(c)



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(iii) State **four** physical changes that take place in food spoilage.

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.....
.....
.....

(iv) What are the internal factors affect the food spoilage?

.....
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.....
.....

(v) (a) Why food preservation should be done?

.....
.....

(b) Write **three** main principles on which the food preservation methods are based.

.....
.....
.....

(C) (i) Name **three** food borne infective diseases and the causative microbe for each.

Infectious diseases	causative microbes
.....
.....
.....

(ii) Define following terms regarding microbicidal agents.

(a) Disinfectants

.....
.....

(b) Antiseptics

.....
.....

(c) Antibiotics

.....
.....

(iii) Name an antibiotic which inhibit the synthesis of fungal cell membranes.

.....

(iv) Mention one species of micro organisms which synthesizes following antibiotics.

antibiotic	species
Penicillin
streptomycin
Tetracycline

* *

Part B - Essay

- * Answer **four** questions only.
- * Each question carries **15** marks.

5. (a) Name the **three** main steps when a glucose molecule undergoes aerobic respiration.
(b) Briefly explain the process of aerobic respiration of a glucose molecule, take place in a mitochondria.
6. (a) Describe the gross structure of human heart.
(b) Mention the structures related with the myogenic stimulation of human heart and location of each and briefly describe the sequential process of myogenic stimulation.
7. (a) What is meant by the growth of plants?
(b) Classify the meristamatic tissues of plants according to the location and write one example for each.
(c) Describe the primary tissue structure of a dicot stem.
(d) Mention, how the primary monocot stem structure differs from the primary structure of the dicot stem.
8. (a) What are the groups of microorganisms used in industries?
(b) Name the occasions in which the microbial process are commercially used as end products and briefly explain each.
9. (a) Briefly describe the theory of biochemical evolution which explains the origin of life on earth.
(b) Explain the significance of mutations in evolution of bio-diversity.
10. Write short notes on,
(a) Functions of human skin
(b) Plant movements
(c) Major conventions and protocols contribute in the conservation of environment.

* * *