

G.C.E (A/L) Support Seminar - 2016

Biology I

Two Hours

Note :

- * *Answer all questions.*
- * *In each of the questions 01 to 50 pick one of the alternatives from (1), (2), (3), (4) and (5) which is **correct** or **most appropriate**.*

1. Which group contains only lipid compounds ?
 - (1) Wax, Cutin and Chitin.
 - (2) Pectin, Phospholipid and Steroids.
 - (3) Wax, Cutin and Steroids.
 - (4) Terpens, Suberin and Chitin.
 - (5) Lignin, Pectin and Terpens.
2. Which of the following property of water is a reason for not freezing easily within cells and in water bodies during winter ?
 - (1) Anomalous expansion of volume in freezing.
 - (2) High latent heat of fusion.
 - (3) High surface tension.
 - (4) High adhesive and cohesive forces.
 - (5) High specific heat capacity.
3. What is the correct statement regarding carbohydrates?
 - (1) All are branched or unbranched chain of polymers.
 - (2) All possess glycoside bonds.
 - (3) Contain in hereditary material of organisms.
 - (4) All show reducing property.
 - (5) They are not found as structural components in animal bodies.
4. Which of the following statements is true regarding plant tissues ?
 - (1) The main function of parenchyma tissue is mechanical support in herbaceous plants.
 - (2) There are no intercellular spaces in collenchyma tissue at all.
 - (3) Cell wall component of sclerenchyma tissue is permeable to water.
 - (4) Only water is transported through xylem tissue.
 - (5) Phloem tissue contains living cells without nucleus.
5. Which of the following statements is **incorrect** regarding mitosis ?
 - (1) Spindle fibers from both poles attach to the kinetochore of chromosome.
 - (2) It occurs in gamete formation of all plants.
 - (3) Homologous chromosomes pair up.
 - (4) Length of the chromosomes reduce.
 - (5) Genetically identical cells are produced.
6. Which of the following statements is correct regarding human blood cells ?
 - (1) Eosinphill are the type of white blood cells that occur in highest percentage.
 - (2) Lifetime of red blood cells is about three days.
 - (3) Production of antibodies is the major function of lymphocytes.
 - (4) Basophills are important in coagulation of blood.
 - (5) After active period white blood cells are destroyed in liver and spleen.

15. Which of the following statements is **incorrect** regarding human saliva ?

- (1) Saliva contains two enzymes.
- (2) pH range of saliva is about 6.5 - 7.4.
- (3) In addition to the main salivary glands, saliva is secreted by other secretory cells in oral epithelium.
- (4) Secretion of saliva is regulated by both nerves and hormones.
- (5) Saliva possesses bacteriocidal property.

16. Which of the following is correct regarding large intestine of human ?

- (1) Mucous glands and lymph nodes are abundant in mucosa.
- (2) Taenea coli in wall of large intestine is made by circular muscles.
- (3) Highest amount of water is absorbed by this part.
- (4) Villi located in it make the absorption effiecient.
- (5) Vitamins synthesized by micro organisms living here are absorbed by itself.

17. Following are few respiratory structures of some animals.

A - Body covering

B - Gills

C - Book lung

D - Lungs

E - Trachea

Which of the above respiratory structures can be found in animals in phylum Arthropoda ?

- (1) A, B and E (2) C, D and E (3) B, C and E (4) C, B and E (5) A, C and E

18. Select the correct combination in relation to structures of human respiratory system

- (1) Bronchus - Stratified ciliated epithelium
- (2) Bronchioles - Irregular cartilage rings
- (3) Alveoli ducts - Pseudo stratified ciliated epithelium.
- (4) Alveoli walls - Macrophages
- (5) Trachea - Skeletal muscles

19. Two potato strips in same diameter and 5 cm long were immersed in two sucrose solutions named as A and B in which solute potential were – 1500 kpa and – 1230 kpa respectively. After the equilibrium the length had become 5.2 cm only the strip immersed in A solution. Which of the following is not acceptable regarding A & B solutions ?

- (1) Solution A is relatively hypotonic to the tissue.
- (2) Water potential of tissue immersed in solution B is equal to – 1230 kpa.
- (3) Water has been entered to the tissue in solution A.
- (4) The water potential of tissue in solution A has been increased.
- (5) There is no entering or removing of water to tissue in solution B.

20. Which of the following is correct regarding circulatory systems of animals ?

- (1) All chordates possess closed circulatory systems.
- (2) All Invertebrates possess open circulatory systems.
- (3) There are no blood pigments in animals having open circulatory systems.
- (4) All chordates possess double circulation.
- (5) Deoxygenated and oxygenated blood is mixed in the heart in single circulation.

21. Select the correct statement regarding human cardiac cycles and its stages.

- (1) A cardiac cycle lasts for 8 seconds.
- (2) Ventricular systole lasts 4 seconds.
- (3) Semilunar valves are closed when ventricles relaxed.
- (4) There is no blood in heart chamber during complete cardiac diastole.
- (5) The duration that ventricles relax is 1 second.

22nd and 23th questions are based on following table.

Hormone	Site of production	Target organ
A Oxytocin	P Kidney	X Bones
B Aldosteron	Q Hypothalamus	Y Uterus
C Erythropoietin	R Adrenal Cortex	Z Kidney

22. The correct sequence of site of production of hormones A, B and C are,
(1) P, Q, R (2) Q, R, P (3) R, Q, P (4) R, P, Q (5) Q, P, R
23. The **correct** sequence of target organs of hormones A, B and C are,
(1) Y, Z, X (2) X, Z Y (3) Y, X, Z (4) Z, Y, X (5) Z, X, Y
24. Which of the following is true regarding photoreceptors of animals ?
(1) Sensory structures are absent in coelenterates.
(2) All Arthropods possess compound eyes.
(3) All photoreceptors make images.
(4) Some Molluscs possess eyes which are mostly similar to that of chordates.
(5) Photoreceptors are developed in flat worms at the first time in animal kingdom.
25. Which of the following is **incorrect** regarding human vertebral column ?
(1) One curve is present in foetus.
(2) Child can hold head upright after formation of cervical curve.
(3) Thoracic and sacral curves remain as primary curves after the development of secondary curves.
(4) Secondary curves are convex anteriorly and primary curve are concave anteriorly.
(5) Child gains the ability to keep the trunk upright about one year after birth.
26. A type of trophic movement is,
(1) Swimming of *chlamydomonas* towards light.
(2) Closure of stomata with the increase of CO₂ in the atmosphere.
(3) Bending and growing of the taproot of horizontally placed potted plant towards the earth.
(4) Folding of *Sesbania* leaves in dark.
(5) Swimming of male gametes of *Pogonatum* towards archegonia.
27. Which of the following is **incorrect** regarding human pelvis ?
(1) It contributes to support abdominal and pelvic viscera.
(2) A part of axial skeleton also included.
(3) It is made by the fusion of three bones.
(4) It contributes to maintain erect posture.
(5) It contributes to hold lower limbs.
28. Which of the following is correct regarding breast milk ?
(1) It contains easily digestible carbohydrates such as starch.
(2) It contains more sodium ions than cow's milk.
(3) It contains lactoferrin.
(4) It does not contain fat.
(5) After 6 months of age, feeding infant with breast milk should be stopped.

29. A - E represents different stages of human spermatogenesis. Select the correct sequence of cells in spermatogenesis.

A - Sperms

B - spermatogonea

C - Primary spermatogyte

D - Secondary spermatocyte

E - Spermatids

(1) B, D, C, E, A

(2) B, C, D, E, A

(3) C, D, B, E, A

(4) D, B, C, A, E

(5) B, C, D, A, E

30. Select the **incorrect** statement.

(1) There are three layers in uterine wall as endometrium, perimetrium and myometriu.

(2) At birth both ovaries contain 2 000 000 primary follicles.

(3) Fertilization is the fusion of male pronucleus and female pronucleus.

(4) By the end of third month, the fetus is about 15 cm long.

(5) Immediately before birth maternal progesterone level drops sharply.

31. **Incorrect** statement regarding Auxin.

(1) Inhibits apical dominance.

(2) Synthesies at stem apices and young leaves.

(3) Inhibits leaf abscission.

(4) Stimulates cambial activity.

(5) Induces the growth of fruits and roots.

32. Possible blood groups that can be found in children of mother having blood group AB and father having blood group B.

(1) A and B only.

(2) AB and B only.

(3) AB and A only.

(4) All blood groups A, B, AB and O.

(5) A, B and AB only.

33. Which of the following is **incorrect** regarding the evolution of life?

(1) The lammark theory says that the evolution occurs due to the passing of adaptive features acquired by organisms during their life time.

(2) The factors affect on Hardy – Weinberg equilibrium are the agents of evolution.

(3) Presence of great reproductive potential is an observation which contribute to propose the theory of natural selection.

(4) The facts proposed by Charles Darwin and Russel Wallace regarding inheritance of characters are also included in theory of natural selection.

(5) Natural selection takes place due to struggle for existence and survival of the fittest.

34. 'Golden rice' is a paddy variety,

(1) which is resistant to viral diseases attack on rice plant.

(2) which contains insect resistant bacterial gene.

(3) which increases the crop yield producing golden colored paddy seeds.

(4) resistant to herbicides which are applied to rice cultivation.

(5) which contains genes of a soil bacteria species that produces vitamin A.

35. Select the correct statement.

(1) Primary production is the amount of light energy converted to chemical energy within a given period by the primary producers.

(2) The correct unit for gross primary productivity is ($\text{kgm}^{-2}\text{yr}^{-1}$) kilogram per year per meter.

(3) The energy consume for respiration by primary producers not included in Net primary productivity.

(4) Energy transmit through organisms in a ecosystem is cyclic.

(5) The base of all ecological pyramids are represented by primary producers.

36. Which of the following is correct ?

- (1) Unicellular eukaryotes have been evolved from bacteria.
- (2) Vertebrate phyla appeared 1 – 1.5 million years ago.
- (3) Reptiles were originated from amphibians who invaded the land first.
- (4) Mammals were dominant in Mesozoic era.
- (5) Diversification of ocean life has been happening over 900 million years.

37. Flagship species is a species.

- (1) that has been introduced from another geographic region to an area outside its natural ranges.
- (2) that remnants of a once widespread species, which are now found in very restricted.
- (3) that confined to a particular area or country, and not found growing naturally anywhere else in the world.
- (4) chosen for their vulnerability, attractiveness or distinctiveness.
- (5) which arrived and inhabited an area naturally, without human intervention.

38. Some species of organisms are given below.

- A - *Nitrosomanas*
- B - *Clostridium*
- C - *Acetobacter*
- D - *Nostoc*
- E - *Lactobacillus*

Select the response having correct sequence of micro organisms that are non-symbiotic nitrogen fixative, Chemoautotroph and obligate anaerobe.

- | | |
|----------------|----------------|
| (1) A, B and D | (2) D, A and B |
| (3) A, E and D | (4) C, D and E |
| (5) B, A and E | |

39. Which of the following process is common to both primary treatment and secondary treatment in waste water treatment plant.

- (1) Removal of oil, grease and sand
- (2) Vigorous oxidation of waste water.
- (3) Sprinkling of waste water over a bed of rocky material
- (4) Removal of organic matter.
- (5) Disinfection by adding chlorine

40. Which of the following process does not takes place aerobically?

- (1) purification of water by tricking filter method.
- (2) Production of Bio gas.
- (3) Production of compost.
- (4) Extraction of copper from low grade ore.
- (5) Production of vinegar from toddy.

- For each of the questions 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 only other response or combination of responses is correct **5**

Directions summarised

1	2	3	4	5
A, B, D correct.	A, C, D correct.	A, B correct.	C, D correct.	Any other response or combinations of responses correct.

41. Which of the following bio chemical process/ess need the energy of ATP?
 (A) For the reducing of PGA in Calvin cycle.
 (B) For the translocation of sucrose through sieve tubes.
 (C) For the absorption of ions from soil solution to root hairs.
 (D) During oxidation of glucose in glycolysis.
 (E) In reabsorption of urea in proximal convoluted tubule of nephron.
42. The enzyme/s secreted by human alimentary tract which do not involve in digestive function is / are,
 (A) Lipase
 (B) Amino peptidase
 (C) Entero kinase
 (D) Lysozyme
 (E) Nuclease
43. The process/es which do not takes place when body temperature increases than the normal level of man?
 (A) Stimulate sweat glands.
 (B) Constriction of shunt vessels.
 (C) Increase the rate of lipid oxidation in liver.
 (D) Increase the secretion of Thyroxin and Adrenaline.
 (E) Dilation of ppheripheral blood vessels of skin.
44. Which of the following is/are functions of ‘bark’ of mature dicot stem?
 (A) Protection.
 (B) Translocation of organic food.
 (C) Transportation of water and minerals.
 (D) Gaseous exchange.
 (E) Photosynthesis.
45. In which of the following event / s that meiosis takes place?
 (A) Production of microspores in microsporangium of *Selaginella*.
 (B) Production of male nuclei within pollen tube of Anthophytes.
 (C) During production of ascospores in Aspergillus.
 (D) Production of pollen grain in pollen sacs.
 (E) Production of polar nuclei in embryo sac.

46. Homozygous dominant pea plant having Yellow Round seeds was crossed with homozygous recessive pea plant having green coloured wrinkled seeds. If the alleles show independent assortment, which of the following statements is /are correct regarding F_1 progeny of above cross?
- (A) F_1 produces gametes with four genotypes.
 - (B) Four phenotypic groups would be obtained by self pollination of F_1 plants.
 - (C) When F_1 subjected to a test cross 50% of the plants in progeny possess dominant genes for both characters.
 - (D) Eight genotypic groups would be present in the progeny obtained from self pollination of F_1
 - (E) Ratio of homozygous dominant plant obtained from self pollination of F_1 is 4/16
47. Common feature/s to all vascular plants is/are
- (A) Sporophyte become dominant.
 - (B) Presence of embryonic stage in life cycle.
 - (C) Presence of photosynthetic sporophyte.
 - (D) Production of seeds.
 - (E) Presence of heterospory.
48. AIDS
- (A) caused by a virus containing RNA.
 - (B) transmitted only by sexual contact.
 - (C) destroy T lymphocytes in immune system.
 - (D) pathogenic virus possesses reverse transcriptase enzyme.
 - (E) anti vaccines are used for curation.
49. Which of the following is / are correct regarding Biomes in the world ?
- (A) There are no trees in savanna grasslands.
 - (B) Leaves of plants in Biome taiga shed during winter.
 - (C) Plants in Biome chapparal are evergreen.
 - (D) Liana and epiphytes are abundant in tropical rain forest.
 - (E) Deserts are present only in tropical regions.
50. Which of the following is / are correct regarding methods used to control the microbial diseases ?
- (A) Ethyl alcohol is used to reduce the microbial population on skin.
 - (B) Vaccines are used to establish artificial active and passive immunity.
 - (C) Disinfectants are used to destroy micro organisms in drinking water.
 - (D) Destroying vectors are successful in controlling some infectious diseases.
 - (E) Epidemic diseases can be prevented by administering antibiotic as precaution.

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G.C.E (A/L) Support Seminar - 2016

Biology II

Three Hours

Part A - Structured Essay

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

* Each question carries **10** marks.

1. (A) (i) Name the main nucleotide which supplies energy for metabolic activities in living cells.

.....

(ii) Name the major component molecules of the above mentioned nucleotide.

.....

(iii) State the main reason to consider the compound mentioned above in A (i) is suitable for its function.

.....

(iv) What is the significance of self replication of DNA in cell division?

.....

(v) Name **two** major enzymes which are important in DNA self replication and state their specific functions.

Enzyme

Function

.....

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(vi) What is meant by a recombinant DNA molecule?

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.....

(vii) State **three** applications of DNA recombination technology in Medicine.

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.....

.....

(viii) Name an enzyme for each of the following functions in genetic recombinant technology.

Function

Enzyme

Cutting DNA at specific sites

.....

Joining of DNA fragments

.....

(B) (i) Name the cellular structure which perform each of the following functions.

Function	Structure
a. Synthesis of membrane phospholipids
b. Cytoplasmic Streaming
c. Production of ribosome
d. Prevent leakages through cells

(ii) (a) What is 'sarcomere'?

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(b) Name the types of muscles in which sarcomere can be seen.

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(iii) State **two** physiological differences between muscle types you mentioned in above (ii) (b).

.....

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(iv) State **four** changes that occur in a sarcomere during contraction of muscles according to the sliding filament theory.

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(v) Name the tissues which are important for mechanical support in plants and state how each tissue is specialized for the relevant function.

Tissue	specialization
.....
.....
.....

(vi) What is the complex tissue type from the tissues you mentioned in B (v) above.

.....

(vii) State **two** functions of the above mentioned (vi) tissue other than mechanical support.

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(C) (i) What are the main functions of human skeletal system?

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(ii) Name the bones in human vertebral column which are formed by fusion of vertebrae and state the number of fused vertebrae in each.

Bone

Number of vertebrae

-
-

(iii) State **two** features seen in the human vertebral column that contribute to erect posture.

.....

.....

(iv) State one major feature of following vertebrae which can be used to differentiate them from typical vertebrae.

- Cervical vertebrae :
- Thoracic vertebrae :
- Lumbar vertebrae :

Q. 1

2. (A) (i) Name the Kingdoms belong to Domain Eukarya.

.....

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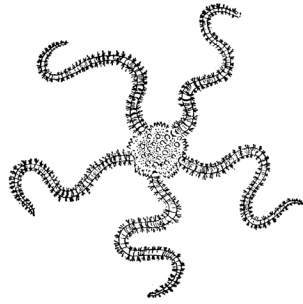
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(ii) If the given character in the first column is present in the animal phyla given in the table, indicate with a (✓) in the appropriate cage.

character	Animal phyla				
	Coelenterata	Arthropoda	Annelida	Nematoda	Mollusca
Cephalization					
Exoskeleton					
Circulatory System is absent					

(iii) Following questions are based on animals A and B.



A



B

(a) State **two** major external features which can be used to distinguish animals A and B from each other.

.....
.....

(b) Name the animal phylum into which above animals A and B belong to.

.....

(c) State **two** external characteristic features which help to categorize animals A and B into the above mentioned phylum.

.....
.....

(B) (i) State **four** reasons to consider that plants of phylum Anthophyta are evolutionary more advanced than that of the plants of phylum Cycadophyta.

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(ii) What is meant by the terms given below regarding morphological features of flowers.

(a) Hypogynous flower :

(b) Epipetaly :

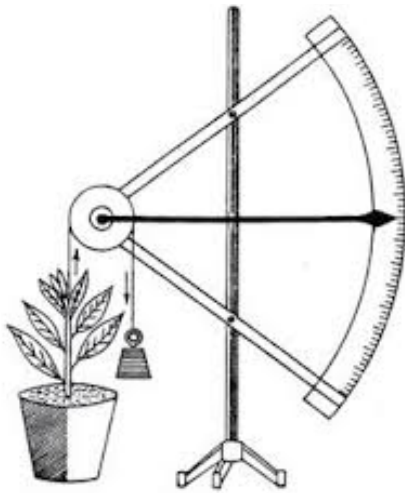
(c) Perianth :

(iii) *Pogonatum, Selaginella, Nephrolepis, Cycas, Mangifera*

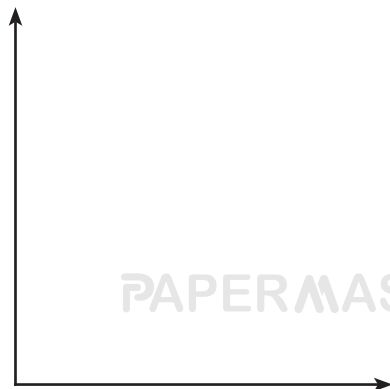
Select and write the relevant genus / genera of plants from the above list compatible to the following features.

- (a) Presence of biflagellated male gametes
- (b) Gametophytes are enclosed by sporophytic tissues.
- (c) Presence of Monoecious photoautotrophic gametophytes.
- (d) Development of pollen tube to conduct male gametes.
- (e) Sporophyte and gametophytes are independent from each other and autotrophic.
- (f) Homospory is present

(C) (i) Given below is an equipment used in the laboratory.



- (a) Identify the above equipment.
.....
- (b) What is the objective of using the above equipment?
.....
- (c) Plot a graph in the given space using the data obtained from above equipment.



(ii) State the parameters used to measure the growth of following plant organs.

(a) A fruit :

(b) A leaf :

(iii) State two differences of plant growth substances from animal hormones.

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

(iv) State a plant growth substance which perform following function.

Function

Plant growth substances

(a) Inhibit apical dominance

(b) Promote the elongation of stem

(c) Inhibit cambial activity

(v) State **three** artificial plant growth substances used in agriculture and horticulture and their applications.

Plant growth substances

Applications

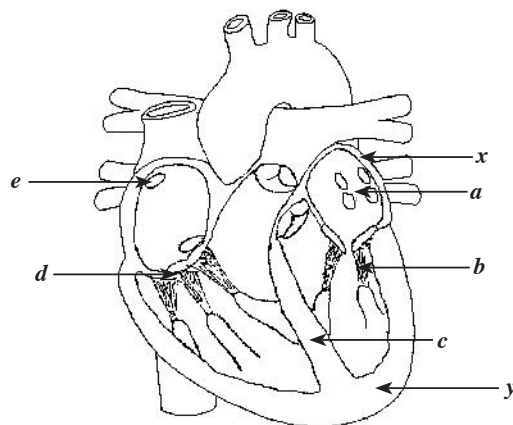
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Q. 2

3. (A) (i) Name the essential components of a blood circulatory system.

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.....
.....

(ii) Diagram given below is a Longitudinal section of a human heart.



(a) Name the parts labelled as (a) to (e) in the above diagram.

(a) -

(b) -

(c) -

(d) -

(e) -

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(b) Why the wall of "Y" is thicker than that of "X".

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

(c) State the functions of "b" and "d".

b

d

(iii) State the correct order of structures passed by a CO₂ molecule being entered into the heart through vena cava upto respiratory surface of man.

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

(iv) State **two** structural differences between blood circulatory System and Lymphatic System of man.

.....
.....

(v) Name the **two** major vessels of lymphatic system of man.

.....
.....

(vi) What is the origin of lymph ?

.....

(B) (i) What is meant by internal environment of the body.

.....
.....

(ii) State the major factors in the internal environment that must be controlled in human body.

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

(iii) Name the hormones which increase blood glucose level of man.

.....
.....

(iv) State the major factors which are controlled in osmoregulation in man.

.....
.....

(v) Name the major osmoregulatory organ in human body.

.....

(vi) Name the **two** hormones which are directly involved in osmoregulation of humans.

.....
.....

(vii) (a) State the secretory site and target / structure of the hormones you mentioned in above 3 B (vi).

Hormone	Secretory site	Target / Structure
.....
.....

(b) State how the secretion of above hormones are stimulated ?

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.....

(C) (i) State **two** organic components and **two** inorganic components translocated in phloem tissue in plants.

Organic Components	Inorganic Components
.....
.....

(ii) State **four** special features of phloem translocation.

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.....

(iii) Name the elements that are obtained in as gaseous form by plants.

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.....

(iv) State **three** natural processes which increase the available form of nitrogen in soil.

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.....

(v) Name a species of chemo autotrophic organism which reduce nitrates to gaseous nitrogen in soil.

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4. (A) (i) Name the layers of cross section of the Earth from outer to inner in order.

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(ii) (a) Name the major layers of atmosphere from bottom to upper according to the temperature.

.....
.....

(b) Name the layer out of the above mentioned layers in 4 (ii) (a) in which the ozone layer is located.

.....

Q. 3

(iii) State **two** sources of pollutants that could pollute each of the following resources.

(a) Ocean :

(b) Air :

(c) Soil :

(iv) State the impact of excessive use of fertilizers in water bodies.

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.....

(v) What is meant by 'Air Pollution'?

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.....

(vi) Name an air pollutant which is responsible for the following undesirable impacts.

(a) Cause photochemical smog.

.....

(b) Decrease in O₂ carrying capacity of blood.

.....

(c) Bronchitis and emphysema.

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(B) (i) (a) What is meant by Bio diversity.

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(b) Name the **three** basic components of Bio diversity.

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.....

(c) What is the importance of conserving Bio diversity.

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.....

(ii) Name the major type of Bio diversity conservation method applied in each of the following instances.

(a) Reintroduction of species :

(b) Maintain field gene banks :

(c) Traditional home gardens :

(iii) Name the International conventions which contribute to conservation of bio diversity and state the specific objective of each.

Convention

Objective

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(C) (i) What is meant by microbial food spoilage.

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(ii) State the reasons for spoiling fish by micro organisms easily.

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(iii) What is the group of micro organisms which spoil fish.

.....

(iv) Briefly explain the chemical reaction occur during spoilage of fish due to micro organisms.

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(v) Name **three** common methods used to preserve fish and state the priciples/principles applied in each method.

Method

The way of control

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Part B - Essay

- * Answer **four** questions only.
 - * Give clear labelled diagrams where necessary.
(Each questions carries **15** marks.)
-

5. Describe the role of chloroplast in photosynthesis.

6. (a) State the location of human liver.
(b) Describe the gross and tissue structure of human liver.
(c) Describe the contribution of human liver for regulation of physical nature and chemical composition of internal environment.

7. (a) State the types of meristems according to the localization in plant body and describe the locations and the functions of each.
(b) Describe the role of secondary meristems of a dicot stem.

8. (a) Describe the contribution of mitosis and meiosis for the continuity of life and evolution process.
(b) Explain how the natural selection is important for evolution of life.

9. Describe the contribution of micro organisms in following processes.
(a) Production of vinegar
(b) Production of compost.
(c) Extraction of metals by microbial leaching.
(d) Coir production

10. Write short notes on the following.
(a) Human brain stem.
(b) Concept of water potential.
(c) Chromosomal mutations.
