2009

Biology II Part A – Structured essay

1. A(i) All living organisms show few characteristics which collectively distinguish them from non-living matter. Indicate four such characteristics.

(ii) Write down the levels of organisation of living matter in the correct order.

(iii) Name two polymeric carbohydrates found in living organisms, and indicate their monomerous molecules.

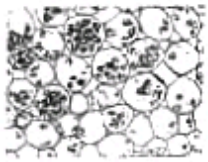
B(i) What are the major structural components of the following?

a) Cell wall of bacteria
b) Eucaryotic cell membranes
c) Fungal cell wall.

(ii) What are the biological molecules that determine the heredity of the following?

a) HIV b) Azotobacter c) Microcystis

B (iii)

(a) 

(b) 

(c) 

(d) 

Given above are four drawings of tissues of plants and animals. Name the tissues, and state a location in the plant or animal body, and one major function of each of them.

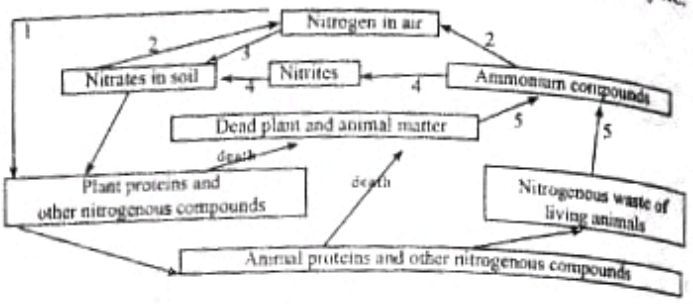
C (i) What is the active site of an enzyme/

(ii) What is a co-enzyme?

(iii) Enzymes are located in various parts of the living cell. Indicate the exact location of the enzymes of the following biochemical processes in a cell.

a) Glycolysis of an eucaryotic cell
b) Calvin cycle of photosynthesis in C_3 plants.
c) Krebs cycle in an animal cell.

D. Given below is an outline of the natural nitrogen cycle.



(i) Identify the steps labelled 1 - 5.

(ii) Name 2 major genera of microorganisms responsible for step 1.

(iii) Name 2 genera of microorganisms responsible for the two steps of process 4.

2. A. (i) In biology, what is meant by reproduction?

(ii) State three advantages of asexual reproduction over sexual reproduction.

(iii) What is the mode of asexual reproduction seen in each of the following animals?

Plasmodium: Planaria: Hydra.

(iv) What is a hermaphrodite animal?

B. 

(i) Name the structures A, B, C, D, and E in the above diagram.

(ii) What are the roles of A, B and E in the fertilization process?

(iii) Name the cellular layer surrounding the human ovum.

(iv) Name the non-cellular layer surrounding the human ovum.

(v) At what stage of development of the human ovum does ovulation take place?

C. (i) In human, what is the function of GnRH?

(ii) Rapid rise and fall of the level of which hormone in blood, triggers ovulation in women?

(iii) In which phase should the endometrium of a woman be present for implantation to occur?

(iv) State four functions of oestrogen.

(v) State two functions of progesterone.

(vi) Why does menstruation occur?

2. (i) What foetal membranes participate in the formation of human placenta?

(ii) Name the hormone secreted by human placenta at the initial stage of pregnancy, and state its function.

(iii) Name two substances that pass from foetus to maternal blood through the human placenta.

(iv) In which trimester does hair develop in the human foetus?

(v) Name a substance secreted by human placenta, which stimulates uterine contractions in the birth process.

3. A. (i) Where is the largest reservoir of carbon found in the biosphere?

(ii) State three main ways by which man influences the cycling of carbon in nature.

(iii) What is the source of carbon used by the primary producers in the ocean?

(iv) What is the international protocol aimed at reducing emission of greenhouse gases?

B. (i) What is an ecological pyramid?

(ii) What are the three types of ecological pyramids?

(iii) Which of the above pyramids could be inverted?

(iv) What is meant by the following terms regarding ecosystems?

(a) Food chain (b) Trophic level
(c) Food web

C. (i) Name the Orders to which most of the insect pests belong.

(ii) Which one of the above Orders contains insets whose larval stages only, damage the crop plants.

(iii) Name three pests of paddy, and one pest of coconut belonging to the order stated in C (ii).

(iv) Name the insect pest that damages the internal tissues of the trunk of the coconut palm.

(v) How could the pest stated in (iv) be controlled?

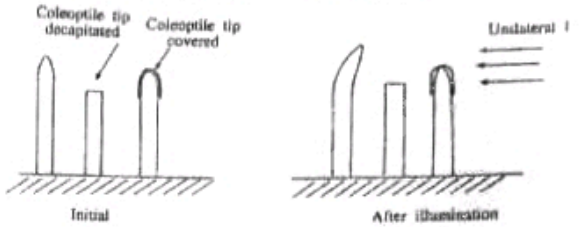
4. A. (i) Name two phyla which contain multicellular internal parasites of man, and name two examples of internal human parasites for each of these phyla.

(ii) Name a unicellular internal parasite of man which may establish a balance with the host, and does not cause a disease.

(iii) Name three parts of plants that can be used for tissue culture.

(iv) State four advantages of tissue culture over conventional methods of plant propagation.

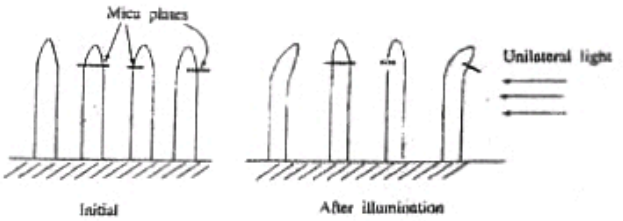
4. A. (i) The diagrams given below, represent an experiment done by two scientists in the last century, to investigate the phototropic response of oat seedlings.



a) State three conclusions that can be drawn from the results shown in the above diagram.

b) State the name of a scientist who carried out the experiments shown above.

(ii) The diagrams given below represent another experiment carried out by another scientist to investigate further, the phototropic response of oat seedlings.



a) Give four conclusions that can be drawn from the results shown in the above diagram.

b) Name the scientist who carried out the above experiment.

4. B. (i) Who is the scientist that discovered auxin?

(ii) State three functions of auxins in plants.

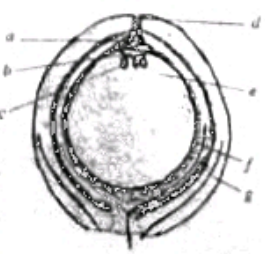
(iii) Give three possible causes of dormancy in seeds.

(iv) Name a plant growth substance that activates the germination of seeds.

(v) Name a plant growth substance that delays the germination of seeds.

C. The diagram given below, shows a longitudinal section of an ovule of Cycas.

(i) Name the parts a - g.



(ii) Write four differences between the ovule of Cycas and that of an angiosperm.

(iii) What is the exact location / structure of male plant of Cycas where meiosis takes place.

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(iv) What is the exact location / structure where male gametes are produced in Cycas?

(v) State two differences between male gametes of Cycas and angiosperms.

D. Questions (i) and (ii) are based on four angiosperm genera given below.
Oryza (rice), Cocos (coconut), Ricinus (castor), Phaseolus (bean)

(i) Name a genus which produces seeds predominantly by self pollination.

(ii) Name a genus which produces seeds predominantly by cross pollination.

(iii) What is meant by double fertilisation?

(iv) Name the parts of an angiosperm ovary which give rise to

a) seed coat of Ricinus
b) husk of Cocus
c) hilum of Phaseolus seed
d) endosperm of Oryza