

Academic Year 2013 – 2014

STD.: 11

Max. Marks: 30

DATE: 28/02/14

DURATION: 3 hours

*(Candidates are allowed additional 15 minutes for only reading the paper.  
They must NOT start writing during this time.)*

*Answer all questions in Part I and six questions in Part II, choosing two questions  
from each of the three sections A, B and C.*

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

*The intended marks for questions or parts of questions are given in brackets [ ].*

### **PART I (20 Marks)**

*Answer all questions*

#### **Question 1**

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

1. Lyases and Hydrolases
2. Cis –face and trans-face of Golgi complex
3. Anaphase and anaphase I
4. Unit membrane model and fluid mosaic model
5. NADH dehydrogenase and succinate dehydrogenase

**b) Give reasons for the following: [5]**

1. Triglycerides are large molecules formed by condensation reactions but are not condensation polymers.
2. Majority of enzymes (not all) are proteinaceous.
3. Microvilli are only possible in animal cells but not in plant cells.
4. The RQ of anaerobic respiration is infinite.
5. Crossing over increases the possible genetic variation which could be found among daughter cells

**c) Each of the following questions / statements has four suggested answers. Rewrite the correct answer in each case: [5]**

**1.** Which of the statements about polysaccharides can be used to describe both amylopectin and cellulose?

- 1 adjacent glucose molecules are rotated by 180°
- 2 contains 1,4 glycosidic bonds
- 3 polymer of  $\alpha$ -glucose

a) 2 only

c) 1 and 2

b) 3 only

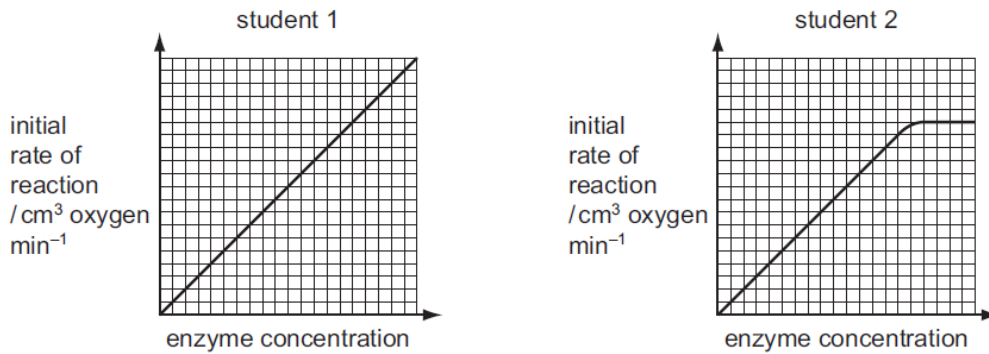
d) 1 and 3

2. Which substances contain carbon, hydrogen, oxygen and nitrogen?

- 1 collagen
- 2 amylopectin
- 3 deoxyribonucleic acid

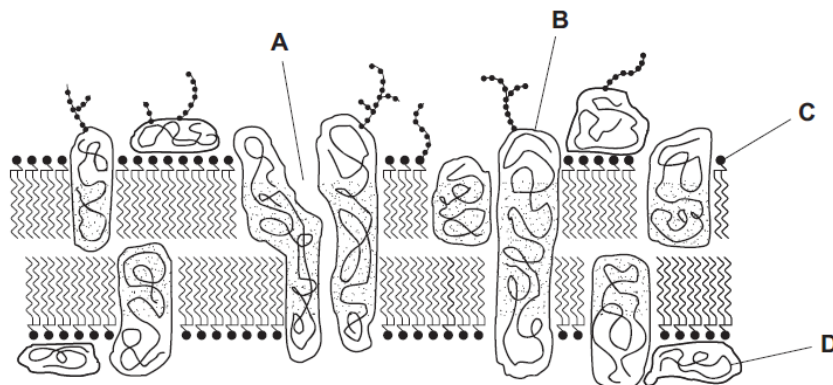
- a) 2 only
- b) 1 and 3 only
- c) 2 and 3 only
- d) 1, 2 and 3

3. Catalase is an enzyme that catalyses the conversion of hydrogen peroxide into water and oxygen. Two students investigated the effect of enzyme concentration on the rate of reaction of the enzyme catalase. The students predicted their results would show the same trend. The graphs show the rates obtained by each student.



Which statement explains the different trend shown by student 2's results?

- a) Student 2 included a competitive inhibitor in the investigation.
  - b) Student 2 performed the investigation at a higher temperature.
  - c) Student 2 performed the investigation at pH6 compared to pH8.
  - d) Student 2 used a lower concentration of substrate in the investigation.
4. The diagram shows the fluid mosaic model of membrane structure. Which would enable a hormone to recognise its target cell?



5. What are the conditions in a human cell just before the cell enters prophase?

	number of chromatids	number of molecules of DNA in nucleus	spindle present	nuclear envelope present
A	46	46	yes	no
B	92	46	no	yes
C	46	92	yes	yes
D	92	92	no	yes

d) State the best known contribution of the following scientists: [3]

1. Wilkins
2. Phoebus Levene

e) Expand the following [2]

1. OAA
2. d CMP

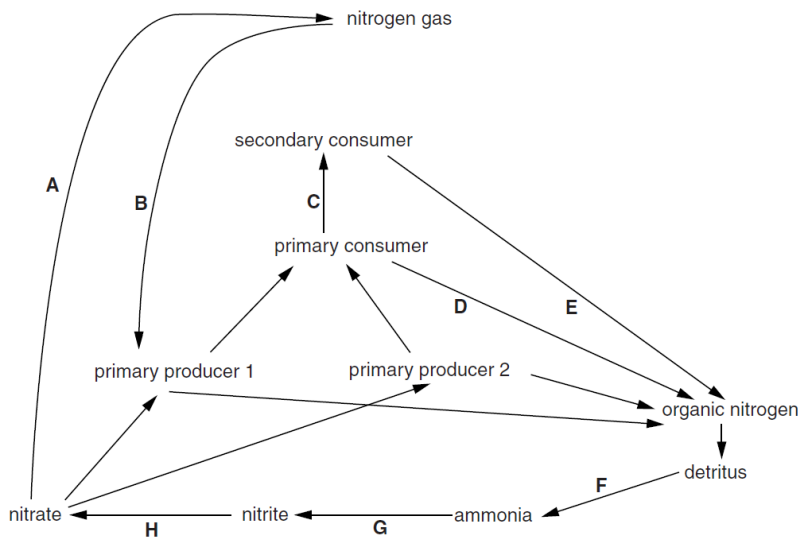
**PART II (50 Marks)**

**SECTION- A (10)**

Answer any *two* questions

**Question 2**

a) Microorganisms play an important role in the cycling of nitrogen in ecosystems. Following figure is a diagram of a nitrogen cycle.



Read the information below about four different species of soil bacteria. In the box provided, write the appropriate letter that matches each microorganism to its corresponding stage in the nitrogen cycle in figure. (Copy the boxes in answer sheet) [2]

- *Nitrosomonas europaea* is an ammonia-oxidising bacterium.
- *Bacillus cereus* is a denitrifying bacterium.
- *Azospirillum lipoferum* lives in the roots of some cereals and grasses and supplies fixed nitrogen to plants.
- *Streptomyces coelicolor* is a bacterium that secretes powerful hydrolases to break down compounds such as proteins and cellulose.


b) Give one role and one deficiency symptom of each of the following in plants. [3]

- i) Nitrogen
- ii) Calcium
- iii) Phosphorus

c) Write any six important functions of auxins. Explain the role of auxin in apical dominance [5]

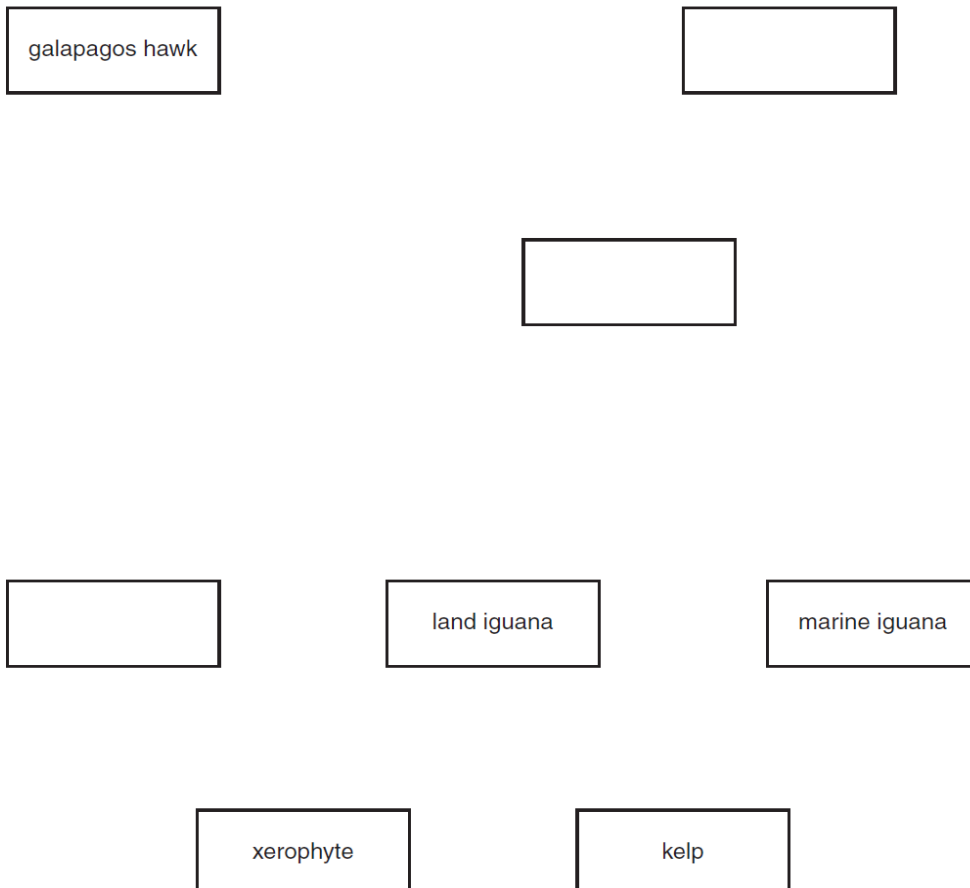
**Question 3**

- a) How would you determine whether or not a particular element is essential for plants? Explain the carrier concept theory of mineral absorption by using suitable sketch. [5]
- b) Describe the historical aspect of gibberellins discovery. Enlist four physiological effects of gibberellins. [3]
- c) When investigating ecosystems, food chains and food webs are constructed. Read the passage below about trophic relationships on one of the Galapagos Islands.

*Marine iguanas feed on kelp, which grows attached to rocks in shallow waters. Kelp is a photosynthetic organism. Further inland, xerophytes are grazed upon by land iguanas. A great diversity of herbivorous insects, including many species of short-horned grasshoppers, feed on the xerophytes. An analysis of the gut contents of lava lizards reveals that these insects are prey for the lizards. The lizards are preyed upon by Galapagos snakes. The snakes also hunt grasshoppers and newly hatched iguanas. The Galapagos hawk has a varied diet and catches animals such as Galapagos snakes, short-horned grasshoppers, small lava lizards and newly hatched iguanas.*

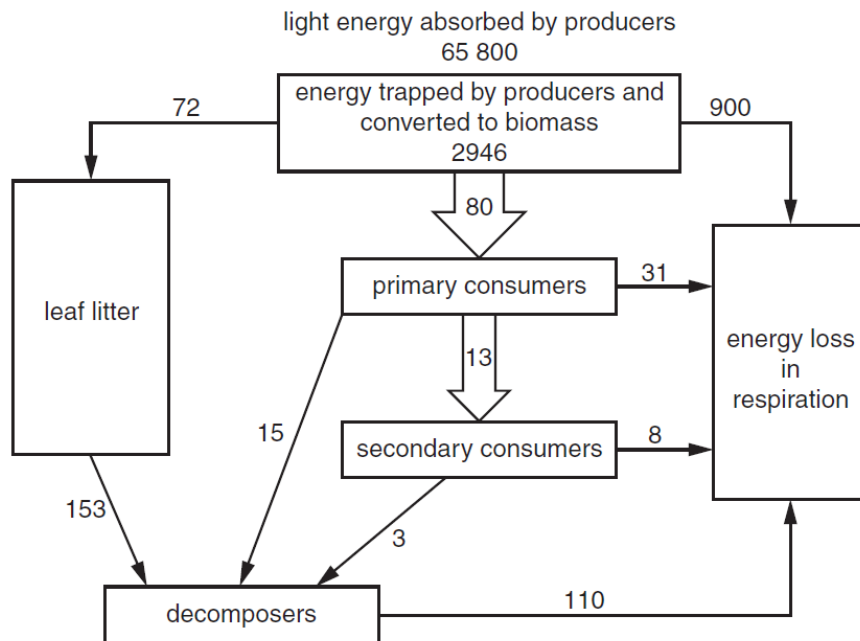
Complete following figure to make a food web by:

- filling in the blank boxes with the names of the organisms
- adding arrows to show the direction of energy flow between all the different links in the food web. **(Copy the food web in answer sheet)** [2]



**Question 4**

- a) Explain the process of nodule formation in leguminous plants root. [3]
- b) What is seed dormancy? How can it be broken artificially? [3]
- c) Define productivity. What is the difference between primary productivity and secondary productivity? [2]
- d) Given figure shows the flow of energy through a woodland. All figures are in kJ m<sup>-2</sup> per week. [2]



Calculate the energy trapped by the producers and converted to biomass as a percentage of the light energy absorbed. Express your answer to the nearest 0.1%.

**SECTION –B (20)**

Answer any **two** questions.

**Question 5**

- a) With the help of flow chart explain the life cycle with zygotic meiosis. [2]
- b) How will you differentiate an ascus from a basidium. (Two differences) [2]
- c) Explain in brief about the following. [4]
  1. Reserve food in algae
  2. Gametophytic stage of Funaria
  3. Endosperm in gymnosperm
  4. Gametophyte stage of fern
- d) Discuss the development of respiratory organs in invertebrate phylas. [2]

**Question 6**

- a) Explain any one group of photosynthetic protists with reference to following features. [3]
  1. Locomotion
  2. Pigments
  3. Reproduction

- b) Give a comparative account of the classes of Kingdom Fungi under the following: [2]  
 1. mode of nutrition  
 2. mode of reproduction
- a) Differentiate between homosporous and heterosporous pteridophytes. Mention any one example of each type. [2]
- e) With the help of a chart give the classification of chordates. [3]

### Question 7

- a) Mention any four economic importances of algae with named algal products. [2]
- b) With the help of suitable sketch, explain the classification of kingdom plantae up to class levels. [4]
- c) Platyhelminthes are parasites. Give its parasitic adaptations. [2]
- d) Annelids are metamerically segmented. Justify. [1]
- e) Arthropods are the most widely distributed phylum. Give reason. [1]

### SECTION –C (20)

*Answer any two questions.*

### Question 8

- a) Describe the transmission of nerve impulse. [3]
- b) Draw the diagram of nephron and mark the parts - [3]  
 Malpighian corpuscle, Vasa recta, distal convoluted tubule, collecting duct,
- c) Draw the structure of artery and vein and state the adaptation of each. [3]

### Question 9

- a) Describe the process of digestion of proteins. [3]
- b) With the help of diagrams show the three main types of freely moveable joints. [3]
- c) Discuss the transport of CO<sub>2</sub> in blood. [4]

### Question 10

- a) Draw the structure of pituitary gland and name the hormones of the posterior pituitary. [3]
- b) Describe the working of ear. [3]
- c) Write note on the following- [4]  
 1. Renal calculi  
 2. Myasthenia gravis  
 3. Exophthalmic Goitre  
 4. Blood pressure