

Part A - Structured Essay

Answer all questions on this paper itself.

01.

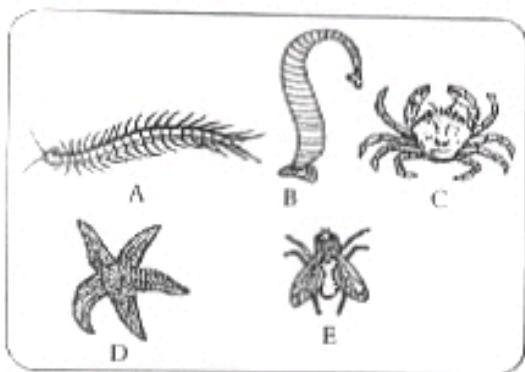
- (A) (i) State in correct sequence, the major taxa used in the classification of an organism

- (ii) Explain what is meant by the term 'species'

- (iii) What is binomial nomenclature?

- (iv) Explain the importance of binomial nomenclature

- (B) The questions (i) - (v) are based on the diagrams given below.



- (i) Insert the letters A, B, C, D and E to the correct places in the following key

1. Jointed legs absent 2
- Jointed legs present 3
2. Body segmented 4
- Body unsegmented 4
3. Wings absent 4
- Wings present 4
4. Eyes stalked 4
- Eyes not stalked 4

- (ii) The above key is known as a key

- (iii) Which of the above animals is/are present only in the marine environment?

- (iv) Name the phyla to which A, B, C, D and E belong

- A
B
C
D
E

- (v) State two external features found only among the animals of the phylum to which D belongs.

- (C) (i) State the five major divisions of the kingdom Plantae

- (ii) Combination of certain basic characteristics distinguishes Kingdom Plantae from other kingdoms. State five of these characteristics

- (iii) Name the division of Kingdom Plantae which includes flowering plants.

- (iv) State six features found only in the division named in (iii) above.

- (D) (i) What is green-house effect?

- (ii) Name three major substances responsible for green-house effect.

- (iii) Name two substances mainly responsible for acid rain.

- (iv) State two major environmental impacts of acid rain

- (v) State the international convention/protocol associated with each of the following.

- a. Conservation of wetlands
- b. Trade of endangered species
- c. Emission of ozone depleting substances
- d. Transboundary movement of hazardous waste
- e. Sustainable utilization of biodiversity

02.

- (A) (i) State five reasons why bacteria are the most widespread organisms in the biosphere

(ii) Bacteria are generally classified according to their shapes and arrangement of cells. Draw and name these shapes and arrangements below.

(iii) State two units used in the measurement of size of micro organisms

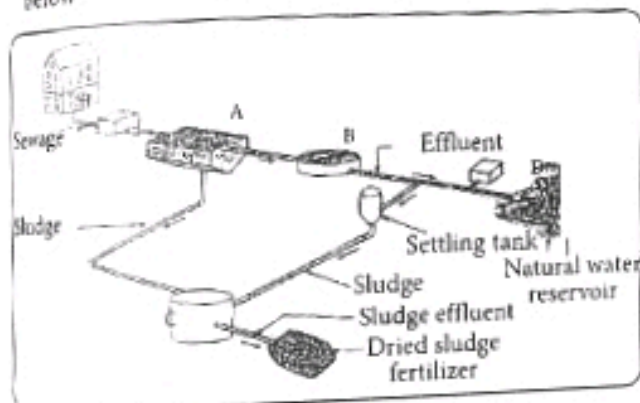
(i) State a solid culture medium generally used in the laboratory to culture each of the following groups of micro organisms.

- a. Bacteria
b. Fungi

(ii) What are the methods commonly used in the laboratory to sterilize the following? (State the equipment, temperature and duration used)

- a. Glass petri dishes
b. Water

10) Questions (i) and (ii) are based on the diagram of a typical in industrial waste water treatment plant given below



(i) Name the stages marked A, B, C and D.

- A -
B -
C -
D -

(ii) State what takes place at each of these stages

- A -
B -
C -
D -

(i) Why is it necessary to stain bacteria for microscopic examinations?

(ii) State in correct sequence the steps involved in the simple staining procedure of bacteria for microscopic examinations and give the purpose of each of these steps.

Step

Purpose

1. Preparation of smear	2. Fixation
3. Primary stain	4. Decolorization
5. Counterstain	6. Examination

03.

(A) (i) State the major characteristics of a hormone.

(ii) State two main differences between plant hormones and animal hormones.

(iii) What is the overall function of animal hormones?

(B) (i) What is the main structural difference between endocrine glands and exocrine glands?

(ii) Name an organ which functions both as an endocrine gland and an exocrine gland in man

(iii) For each of the hormones of man given below, state the site of production and site of action

Hormone	Site of Production	Site of action
Aldosterone		
Secretin		
Oxytocin		
Growth hormone		
Follicle stimulating hormone		

(iv) Name a pituitary hormone which is both under stimulatory influence and inhibitory influence of hypothalamus.

(v) Name a hormone secreted by the human kidney

(C) (i) State the location of the thyroid gland in man

(ii) Name the hormones secreted by the thyroid gland of man.

(iii) State the main functions of each of the thyroid hormones



(iv) Explain how glucagon regulates blood glucose level in man

.....

.....

.....

(D) (i) What are the major types of plant hormones involved in growth and development

.....

(ii) Name the major type of plant hormone that is involved in each of the functions given below.

- a. Breaking of dormancy
- b. Cell division
- c. Apical dominance
- d. Flower initiation
- e. Delaying senescence
- f. Stomatal closure
- g. Shoot growth
- h. Fruit ripening
- i. Increasing the cambial activity
- j. Parthenocarpy

04.

(A) (i) What are the **three** main components of DNA?

.....

(ii) What are the features of DNA that make it the most appropriate molecule to function as genetic material in organisms?

.....

.....

(iii) a. Name another molecule that can function as genetic material

b. Give **two** chemical differences between DNA and the molecule named in (a) above

.....

(B) (i) What is a test cross?

.....

(ii) State the objective of a test cross

.....

(iii) a. In pea plants red flowers are dominant to white flowers and green pods are dominant to yellow pods. What is/are the possible genotype/genotypes of red flowered, yellow pod pea plants?

b. If red flowered yellow pod pea plants were subjected to a test cross, state the possible phenotypes that would be yielded and determine the phenotypic ratios of the resulting progeny.

.....

(C) State **five** applications of DNA recombinant technology

.....

.....

(D) A cross among pea plants yielded 4 phenotypes, A, B, C, and D at frequencies of 80, 40, 25 and 15 respectively. Determine whether the phenotypic ratio of A : B : C : D conforms to 9 : 3 : 3 : 1 at 5% level of significance (The relevant portion of the Chi square table you may need is given below).

No. of classes (n)	Degrees of freedom (n-1)	Chi square value at 5% level of significance
3	2	5.99
4	3	7.82
5	4	9.49

Part B - Essay

Answer four questions only.

01. (i) Describe the manner in which the major photosynthetic product in the leaf mesophyll cells is translocated to storage cells in the root

(ii) Briefly describe the structure of the major tissue involved in this translocation

02. (i) Briefly explain the theories of origin of life.

(ii) Briefly describe the major concepts of Darwin's theory of evolution

03. (i) Describe briefly the gross structure of the respiratory system of man.

(ii) Explain briefly the mechanism of lung ventilation in man

04. (i) Describe how carbon is cycled in the biosphere

(ii) Discuss the effects of human interference on the natural cycling of carbon

05. (i) Describe the life cycle of the malarial parasite

(ii) Explain how the understanding of the life cycle of the malarial parasite helps in the control of malaria in Sri Lanka.

06. Write short notes on the following

(i) Environmental impacts of prawn farming in Sri Lanka

(ii) Ecological pyramids

(iii) Inflammatory response