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The Open University of Sri Lanka
Faculty of Natural Sciences
Advanced certificate in Science Programme

Department	**: Foundation Academic Unit**
Level	**: Level 2**
Name of the Examination	**: Final Examination 2021/22**
Course Title and - Code	**: Biology 1 BYF 2511**
Academic Year	**: 2021/22**
Date	**: 24.09.2022.**
Time	**: 9.30am-12.30pm**
Duration	**: 03 Hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **07** questions in **08** pages.
3.. All questions carry equal marks.
4. Answer for each question should commence from a new page.
5. Draw fully labelled diagrams where necessary.
6. Involvement in any activity that is considered as an exam offense will lead to punishment.
7. Use blue or black ink to answer the questions.
8. Clearly state your index number in your answer script.

Index Number : .....

Answers to questions in Part I should be given in the question paper itself. Answers to questions in Part II should be given in the answer book provided.

PART I (1 ½ Hours)
Multiple Choice and Structured Essay Questions
Answer ALL Questions

1) Multiple Choice Questions

Indicate the most appropriate answer with a cross (X) in the cage provided

1.1 The most accurate statement regarding the reproduction of algae is,

a	a.) Algae carry out sexual reproduction by forming spores.
b	b.) They show sexual and asexual reproduction only.
c	c.) The most advanced mode of sexual reproduction shown by algae is oogamy.
d	d.) All of the above statements are correct regarding reproduction of algae.

1.2 Which of the following is **not** a function of proteins?

a	a.) serving as a thermal insulator.
b	b.) inheritance of characters in organisms.
c	c.) transport of various compounds.
d	d.) regulation of physiological functions.

1.3 Phototropism

a	a.) is the growth of a plant part towards a light stimulus.
b	b.) is the growth of a plant part away from a light stimulus.
c	c.) is a directional growth in response to a light stimulus.
d	d.) All of the above statements are correct regarding phototropism.

1.4 Movement of water from soil into the xylem is through

a	a.) apoplastic pathway.
b	b.) symplastic pathway.
c	c.) vacuolar pathway.
d	d.) all of the above pathways.

1.5 The autotrophs can be defined as the organisms,

a	a.) with the ability of synthesizing their carbon food.
b	b.) synthesizing the carbon food using the energy of sunlight.
c	c.) synthesizing the carbon food using the energy of a chemical reaction.
d	d.) obtaining the carbon food from other sources.

1.6 Which of the following phyto-hormones is responsible for seed dormancy?

a	a.) Auxins
b	b.) Gibberellins
c	c.) Abscisic acid
d	d.) cytokinines

1.7 Fungi

a	a.) are always parasitic.
b	b.) are always pathogenic.
c	c.) Both the a) and b) statements above are correct regarding fungi.
d	d.) Both the a) and b) statements above are incorrect regarding fungi.

1.8 Vegetative propagation

a	a.) is the only mode of propagation of plants.
b	b.) produce daughter plants which are not identical to each other.
c	c.) Both of the statements a and b are correct.
d	d.) Both of the statements a and b are incorrect.

1.9 Enzymes are formed with amino acids connected by,

a	a.) glycosidic bonds.
b	b.) peptide bonds.
c	c.) high energy bonds.
d	d.) ester bonds.

1.10 Transpiration

a	a.) is always beneficial to plants.
b	b.) removes water from plants in liquid form.
c	c.) is affected by external factors only.
d	d.) helps plants in upward movement of water and minerals.

1.11 Which of the following statements is **incorrect** regarding vascular tissues?

a	a.) All the plants contain vascular tissues.
b	b.) Vascular tissue is composed of the xylem and the phloem.
c	c.) These help in conducting water and food in plants.
d	d.) All the vascular tissues have parenchyma cells.

1.12 *Selaginella*

a	a.) has a dichotomously branched heterophyllous sporophyte.
b	b.) does not produce ligules.
c	c.) is homosporous.
d	d.) does not have any of the above characteristics.

1.13 A difference between *Marchantia* and *Pogonatum* is

a.	
b.	
c.	
d.	

a.) *Marchantia* is dichotomously branched and *Pogonatum* is not.
b.) *Marchantia* is a flat thallus while *Pogonatum* is erect.
c.) *Marchantia* produces elaters in the sporophyte but not *Pogonatum.*
d.) All of the above differences are correct.

1.14 When two characters are involved in a cross, such a cross is known as,

a.	
b.	
c.	
d.	

a.) a monohybrid cross.
b.) a test cross.
c.) a back cross.
d.) a dihybrid cross.

1.15 Chromosomes are categorized based on

a.	
b.	
c.	
d.	

a.) the relative length of the chromosome.
b.) the position of the centromere.
c.) both of the above criteria.
d.) none of the above criteria given in a and b.

1.16 According to the fluid mosaic model of the plasma membrane,

a.	
b.	
c.	
d.	

a.) lipids and proteins are not mobile.
b.) lipids and proteins can move laterally.
c.) they can move from one layer to another.
d.) proteins can move while lipids are immobile.

1.17 A virus can be regarded as living because,

a.	
b.	
c.	
d.	

a.) they possess RNA or DNA.
b.) they can multiply extracellularly.
c.) they have a protoplasm.
d.) of all the above features.

1.18 In cymose inflorescences

a.	
b.	
c.	
d.	

a) the young bud is at the base.
b) the young bud is at the apex.
c) the axis can grow further.
d) an indeterminate growth is seen.

1.19 The advantage of the phase contrast microscope is that,

a.	
b.	
c.	
d.	

a.) the specimen can be enlarged 40,000 times.
b.) it is useful for viewing suspension of bacteria.
c.) it avoids requirement of the cells to be stained or killed.
d.) the specimen need not be sectioned.

1.20 The osmosis **cannot be** described as,

a.	a.) a passive process.
b.	b.) a process which requires energy.
c.	c.) a diffusion process through a selective permeable membrane.
d.	d.) a process in which only the solvent will diffuse.

1.21 Which of the following statements is **incorrect** regarding intra-cellular signaling?

a.	a.) Cells change their behaviour in response to internal and external changes.
b.	b.) Water stress in plants would induce uptake of K^+ into guard cells of stomata.
c.	c.) Cell stimulation can change the concentration of intra-cellular solutes.
d.	d.) One of the most important intra-cellular messengers is Mg^{2+}.

1.22 Roots of a plant

a.	a.) can perform only anchorage in soil and absorption.
b.	b.) can sometimes carry out photosynthesis as well.
c.	c.) will not carry out respiration,
d.	d.) are always positively geotropic.

1.23 Flowers

a.	a.) are the reproductive structures in plants.
b.	b.) have petals as the inner most whorl.
c.	c.) always have either an ovary or stamens.
d.	d.) are diploid in nature.

1.24 The modern system of nomenclature was first introduced by

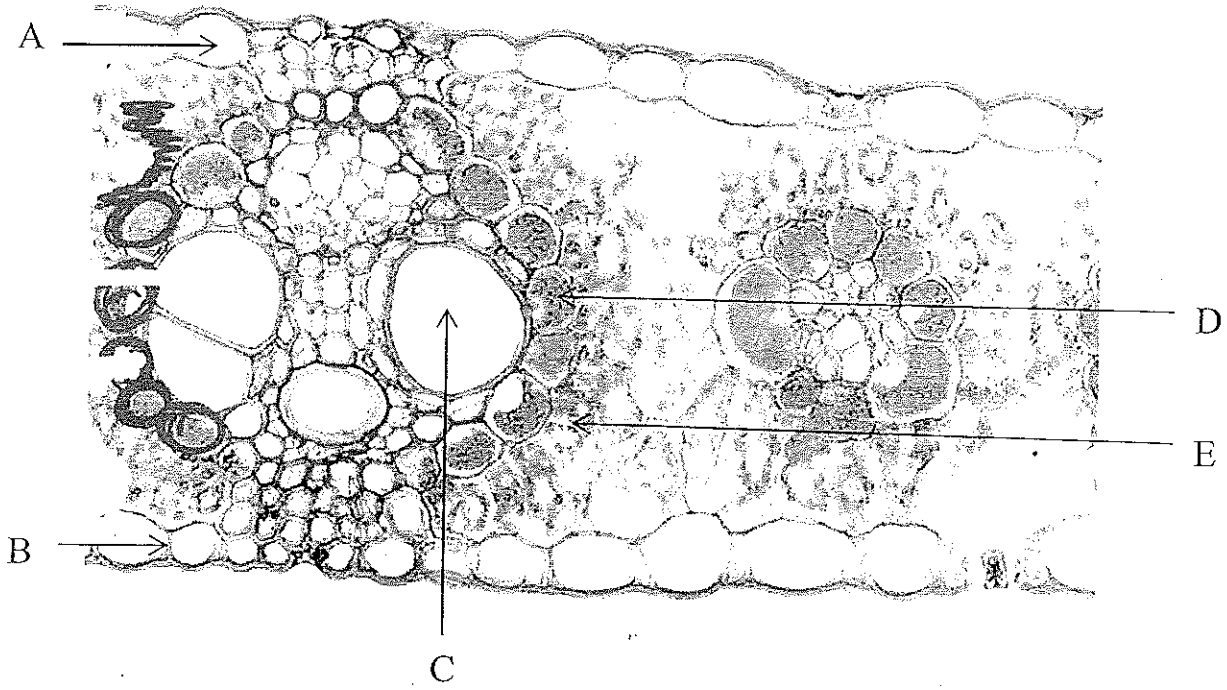
a.	a.) Darwin.
b.	b.) Linnaeus.
c.	c.) Woes.
d.	d.) Whittaker.

1.25 Nyctinastic movements

a.	a.) are permanent.
b.	b.) are irreversible.
c.	c.) are caused by internal stimuli.
d.	d.) can also occur in leaves which do not have a pulvinus.

(100 marks)

2 Structured Essay Question



a) Given above is a transverse section of a leaf. Identify the specimen fully.

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b) Name A, B, C, D and E.

A..... B .....

C..... D.....

E.....

c) Give two features of the above specimen which helped you in identifying it.

.....

.....

d) What is the special term used to describe the anatomy of the leaf shown above.

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e) List the two main pathways by which photosynthesis is carried out by plants.

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f) Out of the above-mentioned pathways, which pathway is more efficient?

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g) Name the first stable product of this pathway and mention why this pathway is called like that.

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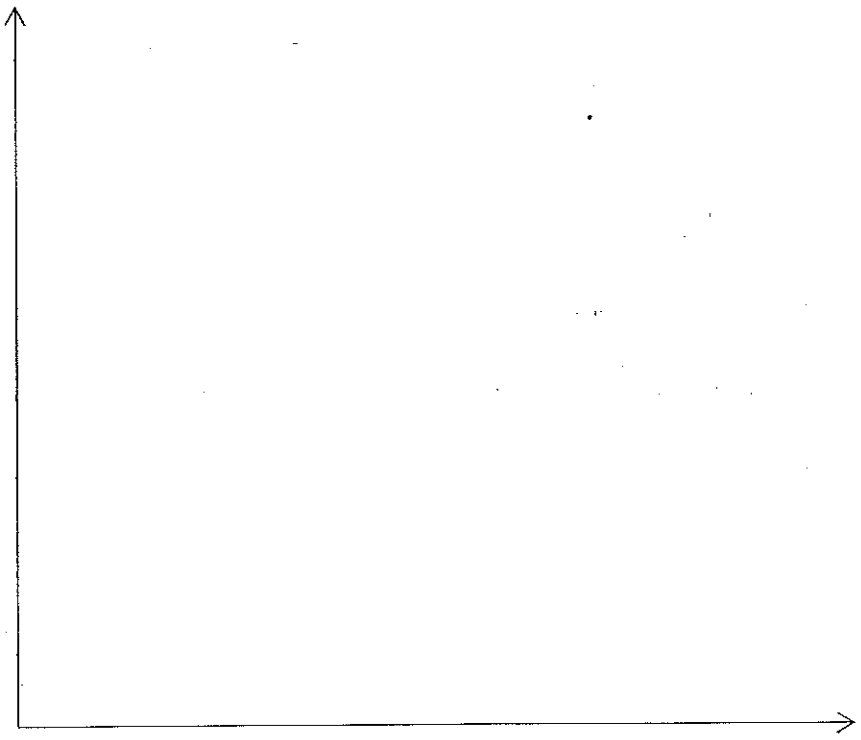
h) Draw a graph to show the effect of CO_2 concentration on the rate of photosynthesis.



(100 marks)

Part II

Essay Type Questions (1 ½ hours)

Answer any <u>three (03)</u> questions in the answer book provided. Each question will carry 100 marks.

1) Tall tomato plants are produced by a dominant allele T while dwarf plants are produced by its recessive allele t. Red fruits are produced by a dominant gene R and yellow fruits by its recessive allele r. When two tall tomato plants having red fruits were crossed, the progeny produced 912 tall plants having red fruits, 306 tall plants with yellow fruits, 301 dwarf plants with red fruits and 101 dwarf plants having yellow fruits.
   a) Diagram the cross to show the genotypes and phenotypes of the parents and the F_1 generation.
   b) What is the F_1 phenotypic ratio?
   c) Show the test cross of parent plants giving the phenotypic and genotypic ratios.

2) a) Name the groups of naturally occurring plant hormones.
   b.) Write the commercial use of the plant hormone which produces parthenocarpic fruits.
   c.) 'Some plant hormones are used to improve the quality and quantity of yield.' Giving three (03) different examples, discuss this statement.

3) a) Draw a bacterial cell and label all the parts.
   b) Give one function each of the parts mentioned in a) above.
   c) Briefly describe how bacteria are classified based on their mode of nutrition?

4) a) Make a line diagram of a transverse section of a monocot stem and label all the tissues.
   b) Briefly describe functions of each tissue you mentioned in a) above.
   c) Compare this structure with a transverse section of a dicot stem.

5) Write short notes on any three (03) of the following.
   a) Incomplete dominance
   b) Importance of meiosis
   c) Uses of fungi
   d) Incipient plasmolysis
   e) Advantages and disadvantages of tissue culture