Ministry of Education

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General Certificate of Education (Adv. Level)

Biology

Part II A – Structured essay

1' A. i. a) What is an adaptation?

Adaptation is a peculiarity of structure, physiology or behavior that promotes the likelihood of an organism's survival and reproduction in a particular environment.

b) Write 2 adaptations against the salt stress in mangrove plants

Having salt glands

Maintain the high water potential in root hair membrane than the soil solution

ii.a) Write structural polysaccharide in animal.

Chitin

b) What is the building unit in above ii) (a) mention polysaccharide

Glucosamine

iii Write 2 structures in eukaryotic cells which shows micro tubule (9+0) structure

Centriole, Basal body

iv. Write 2 structure which is present outside of the outer boundary in a living cell

Cell wall, Extra cellular matrix, cell junction

v. What is the specimen use to observe different stages in mitotic division in school laboratory

longitudinal section of root apex of onion

B. i. Write the specific location for the below given enzymes naturally available in organisms

Enzyme	Specific location
(a). PEP carboxylase	Cytosol of mesophyl cells in C_4 plants.
(b). Carbonic anhydrase	Human red blood cell, Cytosol of mesophyl cells in C_4 plants.
(c). Nitrogenase	Heterocysts

(d). NADP reductase Grana in chloroplast/ Thilakoid membrane

ii. Some steps in cellular respiration in eukaryotic cell are given below

a) Glycolysis
b) Kreb's cycle
c) Electron transport chain
d) Ethyl alcohol fermentation
e) Lactic acid fermentation

Select the correct respiratory step from the above list or below given instances

a) Release CO_2 in cytosol d

b) Consumption of ATP a

c) Synthesis highest no of ATP c

d) Last electron accepter being an organic molecule d,e

iii. a) What is kranz anatomy?

Arrangement of bundle sheath cells around the vascular bundle and mesophy cells beyond that

b) Write 2 adaptation in kranz anatomy to increase the efficiency in photosynthesis

Consist chloroplast in bundle sheath cell

Large number of plasmodesmata between bundle sheath cell

c) What is the 1st ancestral carbohydrate in C_4 mechanism, and where does it synthesis

.

Ancestral molecule	Particular place of synthesis
G3P	Stroma of chloorplast in bundle sheath cell

C. i. What is the classification of organisms?

Arrangement of organisms into groups on the basis of the common characteristics is called classification

ii. Name 2 indicators which used by Aristotal when classifying organism

Mode of locomotion, reproduction and presence or absence of red blood cells

iii. Name the kingdom/s which microorganisms belong according to the classification introduced by Robert Vitaker

Monera, Protista, Fungi,

iv. Write the scientific name of a plant species endemic to Sri Lanka

Dipterocrpus zeylanicus / Garcinia quaesita

v. Given below are the few organisms in Kingdom animalia

a) *Hydra* b) Lordiya c) *Planaria* d)*Taenia* e)*Wueheraria bancrofti*

f) Leech g) Octopus h) Chiton i) Tick j) *Aedes aegypti*

Select the English letter from the above list to the characters given below

a) Use illia for locomotiom — c

b) Having whrole of tentacle around the mouth — a

c) An endoparasite Whose body is covered by a hard culicle — e

d) Having radulla but no shell — g.

e)An organism having 4 pair of jointed legs — i

vi. Name one gemus pf the each of yhe following type of spore producing fungi

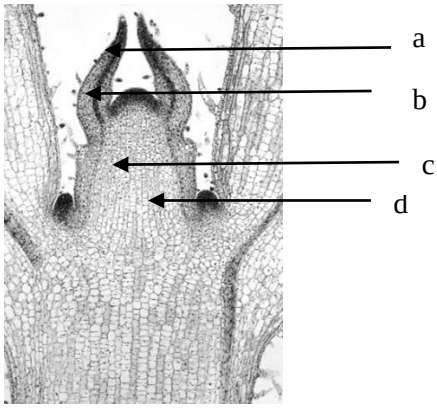
a) exogenus sexual spore — *Agaricus*

b) Exogenuous Asexual spore — Aspergillus / Penicillium

vii Member of the kingdom plantae are considered to have evolved from green Algae.. Name 2 characteristics that were present in terrestial plants during evolution and not in green algae.

Spores consists of wall, depended embryo, consists apical mersterms, multicellular gamatongia

2. A.



i. Recognize the above diagram.

Longitudinal section of shoot apex

ii. Name the parts mention as A-D.

a) Leaf primodia

b)Shoot apical meristem

c) Developing vascular strands

d)Axillary bud meristem

iii. State 2 structural features of the cells at b in the diagrame.

Isodiametric cells, dense cytoplasm, large central nucleus

iv. a) What is the function of a ?

Protect apical meristem

b) What is the structure of root tip that does the same function as a ?

Root cap

c) Name the component concentrated in the structure you mentioned in (b) When responding to gravity

Ca^{+2}, Statolith

v. Name the 2 main photoreceptors present in plants and write the regulatory activity of each photosystem.

Type of photoreceptor	Activity
Phytochrome	seed germination and shade avoidance and blossoming
Blue- Light photo receptors	phototropism, the light induced opening of stomata and the light induced slowing of hypocotyl elongation

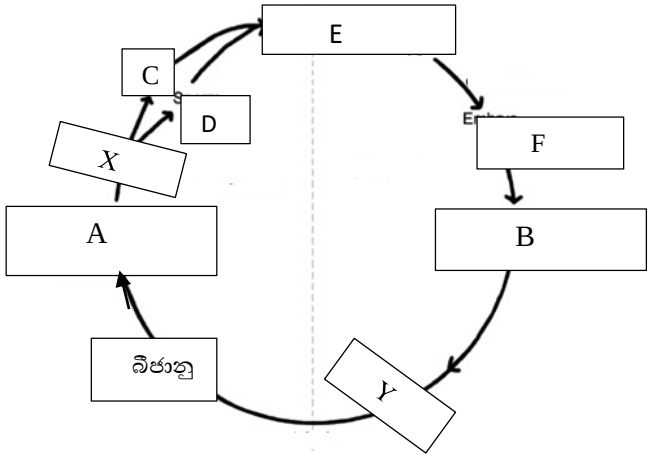
B.

What is the heteromorphic alternation of generation

Presence of morphologically different haploid generation and diploid generation alternatively,

Below given diagram indicates the common life cycle which exhibit by the members of kingdom plantae

.



iii a) a) Write the structures mentioned as A,B, E and F.

A Gametophyten B Sporophyte E Zygote F Embryo

b) Name the processes mentioned as X and Y.

X Mitosis Y Meosis

c) Name the haploid multicellular structure from the above diagrame.

A- Gametophyte

d) Name the Genus of the life cycle which exhibits above given type of life cycle.

Nephrolepis

e) Write 2 structural terrestrial adaptation which exhibits by the sporophyte of the above mention genus of plant.

Consists vascular tissues, differentiate in to true stem, leaves and roots, Stem is an underground rhizome, fiddlehead young leaves, Cuticle is found on aerial parts of the plant body, Sori are covered by the indusium,

C.

i) Define the below given terms according to the ecological basics

a) Primary consumer

The organisms that consume (eat) the primary producers are called primary consumers.

b) Habitat of an organism

The habitat is the physical area where a species lives.

c) Food chain

A food chain is a linear sequence of organisms through which nutrients and energy pass from one trophic level to another trophic level of an ecosystem beginning with a primary producer.

ii) a) What is an inland fresh water marshy land?

Inland freshwater marsh lands are low lying areas which receive water through surface runoff ,ground water seepage or flood water from rivers

b)Name the plant which grow in inland fresh marshy land..

Habarala (Colocasia species) Kekatiya (Aponogeton spp) Reeds / Pan.

c) Name the freshwater swamp forest in Sri Lanka.

Waturana swamp at Bulathsinhala located in the 'kalu ganga basin'.

iii. a) Write the biological definition for species. Group of organisms having common characters and able to produce fertile offspring's from inbreeding

b) Name the relict species in Sri Lanka.

Lingula /Ichthyophis

iv. State the three levels of threatened species in order of increasing risk of endangerment.

. UV , EN, CR

v. a) What is the global warming according to the United Nations Framework Convention on Climate Change? Global warming is the increase the average temperature of the Earth's surface (atmospheric and oceanic temperatures) due to enhanced greenhouse eff ect [or Greenhouse gasses,

.

b) Name 2 green house gases produced by burning fossil fuel.

CO_2 , N_2O

c) How does ozone depletion effect on global warming ? Due to depletion of the ozone layer UV radiation which comes from sun can destroy this kind of tiny organisms (phytoplankant)and may cause to reduce the CO2 absorption capacity of oceans and increase the global temperature.

d) Mention the international convention focused on reducing greenhouse gas?

Kyoto Protocol

3. A

i. a) Name 2 main cells innervous tixxue.

Neuron and neuroganglia

b) What is the function of most abounded type of cell in nervous tissue

nourishment of nerve cells, insulation of nerve cells, replenishing neurons and sometimes modulate neuron functions

ii. Write 3 main parts in peripharal system

cranial nerves, spinal nerves and autonomic nervous system

iii Fill the table based on Peripheral nervous system

Efferent component	Main function	Effector organ
Motor system-	controls voluntary activities.	skeletal muscles
Autonomic nervous system-	controls the involuntary activities	control activities of smooth muscles, cardiac muscles and gland

iv. a) what is the neuro transmitor? Neurotransmitters are the molecules that are released from the synaptic terminals of presynaptic neuron and diff use across the synaptic cleft, bind to the receptors at the postsynaptic membrane,

b) Name the neuro transmitor secreate by sympathetic nerve system.

Noraprinaline

B. i. a) What is acquired immunity /adaptive

Acquired immunity is the ability of the body to defend itself against invading foreign agents (pathogens) through specifi c defense responses mediated by diverse T lymphocytes and B lymphocytes

b) Name the important features in acquired immunity.

Specificity of foreign molecule

Recorgnize the foreign molecule from own molecule

immunological memory

ii. What are the effector cells involved in acquired immunity

Cells in the clone formed by T and B lymphocyte
short lived cells that take effect immediately against antigen to provide primary immune responses

iii. Write the type of effector of T lymphocyte and function

Effector cell	Role
Cytotoxic T cells	use toxic proteins and kill the cells infected with the pathogen
Helper T cells	activate cytotoxic T cells

iv. a) State the reason why diabetes I is considered to be an auto immunity disease.

Because in Type 1 Diabetes mellitus, T cells attack the insulin producing pancreatic beta cells

b).What is the reason for diabetes II.

Though it produces insulin effector cells are not be able take glucose from blood

v. Name the autoimmunity disease associated with human skeletal system

Rheumatoid arthritis,

C. i Name the genetic pattern associated with below given genetic phenomena.

a) Determine the character due to the cumulative expression of two or more allel.

Polyallelism

b) Effect of the expression of the gene at the different locus by a expression of the homozygous recessive gene at different locus of chromosome

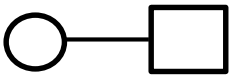
Recessive epistasis

c).Both allels are equally contributing to express phenotype in heterozygosity.

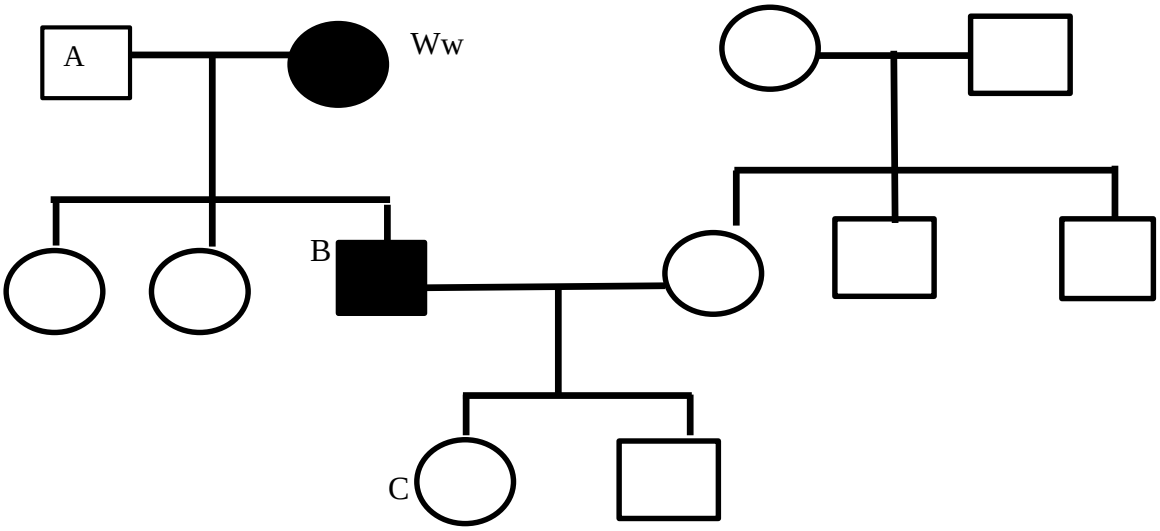
Co dominance

ii. What is represent by the following symbols in pedigree chart?

a)  …….....

b)  …….....

iii The following pedigree chart shows the how the "widow's peak" has been inherited in human family



b) Write the genotype in A,B,C.

A ww B Ww C ww

c) What is the probability of having "Widow peak" of the child if the parents of C expecting their 3rd child.

1/2

iv. a) What is inbreeding

The breeding among genetically similar individuals are known as inbreeding.

b) Write 2 disadvantages in inbreeding

Homozygosis and thus exposes harmful recessive genes which would have otherwise stay hidden among heterozygotes

Reduced genetic fitness in a given population

c) Write an advantage of inbreeding on Agriculture.

Help accumulation of superior genes.

4. A. i. Mention the suitable methods and conditions which are used for sterilization of the following substances.

Substances	Suitable method	Conditions which are used	11 marks
Inoculation needles	Direct flame	Hold in flame of Bunsen burner until red hot	
Nutrient agar	Sterilization by wet heat	Autoclave for 5mins at 121°C, Pressure 1/15lb/sq inch	
Glasswares	Sterilization by dry heat	Oven for 2hrs at a temp 170°C	

ii. Write the sequence of main steps of staining bacteria in a toddy sample.

1. Place a drop and spread as a circle of the toddy sample on the center of a slide.
2. Let the smear air dry.
3. heat fix the smear.
4. Add 2 or 3 drops of Methylene Blue.
5. Keep 30-60 seconds.

6. Wash with tap water to remove the excess stain.
(06)

B. i. Mention the main objective of biodiversity conservation.

Ensuring the long-term survival of as many species as possible.
(01)

ii. Name the group of organisms that absorb 60-70% from atmospheric carbon.

Phytoplankton
(01)

iii. Mention three main factors that contribute to the depletion of the ozone layer.

CFC

MeBr

HCFC

Helene
(Any 3)

iv. Write three major components of biodiversity.

Genetic diversity

Species diversity

Ecosystem diversity
(03)

v. State the three main objectives of the convention on biological diversity.

1. The conservation of biological diversity

2. The sustainable use of components of biological diversity

3. The fair and equitable sharing of benefits arising from genetic resources
(03)

vi. Which agreement was reached to protect biodiversity from potential threats to biodiversity from genetically modified organisms?

Cartagena protocol
(01)

C. i. What is post-harvest loss?

Food losses that occur along the food supply chain from harvesting of a crop until its consumption.
(01)

ii. Mention any two measures that can be taken to prevent post-harvest damage during transportation.

1. Packaging in boxes
2. Packing the top boxes so as not to weigh down the boxes below
3. Application of softeners between packing boxes
4. Transportation at night-time
5. Development of road infrastructure

(Any 02)

iii. Name a species of mosquito that carries dengue.

Aedes aegypti , Aedes albopictus

(Any 01)

iv. Write four warning signs of dengue.

1. Severe abdominal pain
2. Persistent vomiting
3. Rapid breathing
4. Bleeding from the nose and gums
5. Fatigue
6. Enlargement of liver
7. Reduced number of platelets
8. Restlessness and blood in vomit

(Any 04)

v. Name the genetic modification technology used to control dengue vector mosquitoes.

Sterile insect technology

(01)

vi. Mention two main characteristics of human embryonic stem cells.

1. ES cells can self-renew indefinitely to produce more stem cells
2. Under the proper growth conditions, they can differentiate into a variety of mature cells with specializes functions

(02)