



தேசிய வெளிக்கள நிலையம் தொண்டைமான்

ஐந்தாம் தவணைப் பரீட்சை - 2024

National Field Work Centre, Thondaimanaru

5th Term Examination - 2024

உயிரியல் - I
Biology - I

Two Hours

Gr. 13 (2024)

09

E

I

Index No:

Additional reading time 10 minutes

- 01) If the nitrogen base sequence of a strand of DNA is ACT, the anticodon of tRNA corresponding to that is
(1) ACU (2) UGA (3) ACT (4) UAC (5) UGU
- 02) Which of the following statements regarding to cellular organelles is correct
(1) All sub cellular components are organelles
(2) Ribosomes are organelles present in prokaryotes
(3) Organelles are not sub cellular components
(4) All organelles are sub cellular components
(5) Chloroplast and mitochondria have sub cellular components
- 03) Which of the following statements regarding photosynthesis is correct
(1) Only two different enzymes are involved in the carbon fixation of C3 and C4 plants
(2) After light reactions, oxidation of co enzymes occur
(3) All the ATP produced in light reaction s are used in , reduction of #-PGA
(4) PEP works exclusively in the chloroplast of mesophyll cells
(5) Decarboxylation enzymes are present in the bundle sheath cells
- 04) Correct statement regarding to abnormal cell division
(1) Develops in animals after being invaded by very unique organisms
(2) All malignant tumours show metastasis
(3) They can be driven by internal or external factors
(4) They are mostly transferred in sexually reproducing species
(5) Occur when hormonal balance is lost in animals
- 05) During plant evolution
(1) Liverworts are closest to hornworts
(2) Formation of vascular plants occurred about 425 million years ago
(3) Present seeded plants formed about 470 million years ago
(4) Gametophytes were increasing in size and complexity
(5) There are many similarities between sporophytes of non-vascular plants and vascular plants

- 06) Characteristics found in an organism with chloroplast, pellicle and eye spot
- (1) Only marine habitat
 - (2) Flagella
 - (3) Multicellular thallus
 - (4) Two nucleus
 - (5) Starch storage
- 07) The animal phylum that first developed the respiratory structure and body cavity
- (1) Nematoda
 - (2) Annelida
 - (3) Mollusca
 - (4) Arthropoda
 - (5) Echinodermata
- 08) Which of the following features are found in one, two, three, four classes respectively
- (1) Shelled eggs, single circulation, kidney, scales
 - (2) Placoid scale, Nictitating membrane, internal fertilization, cartilage
 - (3) Heterocercal caudal fin, Endothermic, respiration only by lungs, scales
 - (4) Bony scales, caudal fin, nictitating membrane, closed circulation
 - (5) Bony scales, respiration by gills, tympanic membrane, ectothermic
- 09) Which of the following statements are true regarding meristems
- (1) Cambiums are usually of two-cell layer
 - (2) They are involved in increasing the diameter of monocot root
 - (3) Short initials form vessel elements
 - (4) Pericycle of dicot root can act as meristems
 - (5) Diameter of dicot plants increase due to action of meristems
- 10) Which of the following factor can cause opening of stomata
- (1) Darkness
 - (2) Drought
 - (3) Internal clock of guard cells
 - (4) Increase in humidity
 - (5) Decrease in concentration of CO_2 beneath stomata
- 11) Plant tissue of $\psi_s = -6\text{MPa}$, $\psi_s + 3\text{MPa}$ is immersed in a sucrose solution of solute potential -5MPa and left to attain osmotic equilibrium. Correct statement is
- (1) Protoplast is turgid
 - (2) Ψ_p of the cell can be $+1\text{MPa}$
 - (3) ψ of the cell can be -2MPa
 - (4) ψ_p of the cell will be more than $+3\text{MPa}$
 - (5) ψ_p of the cell would have increased
- 12) Thick, leathery and discoloured leaves, poor development of roots are deficiency symptoms of
- (1) B, K
 - (2) Cu, Cl
 - (3) P, Zn
 - (4) Fe, Cl
 - (5) S, P

- 13) Which of the following statements regarding root pressure and guttation is correct
- (1) During guttation, in leaf tips, water exits as liquid through hydathodes
 - (2) Root pressure is needed for guttation to occur
 - (3) Guttation occurs in day time
 - (4) Relative humidity should be low and rate of evaporation should be high for guttation to occur
 - (5) Root pressure helps to push phloem sap upwards
- 14) Some steps in the plant lifecycle are given below
- A - Fiddle headed leaves
 - B - Stomata in sporophytes only
 - C - Heterophylous
 - D - Secondary growth
 - E - Male gametophyte of two cells
- Which of the above can be seen in life cycle of *Cycas*
- (1) A, B, D (2) A, D, E (3) B, C, D (4) C, D, E (5) A, B, E
- 15) Which of the following is a response to abiotic stress
- (1) Production of phenolic compounds
 - (2) Decrease in solute concentration in plant root cells as a result of salt stress
 - (3) Increase of proportion of saturated fatty acids
 - (4) Production of auxins and cytokinins
 - (5) Increase of cytoplasmic level of solutes like sugars
- 16) Correct path of transport of absorbed fat products from alimentary canal to liver
- (1) microvilli → columnar epithelium → lacteal → hepatic portal vein → liver
 - (2) columnar epithelium → microvilli → lacteal → lymph vessel → liver
 - (3) microvilli → lacteal → lymph vessel → circulatory system → liver
 - (4) villi → lacteal → portal vein → sinusoids → liver
 - (5) villi → lacteal → vein → left atrium → liver
- 17) What happens after stimulation of SA node
- (1) Immediately stimulates AV node
 - (2) Ventricles empty
 - (3) Increase in pressure of atrium
 - (4) AV valves open and blood moves into ventricles
 - (5) Remaining blood in atrium moves into ventricles

18) Some steps of homeostatic control of breathing is given below

- A - Stimulation of stretch receptors of lungs
- B - Increase of concentration of H^+ ions
- C - Stimulation of inhalation center
- D - Increase in breathing depth
- E - Inhibition of inspiration

Correct order of the process is

- (1) BCDAE (2) ABCDE (3) ACDBE (4) EADCB (5) ABCED

19) Some cells involved in the immunity of human body are given below

- A - Phagocytic cells
- B - Mast cells
- C - B lymphocyte
- D - Plasma cells
- E - Cytotoxic T cells
- F - Helper T cells

The cells involved in adaptive immunity are

- (1) ABD (2) DEF (3) ADF (4) BDE (5) CDE

20) Which of the following statements regarding human brain is correct

- (1) The hemispheres of brain are joined by corpus callosum
- (2) Vomiting is a reflex action
- (3) Cerebrum controls the movement of skeletal muscles
- (4) There are no endocrine glands in the forebrain
- (5) Motor areas initiate voluntary muscle contraction

21) Which of the following statements regarding human ear is correct

- (1) Incus is connected to oval window
- (2) Hairs of hair cells of cochleae are attached to basilar membrane
- (3) Changes in the position of the head causes movements in the endolymph.
- (4) Round window is on the outer membrane of cochleae
- (5) Eustachian tubes maintains the pressure between inner and middle ear

22) Which of the following hormone actions can be increased by positive feed back

- (1) ADH, Oxytocin (2) Prolactin, Oxytocin (3) Oxytocin
(4) Estradiol, Oxytocin (5) Progesterone, Oxytocin

23) Group of cells that are haploid

- (1) Secondary spermatocyte, spermatid, oogonium, mature egg
- (2) Ovum, polar body, secondary spermatocyte, secondary oocyte
- (3) Spermatogonium, sperm, second polar body, leydig cell
- (4) Corpus luteum, follicles, secondary spermatocyte, ovum
- (5) Ovum, primary spermatocyte, polar body, sperm

24) In human female, after parturition

- (1) There will be no change in the blood progesterone level of mother
- (2) Secretion of PTH increases gradually
- (3) There can be periodic increase of Estradiol level
- (4) Degeneration of corpus luteum
- (5) High level of Estradiol inhibits secretion of GnRH from pituitary gland

25) Human axis skeleton

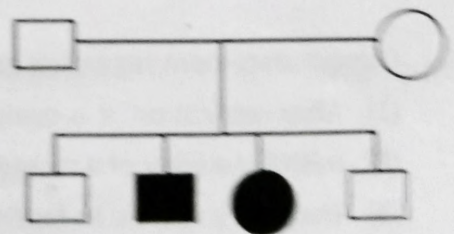
- (1) There are two primary curves at birth
- (2) Seventh cervical vertebrae has bifid spinous process
- (3) All typical vertebrae have costal facets
- (4) Manubrium articulates with 6 bones
- (5) Protects the kidneys

26) Which of the following are correct regarding non Mendallion heredity

- (1) Gene mutation increases inheritance variation
- (2) Alleles can be incompletely dominant or incompletely recessive
- (3) AB blood group is explained by polyalleleism
- (4) As the distance between the alleles increase, possibility of independent assortment decreases
- (5) In double recessive state, always a different phenotype appears

27) A pedigree chart is given below

- (1) These characteristics are passed by dominant alleles
- (2) Second baby is heterozygous
- (3) Either mother or father is heterozygous
- (4) First baby can be either homozygous or heterozygous
- (5) Diagram shows heredity of dimples on cheeks



- 28) In transfer of sex linked characteristics
- (1) Colour blindness can be transferred from father to son
 - (2) X linked disorders can not be directly transferred to male children
 - (3) Characteristics linked to sex chromosomes cannot ever be transferred from father to son
 - (4) The possibility of expression of colour-blindness in females is 50%
 - (5) Males are carriers to some diseases

- 29) Which of the following statements are correct regarding breeding techniques

- (1) There are potential harm to humans due to artificial selection
- (2) Hybrid breeding increases hybrid vigour
- (3) Inbreeding increases heterozygosis
- (4) Mutation breeding is generally done in animals
- (5) Artificial breeding always gives positive response

- 30) In DNA finger printing

- (1) STR markers can not be amplified by PCR
- (2) Done using a marker
- (3) STR markers are mostly similar
- (4) STR marker are found often in the genome
- (5) Characterized STR are found in low number

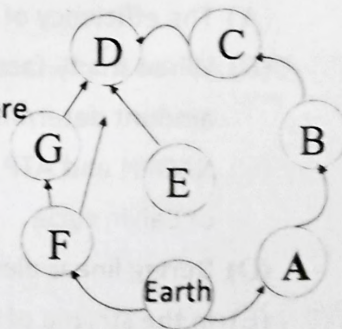
- 31) Correct combination regarding enzymes, proteins involved in DNA replication and their functions

- (1) DNA polymerase – RNA initiated synthesis of DNA
- (2) SSB – binds to double strand of DNA
- (3) Primase is a kind of DNA polymerase
- (4) DNA polymerase only performs one function
- (5) Helicase – loosen the tightly bound DNA

- 32) Correct statement regarding genetic code of DNA

- (1) After replication, it is completely translated
- (2) mRNA is a copy of a strand of DNA
- (3) They have spaces, to facilitate replication
- (4) Replicated as three letter non over lapping word in the mRNA strand
- (5) Contains the codons for the synthesis of Amino acids

- 33) "If the insertion or deletion is a triplet or a multiple triplet, the reading frame, will be back to the original reading frame _____" suitable word for the gap is
- (1) Immediately after the point mutation
 - (2) After substitution
 - (3) After frameshift mutation
 - (4) After nonsense mutation
 - (5) After doubling
- 34) Zygote forms by fertilization of a normal egg with xy sperm will have
- (1) Down syndrome
 - (2) Klinefelter syndrome
 - (3) Turner syndrome
 - (4) Multiple sclerosis
 - (5) Not sterile
- 35) Some steps of DNA isolation are given below. Their correct order is
- A - Add bead beating devices
 B - Adding proteolytic enzymes
 C - Grinding and homogenization
 D - Adding cold ethanol
 E - Restricted digestion with RNAse
- (1) CABED
 - (2) CADEB
 - (3) CABDE
 - (4) BCAED
 - (5) BCEDA
- 36) A food web of an ecosystem is given below. Correct statements is
- (1) Longest food chain has five links
 - (2) Two primary consumers and three tertiary consumers are there
 - (3) G, B are generally carnivores
 - (4) D is the only tertiary consumer
 - (5) Food web will not collapse by destruction of A and E



- 37) Grasslands in Sri Lanka that are found with 500 m vertical height and have rainfall of 1000-1500 mm
- (1) Talawa
 - (2) Savanna
 - (3) Patana
 - (4) Mana
 - (5) *Chrysopogan*
- 38) Inland indigenous species that are at risk in Sri Lanka include
- (1) *Garcinia*, marbled rock frog, elephant
 - (2) Snake head, *Garcinia*, Butter cup
 - (3) Tilapia, Butter cup, Rubber
 - (4) marbled rock frog, Maha Madu, Vesak Orchid
 - (5) *Puntius nigrofasciatus*, Loris, Jungle Squirrel

ABD correct	ACD correct	AB correct	CD correct	Any other combination
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41) Correct statements

- (A) The efficiency of photosynthesis of C₄ plants are 50% higher at 35°C
- (B) When many factors affect the rate of a chemical process, the factor found in the least amount determines the rate of reaction
- (C) NADPH and ATP produced during the light reactions are used during the Oxidation step of Calvin cycle
- (D) During linear electron flow of light reactions PSI and ATP, NADPH and O₂ are produced
- (E) In the stroma of chloroplast of mesophyll cells, Co₂ is efficiently fixed by PEP

42) Which of the following statements regarding natural selection theory is /are correct

- (A) The populations of a species vary in characteristics among their inheritance traits.
- (B) Theory of natural selection denotes the integration of Mendelian genetics and knowledge of population genetics
- (C) Variation in abilities for survival and production among a population may enhance the abundance of favorable characteristics in that population
- (D) Tolerating physical conditions – stress conditions, are favourable traits for survival and reproduction
- (E) Probability of fertilization, overproduction are unfavourable traits for survival

- 43) Correct combination regarding the nervous system of animals
- (A) Multipolar neuron - cnidaria
 - (B) Nerve net of nerves - sponges
 - (C) Longitudinal, solid nerve cord – Platyhelminthes
 - (D) Radial nerves – Echinodermata
 - (E) Ganglion and ventral nerve cord - Arthropoda
- 44) Which of the following are found in prokaryote and eukaryote cells
- (A) Flagella
 - (B) Cell wall
 - (C) Cilia
 - (D) Subcellular components
 - (E) Cytoskeleton
- 45) In initial state of plasmolysis/ flaccid state of a plant cell which of the following pairs are equal
- (A) Water potential and solute potential
 - (B) Wall pressure and pressure potential
 - (C) Water potential and pressure potential
 - (D) Pressure potential and solute potential
 - (E) Wall pressure and solute potential
- 46) Three enzymes involved in digestion of ingested food along mouth, stomach and small intestine respectively
- (A) Amylase, pepsin, amino peptidase
 - (B) Amylase, pepsin, lactase
 - (C) Maltase, pepsin, dipeptidase
 - (D) Amylase, pepsin, nuclease
 - (E) Amylase, trypsin, pepsin
- 47) Four people out of ten thousand people of an ideal population have the recessive ability to roll the tongue.
- (A) Dominant allele frequency is 0.98
 - (B) Recessive allele frequency is 0.02
 - (C) Dominant allele frequency is 0.9996
 - (D) Recessive allele frequency is 0.0004
 - (E) 9996 people are heterozygous

- 48) Which of the following is/are correct statements regarding to operons
- (A) These organized gene clusters in Eukaryotes are called operons
 - (B) These are comprised of structural genes
 - (C) They cannot be transcribed into mRNA
 - (D) Spread across many chromosomes
 - (E) Chromosomes generally found in viruses
- 49) Correct statements regarding to eco systems
- (A) Omnivores are always present in minimum of two levels
 - (B) Size of organisms increase along the food chain, always
 - (C) Generally trophic levels of food chains are limited to four or five links
 - (D) Some primary producers are carnivores
 - (E) Some substances are collected along the food chain
- 50) Some global agreements and their subjects are given below, the correct combinations are
- (A) Montreal – prevent depletion of ozone layer
 - (B) MARPOL - Control of trans boundary movements of hazardous wastes
 - (C) Kyoto – Reduction targets of greenhouse gases (GHGs) emission.
 - (D) Ramzar – protection of endangered habitat
 - (E) Basel - prevention of pollution of the marine environment by ships



தேசிய துறைமுக மையம் தண்டைமனாரில் நடைபெறும்
புத்தகத் துறைமுகப் பரீட்சை - 2024
National Field Work Centre, Thondaimanaru
5th Term Examination - 2024

புத்தகத் துறைமுகம் - II
Biology - II

Three Hours 10 Min.

Gr. 13 (2024)

09

E

A

Index No:

Additional reading time 10 minutes

Use additional reading time to go through the question paper, select the questions you will answer and decide which of them you will prioritise.

Instructions:

- ★ This question paper consists of 10 questions in 11 pages.
- ★ This question paper - **Part II** comprises Part A and B. The time allotted for both parts is three hours.

Part A – Structured essay (Pages 2 – 11)

- ★ Answer **all four** questions on this paper itself.
- ★ Write your answers in the space provided for each question. Note that the space provided is sufficient for your answers and extensive answers are not expected.

Part B – Essay (Page 11)

- ★ Answer **four** questions only. Use the papers supplied for this purpose. At the end of the time allotted for this paper, before handing over to the supervisor tie the two parts together so that **Part A is on the top of Part B**.
- ★ You are permitted to take only **Part B** of the question paper from the examination hall.
(Detach it)

For examiner's use only

Part	Question No.	Marks
A	1	
	2	
	3	
	4	
B	5	
	6	
	7	
	8	
	9	
	10	
Total	In Number	
	In Letter	

Marking Examiner - 1	
Marking Examiner - 2	
Checked by	
Supervised by	

Part - II A Structured Essay

◆ Answer all questions in this paper itself.

(Each question carries 100 marks)

- 01) (A) i) Write the composition of elements found in the following organic compound?
- a) Phospholipid -
 - b) Protein -
- ii) a) Name one protein involved in coordination in human.
.....
- b) Name one macromolecule that is present in the structure of Diatom and indicate the monomer of that?
.....
- iii) a) Mention three agent that affect the denaturation of protein?
.....
.....
- b) Which level of protein structure is not affected by denaturation?
.....
- iv) a) Write the most abundant type of RNA in cells.
.....
- b) Write the function of the above RNA type?
.....
- v) a) Which main components are made extra cellular matrix in animal cell?
.....
.....
- b) Name the membrane bounded canals between plant cells?
.....
- (B) i) Complete the following dichotomous key using relevant numbers and the organisms given below?
- Chondrichthyes, Aves, Mammalia, Amphibian, *Paramecium*, Cnidarian, Mollusca
- 1. Multicellular
 - Unicellular
 - 2. Bilateral symmetry or asymmetrical
 - Radial symmetry
 - 3. Operculum present in adult
 - Operculum absent in adult

4. Exoskeleton present
Exoskeleton absent
5. Glands present in skin
Glands absent in skin
6. Body with hair
Body without hair

ii) Mention 2 distinctive structural characteristic of phylum Nematoda?

.....

.....

iii) What are the types of cells found in the ground tissue of a monocot stem?

.....

.....

(C) i) a) What growth substance of plant root and leaves is produced to response water deficiency?

.....

b) Mention the role of the above growth substance?

.....

.....

ii) a) Name the type of cell that responsible for organic food transportation in seedless vascular plant and gymnosperm?

.....

b) Write the main steps after translocation of sugar loaded into sieve tube components in sugar sources?

.....

.....

iii) Name one plant species showing the following symbiotic relationship with host.

Partially parasite

Parasite

02) (A) i) a) Name the most abundant type of connective tissue found in human?

.....

b) Mention two main functions of chondrocytes?

.....

.....

c) Which type of connective tissue is found in flexible areas of human body

.....

ii) a) What is digestion in animals?

.....
.....

b) Name the part of alimentary canal where the following food digestion begins?

a) Disaccharides :-

b) Small polypeptides :-

c) Lipids :-

iii) What is the disadvantage of continuous intake of certain plant protein without animal protein?

.....

iv) a) Name the main tissue layers of human heart wall?

.....
.....
.....

b) Which layer of the above heart wall contains purkinje fibers?

.....

v) Name the respiratory structures of terrestrial animals of the following animal phylum?

a) Mollusca -

b) Arthropoda -

(B) i) a) What is mucus elimination?

.....
.....

b) Name one chemical substance that can prevent mucus elimination?

.....

c) Mention three possible adverse effects of the above procedure?

.....
.....
.....

ii) a) State two methods by which osmoregulation is achieved in the human body?

.....
.....

b) Name the endocrine gland and their secretion associated with osmoregulation in human body?

Gland

Hormone

.....
.....

c) Name the hormone that increases the blood glucose level other than glycogen?
.....

iii) a) Name the hormone that stimulate the releases of prolactin inhibiting hormone during pregnancy period?
.....

b) Name the endocrine structure that secretes the above hormone
.....

(C) i) a) Name the bones that form ankle joint?
.....
.....

b) Give possible movements of the above joint?
.....

ii) Flower colour of the sweet pea is a recessive epistasis. If the heterozygous violet colour flower of pea plant undergoes the test cross (purple colour is governed by A, B and its recessive genes a, b)

a) write the parents genotypes

b) Phenotype ratio of F1 generation

iii) What is mutation breeding?
.....

03) A) i) a) Define the following term

(i) Dominant trait -

(ii) Monohybrid cross -

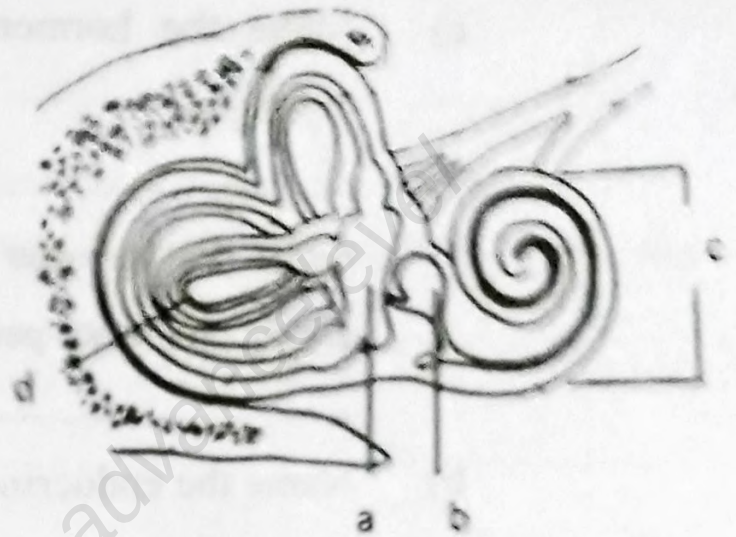
b) Write three patterns of inheritance of Mendelian characteristics in human expressed by dominant trait?
.....
.....

ii) a) What is Polygenic inheritance?
.....
.....

b) Write down one example for Polygenic inheritance?
.....
.....

c) How the data extended for polygenic character representing a population?
.....

iii) a) Identify the following structure?



b) Name the parts of the following letters?

a -

b -

c -

d -

c) Write the English letters responsible for the linear movement related balance?

d) Where is the organ of corti located?

(B) i) a) Write three main specific characteristics which DNA acting as a vital genetic materials of organisms?

ii) a) Which enzyme is added to a deoxyribonucleotide to a 3' end of the primar?

b) Write two other functions of the above type of enzymes?

iii) a) What are okazaki Fragments?

b) Which enzyme is used to join okazaki fragments?

04) (A) i) a) State the main characteristics of operons?

b) What happened at the end of the Transcription for non-coding sequences in Eukaryotic DNA?

ii) a) What is the specific feature of gene code when the human insulin gene is put into bacteria cell for synthesis of same protein?

b) What is the reason for that the cDNA can be used in prokaryota cell without the process of RNA?

iii) a) How are cDNAs made?

b) Name one enzyme used in the above process?

iv) a) What is polysomes?

b) Where can polysomes be observed in a cell?

c) What is the advantage of forming polysomes?

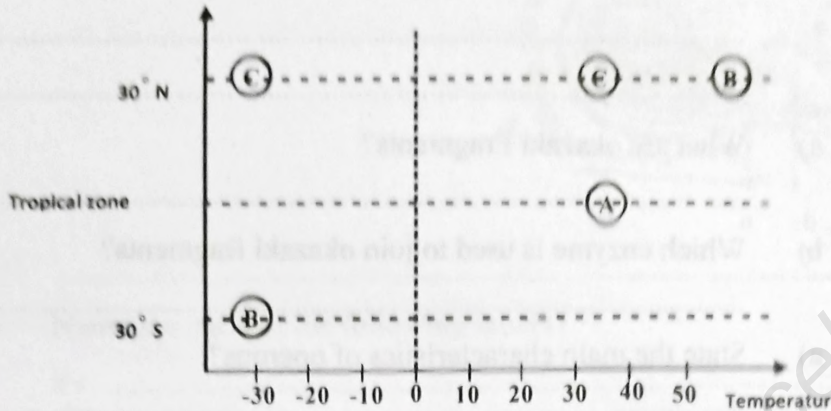
(B) i) a) Define the following words

Community :-

Habitat :-

b) What are Eltonian pyramids based on?

ii) a)



World biomes are graphed based on their location and temperature. Write the biomes for the suitable English letter

A -

B -

C -

b) State main features of desert plants?

.....
.....
.....
.....
.....
.....

(C) i) a) Name two forests in Sri Lanka which can be seen above 1500m elevation?

.....

b) State the temperature and rainfall of the above forests?

.....

c) Write the specific characters of flora in these forests?

.....
.....
.....
.....
.....
.....

ii) a) Write the name of species that chosen as a symbol or icon to represent an ecosystem in need for conservation?

.....

b) Give an example of that species in Sri Lanka?

.....



தேசிய வெளிக்கள நிலையம் தொண்டைமான்னாறு
ஐந்தாம் தவணைப் பரீட்சை - 2024
National Field Work Centre, Thondaimanaru
5th Term Examination - 2024

உயிரியல் - II
Biology - II

Gr. 13 (2024)

09

E

B

Part- II B - Essay

◆ Answer four questions only

◆ Give clear labelled diagrams where necessary

(Each question carries 150 marks)

- 01) Explain the process that occurs when one molecules of glucose undergo aerobic respiration.
- 02) a) Explain how two types of lateral meristems structurally Specialized in woody plant stem and root.
b) Explain in brief about growth rings found in plants.
- 03) a) Describe the specific characteristics of the oral cavity for the process of mechanical digestion and chemical digestion.
b) Briefly explain the common disorders of the digestive system
- 04) a) Give a brief account of female reproductive organs.
b) Explain the skeletal muscle contraction based on sliding Filament theory.
- 05) a) Briefly explain the DNA probes that are used in DNA isolation.
b) Describe the specific characteristics of vectors which are used in host cells
- 06) Write short notes on the following.
 - a) Larmarck's theory of evolution
 - b) Polygenic inheritance
 - c) Patana grass lands