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- 07) a. Formation of exogenous asexual spores.
 b. Multicellular coenocytic.
 c. Dikaryotic mycelium is dominant.
 d. Septa found only where reproductive cells are formed.

Phylum for the above descriptions of fungi respectively

| | a | b | c | d |
|----|-----------------|-----------------|-----------------|---------------|
| 1. | Chytridiomycota | Zygomycota | Basidiomycota | Ascomycota |
| 2. | Basidiomycota | Chytridiomycota | Zygomycota | Ascomycota |
| 3. | Ascomycota | Zygomycota | Chytridiomycota | Basidiomycota |
| 4. | Basidiomycota | Chytridiomycota | Ascomycota | Zygomycota |
| 5. | Ascomycota | Chytridiomycota | Basidiomycota | Zygomycota |

- 08) The feature has the least possibility to be found in the animals which included in the Phylum Mollusca.

- (1) Radula (2) soft body (3) visceral mass
 (4) metanephridium (5) mantle

- 09) a. Keratin found in the body.
 b. Internal fertilization.
 c. Glands found in the body.
 d. Presence of teeth.
 e. Aquatic habitat.

Which of the above are common to Reptiles, Aves and Mammals?

- (1) Only a and b (2) Only a, b and e (3) Only b and e
 (4) Only a, b, d and e (5) a, b, c, d and e

- 10) Correct statement regarding secondary growth of stem or root.

- (1) Vascular cambium form from it has multi cellular thickness.
 (2) Medullary rays form from its initials which are oriented with their long axis.
 (3) In roots, cork cambium arises from the cortex.
 (4) Cork cambium produces cork cells to the exterior, and to the interior.
 (5) Cork cambium can be found permanently in the stem or root.

- 11) Which of the following statement is correct regarding water potential, solute potential and pressure potential?

- (1) Solute potential gets more negative value when more solutes are added.
 (2) Water potential is related to kinetic energy of water molecules.
 (3) An increase in solute potential leads to a positive effect on water potential.
 (4) Pressure potential get a negative value in a living cell.
 (5) In a fully turgid cell, the pressure potential gets zero value.

- 12) Which of the following statement is correct regarding sexual reproduction of terrestrial plants?

- (1) All the terrestrial plants show homomorphic alternation of generations.
 (2) Sporophytes produces gametes by meiosis.
 (3) Delay of meiosis after fertilization results in creating a diploid sporophyte generation.
 (4) Some plants carryout external fertilization to prevent desiccation of gametes.
 (5) In most plants embryo is released and become sporophytes.

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- 13) Male gametophyte of flowering plant
- (1) found in three cell stage.
 - (2) is the unbranched pollen tube.
 - (3) develops from microspores by mitosis.
 - (4) is the pollen sac.
 - (5) is the microsporophyll.
- 14) Pair of plant growth substances that induce seed germination
- (1) Auxin and gibberellin.
 - (2) Auxin and Cytokinin.
 - (3) Cytokinin and ethylene.
 - (4) Gibberellin and Cytokinin.
 - (5) Auxin and ethylene.
- 15) Correct combination regarding tissue – location in the human body.
- (1) Dense connective tissue - ligament
 - (2) Simple squamous epithelium – vagina
 - (3) Simple columnar epithelium – salivary gland
 - (4) Cartilage – fontanelles.
 - (5) Smooth muscle tissue – upper part of the oesophagus.
- 16) Which of the following has the least possibility to transport through the blood capillaries of villi?
- (1) Fructose
 - (2) Chylomicrons
 - (3) Amino acids
 - (4) Glucose
 - (5) Water
- 17) According to the World Health Organization criteria, the minimum weight of a person of height 153 cm should have in order to consider him as non-malnourished,
- (1) 80.3 kg
 - (2) 42.3 kg
 - (3) 44.4 kg
 - (4) 43.3 kg
 - (5) 62 kg
- 18) Which of the following is correct regarding circulatory systems of animals?
- (1) All invertebrate poses haemolymph.
 - (2) Closed circulatory systems are always depend on the pressure exerted from heart.
 - (3) In open circulatory system, chemical exchange occurs directly between the haemolymph and the body cells.
 - (4) All the animals belong to phyla Arthropoda and Mollusca possess open circulatory system.
 - (5) Single circulation found in bony fishes, cartilaginous fishes and amphibian adults.
- 19) In which of the following, is (ii) caused by (i) during the homeostasis control of breathing of man?
- A. (i) Sensors which detect stretching of lung tissues are found in the lungs.
(ii) Inhibition of inspiration.
 - B. (i) Sensors in aorta and the carotid arteries detects low concentration of oxygen in blood.
(ii) Rate of respiration increases.
 - C. (i) Blood increases up to pH 7.4.
(ii) Rate and depth of respiration increases.
- (1) Only A
 - (2) Only A and B
 - (3) Only A and C
 - (4) Only B and C
 - (5) Only B
- 20) Part of the antigen which can join with the special antigenic receptor molecule of T and B lymphocyte.
- (1) Y shaped protein
 - (2) Complement protein
 - (3) Protein cover
 - (4) Epitope
 - (5) Flagellum

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- 28) In human scapula,
- (1) glenoid cavity is found in the medial line.
 - (2) facet for articulation with clavicle found in the lateral line.
 - (3) glenoid cavity articulates with the distal end of the humerus.
 - (4) dorsal part is smooth.
 - (5) shallow glenoid cavity restricts the rotation movements.
- 29) Essential to the detachment of myosin head from cross bridge in skeletal muscle contraction.
- (1) Two Z lines.
 - (2) ADP.
 - (3) Attachment of new ATP.
 - (4) Ca^{++}
 - (5) Creatinine.
- 30) Colour of human skin
- (1) is determined by gene interactions.
 - (2) is involved with the two contrasting traits.
 - (3) which results from alleles of heterozygotes express the phenotype.
 - (4) which results from cumulative expressions of dominant alleles.
 - (5) expressed as qualitatively.
- 31) A dominant allele P causes the production of purple pigment; pp individuals are white. A dominant allele C is also required for colour production; what proportion of off-spring will be purple from PP Cc X PpCc cross?
- (1) $\frac{1}{8}$ (2) $\frac{1}{2}$ (3) $\frac{1}{4}$ (4) $\frac{6}{8}$ (5) $\frac{3}{8}$
- 32) Which of the following statement is correct regarding inheritance of X linked chromosomes?
- (1) Disorders can be found in males in homozygous conditions.
 - (2) X chromosome found in the male zygote is obtained from the father.
 - (3) In females, syndromes can be expressed only in homozygous conditions.
 - (4) Both X chromosomes found in the female zygote are obtained from the mother.
 - (5) In human, sex linked chromosomes are only involved with the X chromosomes.
- 33) In DNA replication, the enzyme which removes DNA – RNA hybrids
- (1) Primase (2) RNA polymerase (3) Helicase
 (4) Topo isomerase (5) DNA polymerase
- 34) Ti plasmid
- (1) used as a vector in the production of recombinant proteins.
 - (2) used in the production of subunit vaccine.
 - (3) used as a recombinant vector can be transferred genes to the plant genomes.
 - (4) used in the manipulations of genes in yeasts.
 - (5) used as a recombinant vector can be transferred genes to the animal embryos.
- 35) End product of gene expression
- (1) Polypeptide (2) Actin (3) Glycoprotein
 (4) Keratin (5) Collagen

- 36) Which of the following statement is correct regarding substitution type gene mutation?
- (1) Missense mutation always produces nonfunctional proteins.
 - (2) There would be a change in the length of gene.
 - (3) Shorter polypeptides are produced as a result of nonsense mutation.
 - (4) This will result in shift in the reading frame.
 - (5) In silent mutation, there is no change in the length of gene but not in the polypeptide.
- 37) Which of the following is the least needed to do PCR mechanism?
- (1) Taq. DNA polymerase
 - (2) DNTPs
 - (3) Mg^{2+}
 - (4) A primer with DNA sequences
 - (5) ATP
- 38) Which of the following statement is correct regarding biomes?
- (1) Deserts are only restricted to temperate regions.
 - (2) Dominant trees in the temperate broad leaf forests are mostly deciduous.
 - (3) Precipitation of arctic tundra is higher than that of alpine tundra.
 - (4) Chapparal is a deciduous forest.
 - (5) The largest biome has an annual average precipitation of 200 – 500 mm.
- 39) Plant that can be found in the water tanks in Sri Lanka
- (1) Holy mangrove
 - (2) Sedge
 - (3) *Halodule* sp.
 - (4) Water hyacinth
 - (5) *Pandanus* (Talai/ Wetakeiya)
- 40) Different pair of the followings.
- (1) Japan fish, Rubber.
 - (2) Snake head, *Ichthyophis*
 - (3) Bengal tiger, Blue magpie.
 - (4) Butter cup, Dusky- striped jungle squirrel.
 - (5) Indian pitta, Indian fly catcher.

❖ Use the following instructions for the questions (41– 50)

| A B D correct | A C D correct | A B correct | C D correct | Any other response |
|------------------------|------------------------|------------------------|------------------------|------------------------|
| 1 st Answer | 2 nd Answer | 3 rd Answer | 4 th Answer | 5 th Answer |

- 41) Which of the following statement / statements is / are correct regarding enzymes?
- A. Biotin, one of the cofactors of enzymes, is a co-enzyme.
 - B. Substrates largely change the shape of the active site.
 - C. Enzymes are highly specific to the substrate.
 - D. Enzymes are considered as polymers.
 - E. Some enzymes do not contain active sites.
- 42) Which group / groups contains/ contain specific characteristics to particular animal phyla?
- A. Clitellum, radial symmetry, fragmentation, radula.
 - B. Notochord, marine habitat, setae, bilateral symmetry.
 - C. Water vascular system, cnidocyte, radula, notochord
 - D. Flame cell, clitellum, tube feet, parapodia.
 - E. Gastro vascular cavity, cylindrical body, mantle, pseudocoel.

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- 43) Deficiency to which of the following element / elements shows/ show chlorosis in young leaves?
 A. Fe B. Mn C. Cu D. S E. N
- 44) Which of the following / followings is/ are considered as response to mechanical stimuli?
 A. Tendrils coil the support.
 B. *Mimosa* collapses its leaflets when touched.
 C. Growing of roots into the soil.
 D. Stems grow towards light.
 E. Growing of radical during seed germination.
- 45) Which of the following statement / statements is / are correct regarding stomach?
 A. It has absorption function.
 B. Its chief cell secretes pepsin.
 C. It has endocrine function.
 D. It contributes to the barrier defense in the innate immunity.
 E. It has function as stores some vitamins.
- 46) Correct statement / statements regarding human reproduction.
 A. First polar body undergo meiosis II and give second polar body.
 B. Spermatids produces sperms by meiosis II.
 C. Inhibition of testosterone effects on both hypothalamus and anterior pituitary gland.
 D. During ovulation secondary oocyte completes the meiosis I.
 E. Compare to the ICSI, IVF need a smaller number of sperms.
- 47) Tall and short traits of pea plants' length of stem are controlled by two alleles. Which of the following statement / statements is / are correct regarding crosses involving pea plants with those traits is / are correct?
 A. If both parents in the above cross are true breeding, F₂ generation produced by crossing F₁ generation shows 3:1 ratio of tall: short plants.
 B. If Tt is found in the F₁ generation regarding the above cross, the parent genotype should be Tt.
 C. If the tall individuals of F₁ was crossed with short plants, this can be a test cross.
 D. If the tall is the dominant trait, above cross not always produce tall plants.
 E. Tall X short plants cross is a dihybrid cross.
- 48) Chromatins'
 A. euchromatins parts are probably active in transcription.
 B. heterochromatin contributes to the epigenetic inheritance.
 C. basic unit is the nucleotide.
 D. second stage fibres are 30 nm in diameter.
 E. heterochromatins are lightly packed.
- 49) Followings are some aneuploidies of human regarding sexual chromosomes. Which is / are viable and fertile?
 A. XO B. XXY C. XYY D. XXX E. YO
- 50) Man-made industrial gas / gases largely contribute to the global warming
 A. PFCs B. CH₄ C. HFCs D. SF₆ E. O₃



Fifth Term Examination –2022

Conducted by
Field Work Centre, Thondaimanaru.

Biology**- II****Time: Three hours ten min.****Gr -13 (2021)****09****E****II**

Index No:

Instructions:

- ❖ This question paper consists of **10** questions in **12** pages.
- ❖ This question paper comprises Part **A** and **B**. The time allotted for **both parts** is **three hours**. (Additional reading time is **10 minutes**)
- ❖ Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

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 12)

- * 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.

*** For examiner's use only**

| Part | Question No. | Marks |
|--------------|--------------|-------|
| A | 01 | |
| | 02 | |
| | 03 | |
| | 04 | |
| B | 05 | |
| | 06 | |
| | 07 | |
| | 08 | |
| | 09 | |
| | 10 | |
| Total | | |

In numbers

In words

Examiner 1

Examiner 2

Checked by

Supervised by

A – Structured Essay

❖ **Answer all questions in this paper itself.**
(Each question carries 100 marks)

01. A) i) Name the type of carbohydrate which are a macro molecules as well as bio polymers.

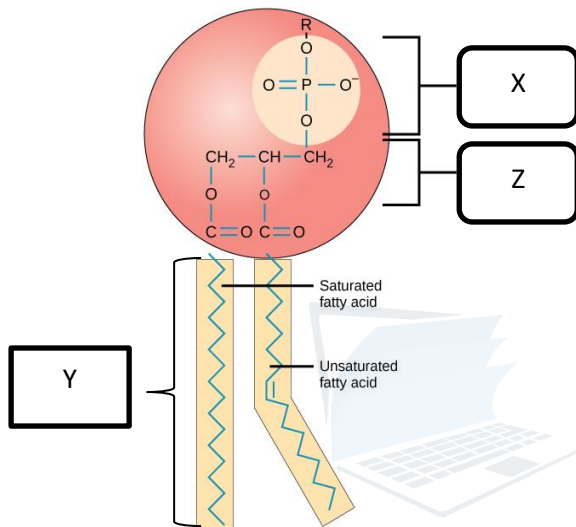
.....

ii) Name **two** common characteristics of the type that you mentioned in above A i).

.....

.....

iii)



a. Name the above-mentioned diagram.

.....

b. Name the **Y** in the above diagram.

.....

c. Which of the above-mentioned components are responsible for the hydrophilic nature?

.....

d. Give the elemental composition of the above-mentioned structure.

.....

iv) What is quaternary structure of proteins?

.....

.....

v) Give an example for the type of protein which can neutralizes foreign bodies.

.....

vi) a. How polypeptide chain forms?

.....

b. Which sugar is used in the formation of nucleotides?

.....

c. In DNA, indicate the location of nitrogenous bases.

.....

B) i) Name the **organelle or sub cellular component** for the each of the following functions.

a. Gives turgidity and support to cell

b. Synthesizing glycoproteins

c. RNA synthesis

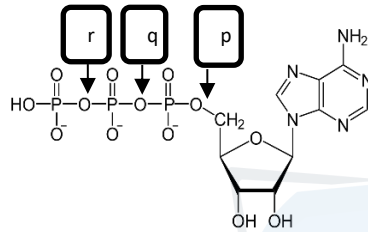
ii) What is synapsis?

.....

iii) What is the significance of synaptonemal complex?

.....

iv)



a. Where there is need of energy, which bond breaks first in the above structure, indicate with the **relevant alphabet**.

.....

b. Give the value of the free energy while the breaking/ hydrolyzing of bond in the above structure?

.....

v) Briefly describe how substrate concentration affects the rate of enzyme reactions.

.....

.....

vi) Which compound can be used in both reduction reactions of Calvin cycle and regeneration of RuBP?

.....

vii). a. Molecules can be seen in the Calvin cycle of C3 plants are as follows:

A. 3 Phosphoglycerate

B. RuBP

C. 1,3 Bis Phosphoglycerate

D. Glyceraldehyde 3 Phosphate

The correct sequence of the above molecules presents in the Calvin cycle (**Indicate with the relevant alphabets of the molecules**).

.....

vii). b. Indicate how the competitive substrates function with the RuBISCO.

.....
.....

C)

i) Name the structure that secrete the shell of snail.

.....

ii) a. What is radula?

.....

b. What is the function of radula?

.....

iii) Which animal class possess swim bladder for control the buoyancy?

.....

iv). Complete the following dichotomous key using appropriate **number and names** to distinguish the animals given below.

Leech, Jelly fish, Earth worm, Snail, Sea star, Centipede.

1. Fragmented body present

Fragmented body absent

2. Radial symmetry present

Radial symmetry absent

3. Mouth in under surface and anus on the top surface.....

Mouth is only in under surface

4. Joints present

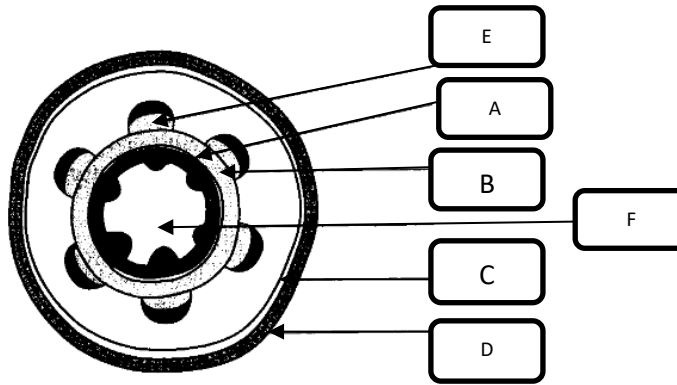
Joints absent

5. Sucker present

Sucker absent



02. A)



i) a. Identify the above diagram.

.....

b. Name **A**, **B**, **C** and **D** in the above diagram.

A. B.

C. D.

ii) a. Give the exact location of **A**.

.....

b. How **C** is originated?

.....

iii) a. Indicate the methods of water movement involve in the phloem translocation.

.....

b. What is a sugar source?

.....

iv) a. Which the major class of photoreceptor that controls the photo period?

.....

b. Indicate the effect of photo period.

.....

v) a. What is stress?

.....

b. Indicate the response showed by plants for each of the following stress.

1. Freezing of water

2. Salt tolerant

B) i) a. What is tissue?

.....

.....

b. Give **two** functions of epithelial tissues which cannot be the functions of connective tissues.

.....

ii) Indicate **two** functions of mucus found in the saliva.

.....

iii) Give the roles of pancreatic carboxypeptidase which is one of the digestive enzymes in human.

.....

iv) How fructose absorbed into the epithelial cells of small intestine and indicate the blood vessel that the absorbed fructose travels from the blood capillaries of villi.

.....

v) Which helps lymph to move into the lymph vessels?

.....

.....

vi) What is stroke volume?

.....

vii) a. What is respiratory pigment?

.....

b. Name **one** respiratory pigment which is found only in vertebrates.

.....

C) i) Name **one** respiratory structure common to both vertebrates and invertebrates.

.....

ii) Which brain parts are responsible for the functions – control of volunteer muscle control and coordination respectively?

.....

iii) a. What is residual volume of human lungs?

.....

b. What is the average value of residual volume of a healthy adult man?

.....

iv) Indicate the special characteristics shown by adaptive immunity.

.....

.....

v) a. What is allergy?

.....

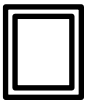
b. Briefly indicate how Rheumatoid arthritis occurs.

.....

.....

vi) In which site, urea reabsorbed in the human uriniferous tubules?

.....



03. A) i) Briefly describe the nervous organization of cnidarians.

.....
.....

ii) Which connects the two cerebral hemispheres and in which they made-up?

.....
.....

iii) During which circumstances a neuron gets negative charge inside its membrane?

.....

iv) Which part of the human ear detects angular movements of head?

.....

v) Indicate the functions of GHRIH.

.....
.....

vi) a. Name the hormones which are secreted by human placenta.

.....

b. Indicate **two** hormones that promote glucose release into the circulating blood, which act on skeletal muscles, other than glucagon.

.....

B) i) Write **one** heat conservation mechanism and **one** heat gain mechanism when the body temperature is lowered to the set point.

a. Heat conservation mechanism

b. Heat gain mechanism

ii) Briefly indicate the significance of testes can be located in the scrotum.

.....
.....

iii) Write in correct sequence, the path way of prostaglandins from its site of production until it ejaculates.

.....

iv) Give **three** functions of Sertoli cells which is found within the seminiferous tubules.

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

v) Indicate **one** function on uterus and **one** function on ovary by the hormones- progesterone and estradiol which are secreted by corpus luteum after ovulation.

Uterus

Ovary

vi) Indicate **three** rapid changes brings about in mother, where there are high levels of progesterone during gestation period.

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

vii) What is the role of loop (IUD) , a birth control method in females?

.....
.....

C) i) What is the role of condyloid process that is found in human lower jaw?

.....

ii) Which bones give resonance and participate only in the formation of cranium?

.....

iii) Indicate the first primary curvature of the human vertebral column and briefly describe.

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

iv) Indicate **one** characteristic found in all the cervical vertebrae to distinguish from other vertebrae.

.....

v) Give the arrangement found in the lower part of the human upper limb for allowing supination and pronation.

.....
.....

vi) Indicate with “**Correct**” or “**Incorrect**” weather each of the following statements regarding the gliding filament theory of skeletal muscle contraction.

- a. The head region of myosin binds with an ATP molecule when its lower energy state (.....)
- b. Actin filaments which joints the two Z lines get shortened (.....)



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04. A) i) What is dominant allele?

.....
.....

ii) Give the important features that the Mendel followed in his experiments to make successfully.

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

iii) a. What is dominant epistasis?

b. Give the phenotypic ratio of F₂ generation of dominant epistasis.

iv) Indicate a disorder due to the results of epigenetics.

v) In a population of 500 plants there are 800 dominant alleles and 200 recessive alleles. If that population obeys Hardy-Weinberg equilibrium, what would be the frequency of heterozygotes in that population?

vi) What is meant by “**gigas effect**” in plant breeding?

vii) What is the reason for screening on mutation breeding efforts continue around the world despite of limitations?

B) i) What are the characteristics of DNA molecule for acting as a vital genetic material in organisms?

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

ii) What is the function of RNA polymerase in DNA replication?

iii) Indicate **three** post translational modifications of polypeptides after translation.

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

iv) Indicate one disorder for the each of the following mutation in human.

- a. Autosomal monosomic
- b. Sex chromosomal monosomic

v) a. Write the nitrogenous sequence of transcribed RNA for the DNA sequence of

3' TACTTGTTTCGATATC 5'.

.....

b. How many amino acids can be coded in the above transcribed RNA in v) a?

.....

vi) How the non – coding DNA sequences are termed which are used in DNA finger prints?

.....

vii) Indicate an international agreement and a national legislation in order to address potential risks and hazards of GMOs.

a. **International agreement**

b. **National legislation**

C) i) Which are the **two** groups of terrestrial ecosystems of Sri Lanka?

.....

.....

ii) In which climatic zone, the mangroves of coastal areas are included?

.....

iii) Name a forest which could be included in the above-mentioned climatic zone in C (ii).

.....

iv) What are biological resources?

.....

.....

v) Give two human activities that leads to loss of biodiversity.

.....

.....

vi) a. Threatened species type are CR, VU and EN. Write in descending order regarding to its “threatened” category.

.....

b. Give **one** example for each of the following categories.

VU.....

CR.....

vii) a. What are the goals of conservation bio diversity?

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

b. Which department has the authority responsible for enforcing laws of Fauna and Flora protection ordinance in Sri Lanka?

.....



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FWC

Fifth Term Examination – 2022

Conducted by

Field Work Centre, Thondaimanaru.

Biology - II

Grade 13(2021)

09

E

II

B – Essay

- ❖ Answer **four** questions only.
- Draw fully labelled diagrams where necessary.
- Each question carries **150** marks.

05. a. Briefly describe the connections between cells.
b. Indicate the types of phosphorylation and briefly indicate the process of ATP generation within living cells.
06. a. Briefly explain the sexual reproductive processes in terrestrial plants.
b. Briefly describe the effects of light in seed germination and plant spacing.
07. a. Describe the actively acquired immunity with examples.
b. Briefly describe the structure of human nephron.
08. a. Write an account regarding mechano- receptors in human.
b. Briefly describe the main types of joints, their functions and its significance in human.
09. a. Briefly describe the DNA delivery systems.
b. Describe on the depletion of ozone layer including contributory factors and effects.
10. Write short notes on the followings:
 - a. Characteristics of Domain Archaea.
 - b. Regulation of respiration in human.
 - c. Test crosses.

