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පැරණි නිර්දේශ/பழைய பாடத்திட்டம்/Old Syllabus

OLD
 Department of Examinations, Sri Lanka
 இலங்கைப் பரீட்சைத் திணைக்களம்

පොදු පාලන පොදු පාලන පොදු පාලන (උසස් පෙළ) විභාග, 2019 අගෝස්තු
 கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2019 ஆகஸ்ட்
 General Certificate of Education (Adv. Level) Examination, August 2019

கீழ் விடையில் I
 உயிரியல் I
 Biology I

09 E I

05.08.2019/1300 - 1500

පැය දෙකයි
 இரண்டு மணித்தியாலம்
 Two hours

Instructions:

- * Answer all questions.
- * Write your Index Number in the space provided in the answer sheet.
- * Instructions are given on the back of the answer sheet. Follow them carefully.
- * In each of the questions from 1 to 50, pick one of the alternatives from (1), (2), (3), (4), (5) which is correct or most appropriate and mark your response on the answer sheet with a cross (x) on the number of the correct option in accordance with the instructions given on the back of the answer sheet.

1. In the scientific method,
 - (1) it is essential to have a control experiment.
 - (2) hypotheses are confirmed by supporting evidences.
 - (3) theories that are formulated are not changed subsequently.
 - (4) predictions are not made.
 - (5) observations are not essential to formulate hypotheses.
2. Which of the following statements is correct regarding the importance of physical properties of water for organisms?
 - (1) High adhesive forces are important for water skaters.
 - (2) High surface tension is important for absorption of minerals by plants.
 - (3) High specific heat capacity supports cooling of the body surface of terrestrial animals.
 - (4) Low transparency of light helps to grow plants in deep areas of water bodies.
 - (5) High latent heat of fusion helps organisms to survive at low temperatures.
3. Which of the following statements regarding organelles is correct?
 - (1) Ribosomes consist of large and small subunits composed of proteins and t-RNA.
 - (2) Rough endoplasmic reticulum is composed of tubular sacs.
 - (3) Golgi complex synthesizes steroids.
 - (4) Lysosomes transport residue materials out of cells by exocytosis.
 - (5) Peroxisomes synthesize hydrogen peroxide.
4. Select the correct statement regarding cell junctions.
 - (1) Cell walls of adjoining cells are joined at cell junctions.
 - (2) Plasmadesmata are found in animal cells.
 - (3) Anchor junctions allow the exchange of materials between adjacent cells.
 - (4) Tight junctions prevent leakage of substances through inter-cellular space.
 - (5) Gap junctions are weak connections found between epithelial cells of the skin.
5. Which of the following statements regarding the cell cycle is correct?
 - (1) DNA synthesis takes place during G1 phase.
 - (2) Nuclear envelope is reformed during anaphase.
 - (3) Alignment of chromosomes in the middle of the cell takes place in metaphase.
 - (4) Condensation of chromosomes takes place in S phase.
 - (5) Formation of spindle takes place in G2 phase.

6. Which of the following statements regarding glycolysis is correct?
- (1) It takes place only under aerobic conditions.
 - (2) It occurs in the cytoplasm.
 - (3) Glucose is first converted to fructose-6-phosphate.
 - (4) Its end product is Acetyl CoA.
 - (5) The total number of ATP molecules produced from one glucose molecule is two.
7. Select the correct statement regarding Krebs cycle.
- (1) It takes place in the cytoplasm.
 - (2) It operates in both aerobic and anaerobic conditions.
 - (3) During cellular respiration, most of the ATP is produced in the Krebs cycle.
 - (4) Carbon dioxide is produced in the Krebs cycle.
 - (5) Oxidation of $FADH_2$ takes place in the Krebs cycle.
8. Kingdom Protista
- (1) does not contain organisms with cilia.
 - (2) does not contain multicellular heterotrophs.
 - (3) does not contain organisms having cell walls.
 - (4) contains organisms with the same origin.
 - (5) does not contain organisms that store starch.
9. Grouping of organisms based on which of the following is an example for natural classification?
- (1) Number of legs
 - (2) Number of stamens in the flowers
 - (3) DNA base sequence
 - (4) Presence of claws
 - (5) Colour of feathers
10. Select the correct statement regarding kingdom Plantae.
- (1) All heterosporous plants do not need external water for fertilization.
 - (2) All homosporous plants do not have vascular tissues.
 - (3) All plants that do not bear flowers are seedless.
 - (4) All plants with vascular tissues do not have dominant gametophytes.
 - (5) All plants with photosynthetic gametophytes do not have vascular tissues.
11. Which of the following can be used to determine the class of an animal that belongs to phylum Platyhelminthes?
- (1) Presence of mouth
 - (2) Absence of eye spots
 - (3) Structure of the body covering
 - (4) Absence of scolex
 - (5) Leaf-like body
12. When examined under the light microscope, a cross section of the duodenum of man can be distinguished from the cross sections of other regions of the alimentary canal due to presence of
- (1) villi.
 - (2) longitudinal muscles.
 - (3) circular muscles.
 - (4) lacteals.
 - (5) Brunner's glands.
13. Which of the following indicates the correct pathway that a red blood corpuscle in the hepatic artery in man reaches the lung?
- (1) hepatic vein \rightarrow inferior vena cava \rightarrow heart \rightarrow pulmonary vein
 - (2) hepatic portal vein \rightarrow hepatic vein \rightarrow inferior vena cava \rightarrow heart \rightarrow pulmonary artery
 - (3) hepatic vein \rightarrow inferior vena cava \rightarrow heart \rightarrow pulmonary artery
 - (4) hepatic portal vein \rightarrow inferior vena cava \rightarrow heart \rightarrow pulmonary artery
 - (5) hepatic portal vein \rightarrow hepatic vein \rightarrow inferior vena cava \rightarrow heart \rightarrow pulmonary vein

14. Select the correct statement regarding white blood corpuscles.
- (1) Eosinophils act against parasitic infections.
 - (2) Basophils destroy bacteria by phagocytosis.
 - (3) Monocytes produce antibodies.
 - (4) Lymphocytes secrete heparin.
 - (5) Neutrophils secrete histamine.
15. Which of the following statements regarding transport of materials in plants is correct?
- (1) Endodermis acts as a barrier for the passage of all ions from cortex to xylem.
 - (2) Vacuolar pathway is less resistant than apoplast and symplast pathways for water movement in plants.
 - (3) Pits do not play a role in the transport of water through xylem.
 - (4) Transport of K^+ from guard cells into adjoining epithelial cells helps to open stomata in the presence of sunlight.
 - (5) Transport of K^+ into guard cells during stomatal movement is an active process.
16. Select the correct statement regarding the transport of materials in phloem.
- (1) Phloem transports growth substances and chemicals applied to plants.
 - (2) Phloem transport is unidirectional.
 - (3) Starch is the major organic substance transported in phloem.
 - (4) Inorganic ions are not transported in the phloem.
 - (5) Removal of organic substances from sieve tubes does not require ATP.
17. Spinal nerves of man consist of
- (1) axons and dendrites of sensory neurons.
 - (2) axons and dendrites of motor neurons.
 - (3) axons of sensory neurons and dendrites of motor neurons.
 - (4) axons of motor neurons and dendrites of sensory neurons.
 - (5) axons of sensory neurons and axons of motor neurons.
18. Select the correct statement regarding autonomic nervous system of man.
- (1) Stimulation of sympathetic division increases the secretion of saliva.
 - (2) Skin receives both sympathetic and parasympathetic nerves.
 - (3) Effectors for both sympathetic and parasympathetic divisions are glands, cardiac muscle and smooth muscles.
 - (4) Parasympathetic activity predominates in stressful conditions.
 - (5) Sympathetic preganglionic axons are longer than parasympathetic preganglionic axons.
19. Which of the following combinations is **incorrect** regarding sensory reception in humans?
- (1) Olfactory epithelium - Mechanoreception
 - (2) Free nerve endings - Thermoreception
 - (3) Taste buds - Chemoreception
 - (4) Rods - Photoreception
 - (5) Organ of Corti - Mechanoreception
20. ADH in humans
- (1) is produced in the posterior pituitary.
 - (2) is secreted in response to low osmotic pressure of blood.
 - (3) increases blood pressure by dilation of arterioles.
 - (4) acts on proximal and distal convoluted tubules of nephrons.
 - (5) conserves water in the body by decreasing urine volume.
21. A blood constituent remaining in glomerular capillaries after ultra-filtration in a healthy normal adult person is
- | | | |
|--------------------|-----------------|----------------------|
| (1) amino acids. | (2) creatinine. | (3) plasma proteins. |
| (4) mineral salts. | (5) urea. | |

22. In the human skull,
- (1) cranium is made up of 21 bones.
 - (2) maxilla is the only movable bone.
 - (3) sphenoid, nasal, maxilla and frontal contain sinuses.
 - (4) frontal contributes to form cranium and face.
 - (5) mastoid process of the temporal bone forms part of the zygomatic arch.
23. Which of the following statements is correct regarding human upper limb?
- (1) Shallow ball and socket joint in the glenoid cavity of humerus permits movement in a wide range.
 - (2) Elbow joint formed by distal end of humerus and the radius permits flexion and extension of the fore arm.
 - (3) All carpal bones contribute to form the wrist joint.
 - (4) Phalanges in three fingers articulate with carpal bones and with each other by hinge joints.
 - (5) Special joint between the first metacarpal and relevant carpal bone permits opposability of the thumb.
24. A few characteristics of some muscle cells are given below.
- | | | |
|------------------|----------------------------|--------------------|
| a - Elasticity | b - Unbranched | c - Fatigue easily |
| d - Uni-nucleate | e - Presence of sarcomeres | |
- Which of the above characteristics are shown by the muscle cells in the small intestine of man?
- (1) a, b and c
 - (2) a, b and d
 - (3) a, c and d
 - (4) b, c and d
 - (5) b, d and e
25. Select the correct statement regarding plant movements.
- (1) Tropic movements are a type of growth movement exhibited by the whole plant in a given time.
 - (2) Auxins are responsible for tropic movements.
 - (3) Equal distribution of auxins in stem apex is responsible for its phototropic movement.
 - (4) Pollen tubes growing towards ovules show a nastic movement.
 - (5) Direction of the stimulus is important for nastic movement.
26. Which of the following combinations is **incorrect** regarding the modes of asexual reproduction in organisms?
- | Mode of asexual reproduction | Examples |
|------------------------------|--|
| (1) Binary fission | - Bacteria, <i>Paramecium</i> |
| (2) Multiple fission | - <i>Spirogyra</i> , <i>Amoeba</i> |
| (3) Budding | - Cnidarians, Yeast |
| (4) Fragmentation | - Ribbon worms, <i>Planaria</i> |
| (5) Formation of spores | - <i>Agaricus</i> , <i>Selaginella</i> |
27. Human sperms acquire motility and ability to fertilize an ovum in the
- (1) testis.
 - (2) epididymis.
 - (3) vas deferens.
 - (4) ejaculating duct.
 - (5) prostate gland.
28. A feature seen in the sexual reproduction of all land plants is
- (1) non-requirement of external water for fertilization.
 - (2) internal fertilization.
 - (3) dominant sporophyte.
 - (4) production of two types of spores.
 - (5) having two types of sporophytes.
29. Select the correct statement regarding the life cycle of *Pogonatum*.
- (1) Gametophyte is dioecious.
 - (2) Sporophyte is photosynthetic.
 - (3) Sporophyte lives longer than the gametophyte.
 - (4) Archegonium contains more than one ovule.
 - (5) Diploid sporophyte depends on the gametophyte and consists of only foot and sporangium.

30. Which of the following statements is correct regarding the fertilization in angiosperms?
- (1) Pollen grain can germinate before it is placed on stigma.
 - (2) Generative nucleus divides forming three sperm nuclei.
 - (3) Double fertilization is not a unique characteristic of angiosperms.
 - (4) Endosperm is developed from the triploid nucleus.
 - (5) Fertilization is essential for the development of fruit from the ovary.
31. In a test cross, an organism with
- (1) dominant trait is crossed with one of its parents.
 - (2) recessive trait is crossed with one of its parents.
 - (3) dominant trait is crossed with an organism showing recessive trait.
 - (4) recessive trait is crossed with an organism showing dominant trait.
 - (5) dominant trait is crossed with an organism of the F_1 generation.
32. Inbreeding
- (1) increases genetic diversity.
 - (2) always increases productivity in plants.
 - (3) increases hybrid vigour.
 - (4) contributes to develop pure lines.
 - (5) occurs naturally in all plants.
33. A cross between two individuals having heterozygous genotype for two characters usually results in 9:3:3:1 ratio of phenotypes in their progeny. In some cases however, the phenotypic ratio in the progeny is 3:1. This may be due to
- (1) codominance.
 - (2) interaction of genes.
 - (3) incomplete dominance.
 - (4) polygenic inheritance.
 - (5) gene linkage.
34. In the earth atmosphere,
- (1) small dust particles are present in stratosphere.
 - (2) water vapour is present in mesosphere.
 - (3) ozone layer is found between stratosphere and troposphere.
 - (4) temperature continuously decreases from sea level to mesosphere.
 - (5) mesosphere is present from about 50 km to about 85 km above sea level.
35. Which of the following three organisms belong to the same group when endemism or indigenoussness or exoticness or migration is considered?
- (1) Black ruby barb, snakehead, slender loris
 - (2) *Hevea brasiliensis*, *Caryota urens*, *Dipterocarpus zeylanicus*
 - (3) Indian fly catcher, barn swallow, Indian pitta
 - (4) *Loris tardigradus*, *Garcinia quaesita*, *Ophicephalus striatus*
 - (5) Tilapia, rubber, Indian pitta
36. Which one of the following organisms indicate the correct chronological order when their origin is considered?
- (1) Mosses, insects, conifers, dinosaurs
 - (2) Protists, first land plants, trilobites, modern fish
 - (3) Mollusks, modern fish, early mammals, man
 - (4) Crustaceans, first land animals, modern fish, dinosaurs
 - (5) Trilobites, amphibians, first land plants, reptiles
37. Cyanobacteria are
- (1) freshwater organisms which use atmospheric nitrogen as source of energy for synthesizing food.
 - (2) prokaryotic photosynthetic organisms some of which fix atmospheric nitrogen.
 - (3) organisms that contain heterocysts, endospores and akinetes.
 - (4) prokaryotic organisms that reproduce by sexual and asexual methods.
 - (5) organisms having chloroplasts for photosynthesis and heterocysts for nitrogen fixation.

38. Viruses

- (1) multiply in dead cells of the host.
- (2) grow in laboratory culture media.
- (3) could be retained by a 0.45 μm micro-filter.
- (4) cause lysis of some host cells.
- (5) cause mad cow disease.

39. Select the correct combination regarding the use of microorganisms in commercial production of some enzymes.

Enzyme	Microorganism used in the production
(1) Amylase	<i>Saccharomyces cerevisiae</i>
(2) Lipase	<i>Rhizopus</i> sp.
(3) Cellulase	<i>Aspergillus oryzae</i>
(4) Protease	<i>Saccharomyces cerevisiae</i>
(5) Invertase	<i>Aspergillus niger</i>

40. Two species of microorganisms that cause food intoxication are

- (1) *Vibrio cholerae* and *Clostridium botulinum*.
- (2) *Salmonella typhi* and *Shigella* sp.
- (3) *Clostridium botulinum* and *Salmonella typhi*.
- (4) *Staphylococcus aureus* and *Vibrio cholerae*.
- (5) *Staphylococcus aureus* and *Clostridium botulinum*.

● For each of the questions 41 to 50 one or more of the responses is/are correct. Decide which response/responses is/are correct and then select the correct number.

- If only A, B and D are correct 1
 If only A, C and D are correct 2
 If only A and B are correct 3
 If only C and D are correct 4
 If any other response or combination of responses is correct 5

Directions summarised				
1	2	3	4	5
A, B, D correct.	A, C, D correct.	A, B correct.	C, D correct.	Any other response or combination of responses correct.

41. Which of the following statements regarding cofactors is/are correct?

- (A) They are non-protein components.
- (B) They are always needed for enzyme activity.
- (C) They could be permanently bound to enzyme molecule.
- (D) They could be temporarily bound to enzyme molecule.
- (E) They are always organic compounds.

42. Select the correct statement/statements regarding nutrition of organisms.

- (A) Parasitism is a form of symbiosis.
- (B) *Rhizobium* is heterotrophic.
- (C) Orchids are mutualistic.
- (D) Holozoic nutrition consists of five main steps.
- (E) *Cuscuta* is autotrophic.

43. Which of the following parts of the human brain is/are involved in the regulation of normal inspiration and expiration?

- (A) Cerebellum
- (B) Hypothalamus
- (C) Pons Varolii
- (D) Medulla oblongata
- (E) Red nuclei

44. Which of the following is/are a function/functions of medulla oblongata of man?
 (A) Regulation of heart beat
 (B) Control of blood pressure
 (C) Control of reflex movements of eye muscles
 (D) Control of involuntary reflexes
 (E) Maintaining posture
45. Which of the following comparisons is/are correct regarding nitrogenous waste products of animals?
- | | Ammonia | Urea | Uric acid |
|----------------------------------|----------------|-------------|------------------|
| (A) Toxicity | High | Low | Least |
| (B) Water solubility | High | Low | Least |
| (C) Energy cost in production | High | Low | Low |
| (D) Water loss during excretion | High | Low | Least |
| (E) Carbon loss due to excretion | Low | High | Low |
46. Which of the following statements is/are correct regarding human female reproductive cycle?
 (A) Ovarian cycle consists of a follicular phase and a luteal phase.
 (B) Small secondary follicles in the ovary begin to enlarge during the menstrual phase of the uterine cycle.
 (C) LH surge triggers ovulation and shedding of the uterine lining to nourish the released ovum.
 (D) If ovum is not fertilized, corpus luteum becomes corpus albicans terminating the secretory phase of the uterine cycle.
 (E) If the ovum is fertilized, corpus luteum begins to secrete progesterone and estrogen which continues throughout the pregnancy.
47. Which of the following is/are required for transcription of DNA?
 (A) DNA helicase
 (B) A single strand of DNA
 (C) RNA polymerase
 (D) Gyrase
 (E) Ribosomes
48. Which of the following biomes is/are found in the tropical regions?
 (A) Savanna (B) Deserts (C) Taiga (D) Chaparral (E) Tundra
49. Genetically modified organisms
 (A) carry one or more genes originated in other organisms.
 (B) are very similar to their mother organism except for one or a few traits.
 (C) are accepted by public as safe.
 (D) have not been released to the environment so far.
 (E) are produced by hybridizing unrelated organisms.
50. Which of the following combination/combinations is/are correct with respect to nutrition of microorganisms?
- | Nutritional type | Source of energy | Source of carbon | Example |
|-------------------------|-------------------------|-------------------------|-------------------------|
| (A) Photoautotrophic | Light | Carbon dioxide | Green sulphur bacteria |
| (B) Chemoautotrophic | Organic chemicals | Carbon dioxide | <i>Nitrosomonas</i> |
| (C) Chemoautotrophic | Inorganic chemicals | Carbon dioxide | <i>Nitrobacter</i> |
| (D) Chemoheterotrophic | Organic chemicals | Organic carbon | Fungi |
| (E) Photoheterotrophic | Light | Organic carbon | Purple sulphur bacteria |

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
 இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்
 Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka
 Department of Examinations, Sri Lanka

OLD

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2019 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2019 ஓகஸ்ட்
General Certificate of Education (Adv. Level) Examination, August 2019

ජීව විද්‍යාව II
 உயிரியல் II
Biology II

09 E II

06.08.2019 / 1300 - 1610

පැය තුනයි
 மூன்று மணித்தியாலம்
Three hours

අමතර කියවීමේ කාලය - මිනිත්තු 10 යි
 மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்
Additional Reading Time - 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.

Index No. :

Instructions:

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

PART A – Structured Essay (Pages 2 - 9)

- * 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 10)

- * 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 remove only Part B of the question paper from the examination hall.

For Examiners' Use Only

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

Total	
In Numbers	
In Letters	

Code Numbers	
Marking Examiner 1	
Marking Examiner 2	
Marks checked by	
Supervised by	

Part A - Structured Essay
Answer all questions on this paper itself.
(Each question carries 10 marks.)

Do not
write
in this
column

1. (A) (i) State **three** characteristics of living organisms.

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

(ii) Explain the primary, secondary, tertiary and quaternary structures of proteins.

(a) Primary structure:

.....

(b) Secondary structure:

.....

(c) Tertiary structure:

.....

(d) Quaternary structure:

.....

(iii) Briefly explain the structure of a vacuole found in plant cells.

.....
.....

(iv) State **four** functions of vacuoles in plant cells.

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

(v) State **three** functions of smooth endoplasmic reticulum that are **not** performed by rough endoplasmic reticulum.

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

(B) (i) State the main difference that can be seen between animal cells and plant cells during cytokinesis.

.....
.....

(ii) What is kinetochore?

.....
.....

(iii) State the **three** types of cofactors of enzymes and give one example for each of them.

	Type of cofactor	Example
(a)
(b)
(c)

Do not write in this column

(iv) Name the **three** structural components of ATP.

.....

(C) (i) Write the scientific name of Sri Lankan leopard.

.....

(ii) State the rules adopted by biologists in naming organisms.

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

(iii) Name the main storage substance of *Allomyces*.

.....

(iv) The main nitrogenous excretory product of the animal species belonging to a particular class varies according to the environment where they live. What is this class?

.....

(v) State the symmetry of adult sea cucumbers.

.....

2. (A) (i) (a) State **two** deficiency symptoms of vitamin B₅ in man.

.....
.....

(b) Write the dentition of a normal healthy adult man.

.....

(ii) (a) In man, enterogastrone is secreted by

(b) What is the function of enterogastrone in man?

.....

(iii) (a) Surface: volume ratios of two animals are as follows.

Animal A: 8.3 cm⁻¹ Animal B: 0.25 cm⁻¹

Which of the above animals may respire through the body surface?

.....

(b) Name the muscles involved in the normal inspiration and expiration of man.

.....
.....

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(iv) Name a group of organisms having each of the following excretory structures.

(a) Contractile vacuoles:

(b) Salt glands:

(v) (a) State one basic difference between cortical nephrons and juxtamedullary nephrons of man other than their position in the kidney.

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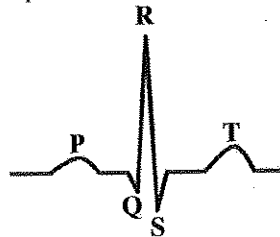
(b) State **two** major causes for developing kidney stones in man.

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.....

(B) (i) What is double circulation?

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.....

(ii) (a) Electrocardiograph of a normal healthy adult person is given below.



State what is represented by each of the **P**, **QRS** and **T**.

P:

QRS:

T:

(b) What is a bypass surgery?

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

(iii) Haemoglobin levels in the blood of four adult human males (**A**, **B**, **C** and **D**) are as follows:

A: 10.5 g/dL; **B:** 12.5 g/dL; **C:** 15.0 g/dL; **D:** 9.0 g/dL

Of these persons, who is/are having a haemoglobin level below the minimum level of a healthy adult man?

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(iv) What is imbibition?

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.....

(v) (a) Name the theory that has been put forward to explain xylem transport.

.....

(b) What are the underlying principles of upward movement of water through xylem?

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(C) (i) (a) What is the functional unit of the human nervous system?

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(b) What is meant by resting potential of a neuron?

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(ii) (a) Name the neurotransmitter released from motor neurons in humans.

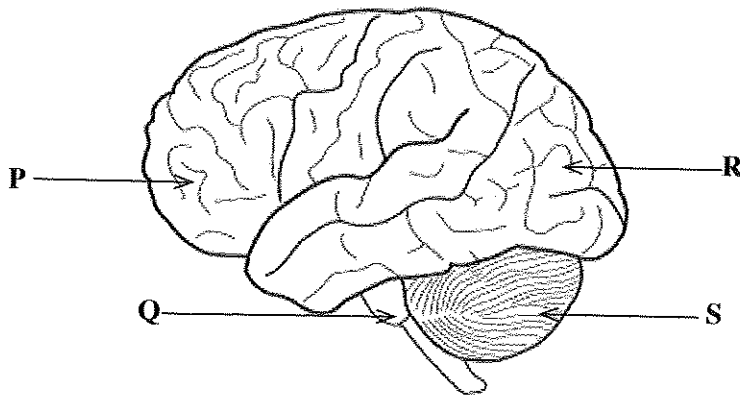
.....

(b) State **two** factors that increase the speed of propagation of nerve impulses along a neuron.

.....

.....

(iii) This question is based on the following diagram of the human brain.



(a) Name the parts labelled as P, Q, R and S.

P: Q:

R: S:

(b) Which of the above parts has/have been developed from the embryonic hind-brain?

.....

(c) Which of the above parts coordinates the voluntary muscular movements?

.....

(iv) (a) What is the main advantage of binocular vision in man?

.....

(b) Write in correct sequence, the pathway through which vibration waves are transmitted from external air to the sensory receptors in the human ear during hearing.

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(v) (a) State the location of the thyroid gland of man.

.....

.....

(b) Name the hormone secreted by the thyroid gland which contributes to calcium homeostasis in the human body.

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3. (A) (i) (a) What is a hydrostatic skeleton?

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.....

(b) Name the type of bone cells responsible for deposition of inorganic salts in the bone tissue.

.....

(ii) (a) Name the bone that forms the sides and most of the roof of the human cranium.

.....

(b) What are known as fontanelles in the human skull?

.....
.....

(iii) State **two** functions of the human vertebral column other than providing support and maintenance of erect posture.

.....
.....

(iv) State **two** features of the female pelvis that makes it different from the male pelvis.

.....
.....

(v) Give **two** functional properties of all muscle tissues other than contractility.

.....
.....

(B) (i) (a) State **three** advantages of asexual reproduction.

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

(b) State the main advantage of sexual reproduction.

.....
.....

(ii) (a) Name the gland that secretes the major portion of semen in man.

.....

(b) State the function of Leydig cells.

.....

(iii) (a) When a cross section of a human ovary was examined under the high power of the light microscope, a structure with a spherical cell filled with cytoplasm which was surrounded by a clear layer followed by several layers of cuboidal cells was observed in the cortex region. What would this structure be?

.....

(b) What is the structure in the human ovary that secretes progesterone?

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(iv) (a) What is the average life span of a human ovum?

.....

(b) In which trimester of the human pregnancy, the heart beat of the developing foetus can be detected first?

.....

(v) Name a sexually transmitted disease in humans caused by a bacterial infection.

.....

(C) (i) Name **three** tissues that provide support in plants.

.....

(ii) (a) What is the significance of seed dormancy?

.....

(b) Give **three** causes of seed dormancy.

.....

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(iii) (a) Name a plant growth substance involved in each of the following.

Activation of seed germination:

Inhibition of seed germination:

(b) State in correct sequence, the events that take place during seed germination.

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(iv) Name the type of exotoxin produced by each of the following pathogens.

Corynebacterium diphtheriae:

Clostridium tetani:

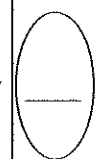
Vibrio cholerae:

(v) (a) A person develops immunity against chickenpox when infected once with it. What is the type of this immunity?

.....

(b) Name the type of specific molecule which causes immunity.

.....



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4. (A) (i) Name the type of cross given below and state its purpose.

An organism of F₁ generation × One of the parents.

Cross:

Purpose:

(ii) In a monohybrid cross, Mendel observed 3:1 ratio between dominant and recessive phenotypes in the F₂ generation of pure line parents. What would be the type of inheritance if the following ratios of phenotypes are resulted in the F₂ generation?

Phenotypes	Ratio	Type of inheritance
(a) Plants bearing red:pink:white flowers	1:2:1
(b) Persons with blood groups A:AB:O	1:2:1
(c) Plants bearing red:white flowers	1:1

(iii) What are the factors that contribute to change the allele frequency of a population?

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(iv) State **three** agriculturally important traits that have been introduced to genetically modified plants.

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(v) State **two** substances other than hormones produced using recombinant DNA technology that are used in the treatment of human diseases.

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(B) (i) What were the sources of energy contributed to form organic compounds from simple molecules during origin of life?

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(ii) What is extinction of species?

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.....

(iii) Briefly explain what a keystone species is.

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(iv) What are the objectives of each of the following conventions?

(a) CITES:

(b) Biodiversity convention:

(v) State **four** adverse impacts of hydrocarbons on human health as air pollutants.

.....

(C) (i) State **two** morphological forms of viruses.

.....

(ii) State the method generally used to sterilize each of the following materials.

(a) Nutrient agar:

(b) Petri dishes:

(c) A solution of enzymes:

(iii) State **two** adverse impacts of soil microorganisms on plants.

.....

(iv) State **two** symbiotic associations of microorganisms with the roots of some plants.

.....

(v) Name a species of bacteria used in the preparation of biopesticides.

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