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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|
| Department of Examinations, Sri Lanka<br>இலங்கைத் தீர்மானப் பரீட்சைத் திணைக்களம்<br>Department of Examinations, Sri Lanka<br>இலங்கைத் தீர்மானப் பரීட்சைத் திணைக்களம்                                |                                                  | 09 E I |
| අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2011 අගෝස්තු<br>கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2011 ஓகஸ்ட்<br>General Certificate of Education (Adv. Level) Examination, August 2011 |                                                  |        |
| ජීව විද්‍යාව I<br>உயிரியல் I<br>Biology I                                                                                                                                                           | පැය දෙකයි<br>இரண்டு மணித்தியாலங்கள்<br>Two hours |        |

**Important :**

- 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 those carefully.
- In each of the questions 1 to 60, 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.

- Which one of the following is a disaccharide?  
 (1) Fructose (2) Maltose (3) Ribose (4) Galactose (5) Glyceraldehyde
- Which one of the following properties of water is most directly responsible for maintaining body temperature of warm blooded animals?  
 (1) High latent heat of fusion (2) High adhesive and cohesive forces  
 (3) High latent heat of vaporization (4) High specific heat (5) Polarity
- Which one of the following structure - function relationships is incorrect?  
 (1) Nucleus - Ribosome synthesis (2) Microbodies - Photorespiration in plants  
 (3) Lysosomes - Detoxification (4) Mitochondria - Synthesis of ATP  
 (5) Golgi complex - Synthesis of glycolipids
- Which one of the following metabolic processes is exergonic?  
 (1)  $ADP + P \longrightarrow ATP + H_2O$  (2)  $6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$   
 (3)  $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$  (4) Amino acids  $\longrightarrow$  Protein  
 (5) Glycerol + Fatty acids  $\longrightarrow$  Fat
- Description of a type of plant cell is given below.  
 Vacuolated cells, living at maturity, have thin primary cell walls, usually isodiametric, metabolically active, storage cells, found in both primary and secondary tissues of plants.  
 Which of the following cell types fits into the above description?  
 (1) Sieve tube cells (2) Companion cells  
 (3) Parenchyma cells (4) Collenchyma cells (5) Sclerenchyma cells
- The action spectrum of photosynthesis is a graph showing  
 (1) the amount of light absorbed by pigments at different wavelengths of light.  
 (2) the amount of light absorbed by pigments at different times of the day.  
 (3) the rate of photosynthesis at different wavelengths of light.  
 (4) the amount of  $CO_2$  absorbed at different wavelengths of light.  
 (5) the rate of photosynthesis at different light intensities.

7. Members of the group Lycophta
- (1) are aquatic.
  - (2) produce gametophytes which are non-photosynthetic.
  - (3) are always homosporous.
  - (4) Have no vascular tissues.
  - (5) depend on external water for fertilization.

8. Some characteristics of three animals labelled A, B and C are as follows.
- (i) All three animals show bilateral symmetry and cephalization.
  - (ii) Alimentary canals of A and B are complete while in C it is incomplete.
  - (iii) Gills and dorsal hearts are present only in A and B.
  - (iv) A has an exoskeleton, B has an endoskeleton and C does not have an exoskeleton or an endoskeleton.

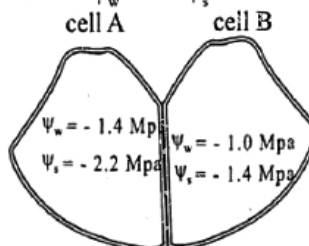
The animals labelled A, B and C are respectively

- (1) prawn, squid and tapeworm.
  - (2) snail, tilapia and earthworm.
  - (3) sea turtle, tuna and *Planaria*.
  - (4) crab, snail and liver fluke.
  - (5) prawn, mussel and tapeworm.
9. Which of the following characters could be seen in both Annelida and Echinodermata?
- A - Well developed coelom  
B - Nephridia  
C - External fertilization  
D - Gills  
E - Larval stages  
F - Cephalization
- (1) B, D and E only
  - (2) A, C and D only
  - (3) A, C, D and E only
  - (4) A, C, D and F only
  - (5) A and E only
10. Which one of the following is not a contributory factor for gastritis?
- (1) Consumption of alcohol
  - (2) Skipping breakfast
  - (3) Tuberculosis
  - (4) Mental Stress
  - (5) Consumption of diets deficient in fibres

11. Some respiratory structures found in the animal kingdom are as follows
- A - Lungs                      B - Book lungs                      C - Trachea  
D - Internal gills                      E - External gills                      F - Body covering
- Which of the above are used by vertebrates for respiratory gas exchange?
- (1) A only
  - (2) A and D only
  - (3) A, D and E only
  - (4) A, D, E and F only
  - (5) A, C, D, E and F only

12. Which of the following processes does not involve active transport of material?
- (1) Transport of soil mineral nutrients into plant root hair cells.
  - (2) Transport of  $K^+$  into guard cells during stomatal movement.
  - (3) Transport of sugar from mesophyll cells of leaves into sieve tube cells.
  - (4) Transport of photosynthetic products from one sieve tube cell to another sieve tube cell.
  - (5) Transport of mineral nutrients through cell wall to the symplast.

13. A and B are two plant cells adjacent to each other. The  $\psi_w$  and  $\psi_s$  values of the two cells are indicated in the diagram



Which one of the following statements is incorrect?

- (1) Water will move from cell B to cell A.
- (2) Movement of water will occur until  $\psi_w$  of the two cells are equal
- (3)  $\psi_p$  of cell A is 1.0 MPa.
- (4)  $\psi_p$  of cell B is 0.6 MPa.
- (5) The  $\psi_w$  and  $\psi_s$  values of normal plant cells are always negative.

14. Some statements regarding the basic plan of the blood circulatory system of mammals are given below

- A - Dorsal aorta is formed by the 4th pair of aortic arches of the basic plan.
- B - Carotid arteries are formed by the 2nd pair of aortic arches of the basic plan.
- C - The 3rd and 5th aortic arches of the basic plan are lost.
- D - The 6th pair of aortic arches of the basic plan form pulmonary arteries.

Which of the above statements is/are correct ?

- (1) A and D only
- (2) A and B only
- (3) C only
- (4) B and D only
- (5) D only

15. Blood circulatory systems found among animals are as follows

- A - Open circulatory system.
- B - Closed single circulatory system.
- C - Closed double circulatory system.

Which of the following indicates in correct order, the animals which possess the above circulatory systems A, B and C?

- (1) Spider, snail and rat
- (2) Centipede, *Ichthyophis* and bat
- (3) Crab, earthworm and turtle
- (4) Sea urchin, shark and crow
- (5) Cockroach, *Nereis* and octopus

16. A person developed a tumour between pons varoli and thalamus affecting the functions carried out by that region of the brain Which of the following could be most affected by this tumour?

- (1) Movement of eyes
- (2) Maintenance of balance
- (3) Memory
- (4) Control of respiration
- (5) Speech

17. Which of the following statements regarding a motor neurone of man at the stage of not transmitting an impulse is correct?

- (1) Inner surface of the plasma membrane of neurone is negatively charged compared to outside due to entering of higher number of anions than that goes out.
- (2) Major anion inside the neurone is  $\text{Cl}^-$
- (3) Concentration of  $\text{Na}^+$  and organic anions is higher inside the neurone than outside the neurone.
- (4)  $\text{Na}^+ \text{K}^+$  Pump is maintained by active transport that involves carrier proteins.
- (5) Permeability of plasma membrane for  $\text{Na}^+$  is higher than for  $\text{K}^+$

18. Which of the following best indicates the site of organ of Corti ?

- (1) Cochlea
- (2) Cochlear canal
- (3) Inner ear
- (4) Membranous labyrinth
- (5) Sacculus

19. Some excretory structures found in the animal kingdom and examples for the animals having those structures are given below. Which of these excretory structure - example combinations is incorrect?

- (1) Salt glands - Tilapia
- (2) Green glands - Prawn
- (3) Nephridia - Leech
- (4) Flame cells - *Bipalium*
- (5) Malpighian tubules - Honey bee

20. In man, a well developed centrum, a long neural spine and long transverse processes could be seen in

- (1) lumbar vertebrae only.
- (2) thoracic vertebrae only.
- (3) lumbar and thoracic vertebrae only.
- (4) 6th cervical, lumbar and thoracic vertebrae only.
- (5) thoracic lumbar and sacral vertebrae only.

21. When a cross section of an organ of man was examined under a microscope, ciliated cells, goblet cells and lacunae containing one or two cells were observed. This organ could be the

- (1) liver
- (2) trachea
- (3) oviduct.
- (4) intestine.
- (5) kidney

22. This question is based on the following animal groups  
 A - Crustacea    B - Vertebrata    C - Mollusca    D - Radiolaria  
 Which of the above groups include/includes animals with exoskeletons as well as animals with endoskeletons?  
 (1) B only    (2) B and C only    (3) B, C and D only  
 (4) A and C only    (5) A and D only
23. Which one of the following plant tissues/cells contains suberin?  
 (1) Epidermis    (2) Endodermis    (3) Sclerides    (4) Trachieds    (5) Sieve tubes
24. In angiosperms, which of the following does not develop from the fertilized ovum?  
 (1) Cotyledons    (2) Plumule    (3) Radicle    (4) Endosperm    (5) Hypocotyl
25. Which one of the following classes of plant hormones are essential for mitosis and cell division?  
 (1) Auxins    (2) Gibberellins    (3) Abscissic acid    (4) Cytokinins    (5) Ethylene
26. Diploid stage of the life cycle is shortest in  
 (1) *Pogonatum*    (2) *Nephrolepis*    (3) *Selaginella*    (4) *Cycas*    (5) *Musa*
27. This question is based on the following statements regarding the human ovum.  
 A - At the time of ovulation, it is in the metaphase of the first meiotic division.  
 B - It releases the first polar body immediately after ovulation.  
 C - It is multicellular because granular cells of corona radiata are attached to it.  
 D - It has a dense cytoplasm with minute amount of yolk.  
 E - It is usually fertilized in the Fallopian tube.  
 Which of the above statements is /are correct?  
 (1) A and B only    (2) A, B and C only  
 (3) B, C, D and E only    (4) D and E only    (5) E only
28. Which of the following statements regarding seminal fluid of man is correct?  
 (1) Its pH is 6.5 - 7.0    (2) It contains ascorbic acid  
 (3) About 40% of it is secreted by seminal vesicles.  
 (4) It contains proteins to provide energy for the movement of sperms.  
 (5) It contains substances that help in capacitation of sperms.
29. Which of the following are examples for bisexuality, unisexuality and parthenogenesis respectively?  
 (1) Mosquito, prawn, *Cycas*    (2) Earthworm, cat, honey bee  
 (3) *Hibiscus*, Dog, *Cycas*    (4) Sea urchin, bat, honey bee    (5) Centepede, *Cycas*, whale
30. Which of the following is arranged in correct order by size, from largest to smallest?  
 (1) Chromosome → Gene → nucleotide → nitrogenous base.  
 (2) Codon → chromosome → gene → nucleotide  
 (3) Chromosome → gene → nitrogenous base → nucleotide  
 (4) Gene → chromosome → codon → nucleotide  
 (5) Nucleotide → chromosome → gene → codon
31. Three types of RNA are involved in the synthesis of proteins in cells. Which of the following shows the correct sequence of the participation of the three types of RNA in protein synthesis?  
 (1) mRNA, tRNA, rRNA    (2) rRNA, tRNA, mRNA  
 (3) tRNA, mRNA, rRNA    (4) tRNA, rRNA, mRNA    (5) rRNA, mRNA, tRNA

32. In a variety of pea, flower colour red (R) is dominant over white (r) and seed colour yellow (Y) is dominant over green (y). Assume that genes for flower colour and seed colour are on two different chromosomes. When two plants with red flowers and yellow seeds were crossed,  $\frac{3}{4}$  of the progeny were red flowered with yellow seeds and the remaining  $\frac{1}{4}$  were white flowered with yellow seeds. The genotypes of the parents are likely to be
- (1) RRYy and rr Yy. (2) RrYY and RRYy. (3) RrYy and RrYy  
(4) RrYy and RrYY. (5) Rryy and RrYy
33. The following are some steps occurring during the process of meiosis.
- A - Formation of four daughter cells  
B - Separation of homologous chromosomes  
C - Exchange of genetic material  
D - Duplication of chromosomes  
E - Division of cytoplasm  
F - Pairing of homologous chromosomes
- Which of the following is the correct order of steps of meiosis?
- (1) DCBEFA (2) FDBCEA (3) DFCBEA (4) FDECBA (5) DBFEBA
34. In Genetic engineering technology several enzymes are used to produce recombinant DNA. Which one of the following enzymes is used to recognize and cut a specific sequence of nucleotide bases in DNA?
- (1) Exonuclease (2) Ligase (3) Polymerase  
(4) Restriction endonuclease (5) Deoxyribonuclease
35. Which of the following ecosystems has evergreen trees with continuous canopy?
- (1) Dry mixed evergreen forest (2) Thorn forest  
(3) Montane forest (4) Tropical rain forest (5) Mangrove forest
36. Which of the following statements regarding air pollutants is correct?
- (1) Sulphur dioxide, oxides of nitrogen and chlorofluorocarbon are found to be associated with high incidence of lung cancer.  
(2) Hydrocarbons and ozone reduce the resistance of the human body to pneumonia.  
(3) Particulate matter and hydrocarbons can be carcinogenic and may reduce primary productivity.  
(4) Carbon monoxide and sulphur dioxide cause eye irritation.  
(5) Ozone cannot be considered as an air pollutant because it contributes to the maintenance of the ozone layer in the atmosphere.
37. Some categories of threatened organisms given in the IUCN red data book with examples are given below'. Which one of the following IUCN category - example combinations is correct?
- (1) Extinct - Tuatara (2) Critically endangered - Loggerhead turtle  
(3) Endangered - Leatherback Turtle (4) Vulnerable - Asian elephant  
(5) Near threatened - marsh crocodile
38. Which of the following international conventions/protocols is concerned with global climatic change?
- (1) Basel convention (2) Marpol convention  
(3) Montreal protocol (4) Kyoto protocol (5) Biodiversity convention
39. Which of the following antimicrobial drugs inhibit the growth of bacteria by inhibiting the synthesis of DNA?
- (1) Penicillin (2) Ciprofloxacin (3) Polymyxin  
(4) Erythromycin (5) Clotrimazole

40. Which one of the following stages of the nitrogen cycle in nature is carried out by chemoautotrophic bacteria?  
 (1) Proteolysis (2) Ammonification (3) Nitrification  
 (4) Denitrification (5) Nitrogen fixation

- ◊ For each of the questions 41 to 50 one or more of the responses is/ are correct. Decide which of the 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 only other response or combination of responses is correct.....5

| Directions summarised |                  |                |                |                                                              |
|-----------------------|------------------|----------------|----------------|--------------------------------------------------------------|
| 1                     | 2                | 3              | 4              | 5                                                            |
| A,B,D<br>Correct.     | A,C,D<br>Correct | A,B<br>Correct | C,D<br>Correct | Any other response of<br>combination of responses<br>correct |

41. Which of the following characteristics is/ are common to Domains Archea and Eukarya?  
 (A) Presence of several kinds of RNA Polymerases  
 (B) Non- sensitivity to antibiotics  
 (C) Presence of branched lipid molecules in the cell membrane  
 (D) Absence of peptidoglycans in the cell wall.  
 (E) Eukaryotic cellular organization
42. Which of the following statements is/are correct regarding essential elements in plants?  
 (A) They are components of the structural material in plants.  
 (B) Plants cannot complete the life cycles without these nutrients.  
 (C) Plants show deficiency symptoms when some of the essential elements are in short supply.  
 (D) Atmosphere is the major reservoir of essential elements.  
 (E) All essential elements are macronutrient elements.
43. Which of the following statements regarding reflex arcs of man is / are incorrect?  
 (A) They help to control many involuntary actions.  
 (B) Responses resulting due to their involvement are automatic.  
 (C) They generally consist of two neurones.  
 (D) They connect the receptor and effector organs through the autonomic nervous systems.  
 (E) They are the functional units of the nervous system.
44. Which of the following statements regarding human skin is/are incorrect?  
 (A) All four types of basic tissues can be seen in the dermis.  
 (B) It excretes salts and urea.  
 (C) Nerve endings do not penetrate into the epidermis.  
 (D) Epidermis is a stratified squamous epithelium containing glands.  
 (E) It synthesizes vitamin D.
45. Which of the following endocrine glands in man secrete hormones that are responsible for the regulation of functioning of the kidney?  
 (A) Hypothalamus, adrenal medulla, posterior pituitary  
 (B) Posterior pituitary, adrenal cortex, thymus  
 (C) Anterior pituitary, hypothalamus, posterior pituitary  
 (D) Hypothalamus, parathyroids, adrenal cortex  
 (E) Hypothalamus, thyroid, pancreas.

46. Which of the following statements regarding human kidney is/are incorrect?
- (A) Glomeruli of cortical nephrons have fewer number of capillaries than those of juxta-medullary nephrons.
  - (B) Water is never reabsorbed actively in the kidney
  - (C) Amino acids are actively reabsorbed in the kidney
  - (D) Excess of vitamin D is secreted in the kidney
  - (E) Thoracic vertebrae are also located at the same level of the kidneys.
47. Which of the following could be seen in a six month old human male foetus?
- (A) Wrinkled skin
  - (B) Eye lashes
  - (C) Fused eye lids
  - (D) Nails extended to the tip of the fingers.
  - (E) Scrotum with descended testicles.
- ◊ Question 48 and 49 are based on the following microorganisms.
- (A) *Saccharomyces cerevisiae*
  - (B) *Acetobacter aceti*
  - (C) *Clostridium tetani*
  - (D) *Corynebacterium diphtheriae*
  - (E) *Salmonella typhi*
48. Which of the above organisms is/ are important for the production of vinegar from toddy
49. Which of the above organisms produce/ produces exotoxins?
50. Which of the following substances are generally transported in the xylem?
- (A) Nitrates
  - (B) Water
  - (C) Phosphates
  - (D) Vitamins
  - (E) Auxins

Department of Examinations, Sri Lanka  
09 E II

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கல்விய் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2011 ஓகஸ்ட்  
General Certificate of Education (Adv. Level) Examination, August 2011

ජීව විද්‍යාව III  
உயிரியல் III  
Biology III

පැය තුනයි  
மூன்று மணித்தியாலம்  
Three hours

Index No. : .....

**Important :**

- \* This question paper consists of 12 pages.
- \* This question paper comprises Part A and Part B. The time allotted for both parts is three hours.

1. (A) (i) What are the major characteristics that distinguish living from non-living?

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

(ii) Living matter is composed of about 92 chemical elements. What are the six most abundant chemical elements in living matter?

.....

(iii) The most abundant inorganic compound in living matter is water. What are the main functions of water in living organisms?

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

(iv) Name two major nitrogen containing polymeric compounds in living organisms and indicate two major functions of each.

| Compound | Functions      |
|----------|----------------|
| 1. ....  | .....<br>..... |
| 2. ....  | .....<br>..... |

(B) (i) What are the three major principles on which the cell theory is based?

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

(ii) Write four major characteristics unique to prokaryotic organisms.

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

(iii) Name two major polymeric compounds found in the plant cell wall.

.....  
.....

(iv) (a) What are microbodies?

(b) State two microbodies commonly found in living organisms and give one function of each

Type of cell junction

Function

| Type of cell junction | Function |
|-----------------------|----------|
| .....                 | .....    |
| .....                 | .....    |

(v) (a) What are cell junctions?

.....

(b) State three types of cell junctions found in animal cells and give one function of each.

Type of cell junction

Function

| Type of cell junction | Function |
|-----------------------|----------|
| .....                 | .....    |
| .....                 | .....    |
| .....                 | .....    |

(C) (i) (a) What is catabolism?

(b) Give one example for a catabolic reaction taking place in a living cell.

.....

(ii) (a) What is anabolism?

(b) Give one example for an anabolic reaction taking place in a living cell?

.....

(iii) (a) What are three major chemical constituent groups of an ATP molecule?

.....

(b) Name three sites in a living cell where ATP is produced.

.....

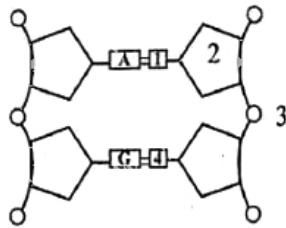
(iv) How do cellular enzymes speed up metabolic reactions in a living cell?

.....

(v) What is the major difference between competitive and non-competitive inhibitors of enzyme activity?

.....

2. (A)



The diagram given above shows a part of the molecular structure of DNA

(i) (a) Label 1, 2, 3 and 4.

1. .... 2. ....  
3. .... 4. ....

(b) Indicate in the diagram a single nucleotide by drawing a circle around it.

(ii) How does RNA differ chemically from DNA?

.....  
.....

(iii) Name the types of RNA found in an eukaryotic cell and indicate one function of each of them.

| Type of RNA | Function |
|-------------|----------|
| .....       | .....    |
| .....       | .....    |
| .....       | .....    |

(iv) List the main features of the genetic code.

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

(v) Name the enzymes involved in the following stages taking place during self replication of DNA.

Unwinding of double helix .....  
Formation of complementary strands of DNA .....

(B) Assume that in tomato plants, round fruit (R) is dominant to elongated fruit (r) and tall plant (T) is dominant to dwarf plant (t)

(i) (a) A true breeding dwarf plant with round fruits was crossed with a true breeding tall plant with elongated fruits. What are the genotypes of parent plants and the progeny of this cross.

Parent plants .....  
Progeny .....

(b) The progeny of the above cross was subjected to a test cross. Among the progeny of the test cross, 80% of the plants had parental phenotypes and 20% had recombinant phenotypes. What are the genotypes of the parent plants and the progeny of the test cross? Indicate the percentage frequency at which each of the genotypes of the progeny has occurred.

Genotypes of parent plants .....  
Genotypes of progeny .....  
Percentage frequency .....

(Write in sequence corresponding to genotypes of progeny)

(c) Indicate the possible reason for not producing the different genotypes of the progeny in the above test cross in equal frequencies.

.....

(ii) Write two benefits of meiosis in organisms

.....  
.....

(C) (i) What are the major reasons for the dominance of microorganisms in the biosphere?

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

(ii) What are the physical indications seen in food spoiled by microorganisms?

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

(iii) What is understood by the terms (a) food borne infections and (b) food intoxication in microbial food spoilage? Give one example of a causative bacterium for each

(a) Food borne infection : .....

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

Example of a causative bacterium : .....

(b) Food intoxication : .....

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

Example of a causative bacterium : .....

(iv) Antibiotics used for the treatment of bacterial infections, inhibit the growth of bacteria by several mechanisms. Name four such mechanisms and corresponding antibiotics.

**Mechanism**

**Antibiotic**

|       |       |
|-------|-------|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

3. (A) (i) What are the structures involved in the formation of human placenta?

.....

(ii) Name the hormone produced by the placenta during the initial stages of pregnancy and state its function.

**Hormone**

**Function**

.....

(iii) Name the hormones produced by placenta during the later stages of pregnancy.

.....

(iv) (a) Name the other important substance produced by the placenta in addition to hormones and state its function.

**Substance**

**Function**

.....

- (b) Name the hormone that induces the production of the substance stated in (iv) (a) above and state its site/sites of synthesis.

**Hormone**

**Site/Sites of synthesis**

- (v) What is the hormone responsible for inhibiting the contraction of myometrium during pregnancy?

- (B) (i) Name the hormones responsible for the development of milk glands and their ducts.

Milk glands

Ducts of milk glands

- (ii) (a) Name the hormone responsible for the production of breast milk and state its site of production

**Hormone**

**Site of production**

- (b) Name the hormone that prevents the secretion of breast milk during pregnancy.

- (iii) What are the major components of breast milk other than water?

- (iv) At what age should supplementary food be introduced to the infant?

- (v) Until what age should breast feeding be continued to the child?

- (C) (i) (a) What are the methods of asexual reproduction seen among organisms? Give one example for each method

**Method**

**Example**

- (b) What are the advantages of asexual reproduction?

- (ii) What are the methods widely used by local farmers to propagate each of the crops listed below?

Sugarcane

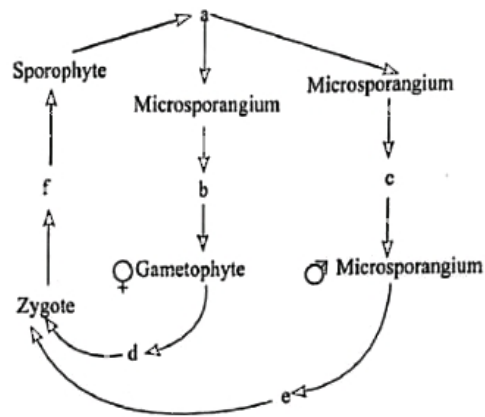
Mango

Potato

Banana

- (iii) What is alternation of generations in plants?

(iv) An outline of the life cycle of *Selaginella* is given below



Name a-f

a ..... b .....  
c ..... d .....  
e ..... f .....

(v) In the above life cycle, during the formation of which structures/ parts does meiosis occur?

4. (A) (i) State three main types of skeletons found among animals and as an example for each of these, name a phylum which includes the animals having only that particular skeleton type.

Skeleton type

Phylum

a .....  
b .....  
c .....

- (ii) Name the three main types of cells found in bone tissue of man, and state the function of each of these types.

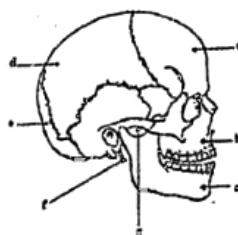
Type of cell

Function

a .....  
c .....  
e .....

- (iii) State the functions carried out by the skeletal system of man.

(B) Questions of this section are based on the diagram of the human skull given below:



- (i) Name the bones labelled a-e,  
 a ..... b .....  
 c ..... d ..... e .....

- (ii) What are the functions of the bone labelled as e?  
 .....  
 .....  
 .....

- (iii) Name f and g and state their function  
 f. ....  
 g. ....  
 function: .....

- (iv) (a) of the bones labelled a -e , Name two bones that contain sinuses?  
 .....  
 .....  
 (b) What are the functions of these sinuses?  
 .....  
 .....  
 .....

- (C) (i) What are the types of movements seen in plants? Give one example for each.
- | Type of movement | Example |
|------------------|---------|
| .....            | .....   |
| .....            | .....   |
| .....            | .....   |

- (ii) (a) Auxin was the first plant growth substance discovered. What is its chemical name?  
 .....  
 (b) Name the parts of the plants where auxins are synthesized.  
 .....

- (iii) What are the major effects of auxins on plants?  
 .....  
 .....

- (iv) What are the commercial applications of auxins?  
 .....  
 .....  
 .....

- (v) What are the other growth regulators produced in plants?  
 .....  
 .....  
 .....

### Part B - Essay

5.
  - a) What are mutations?
  - b) Explain the types of mutations and their causative factors.
  - (c) What is the significance of mutations in evolution?
  - (d) Briefly discuss human genetic disorders caused by mutations.
  
6.
  - (a) Giving suitable examples, state the four physiological groups of microorganisms recognized on the basis of their relation to molecular oxygen.
  - (b) Describe, with underlying principles, the methods used to control microorganisms in the preparation of glassware and culture media in a microbiological laboratory.
  
7.
  - (a) Describe the different pathways of movement of water from soil solution into xylem of a plant root with reference to the basic principles underlying the movement of water across plant cells.
  - (b) Describe how the solute potential of cells of a *Rhoeo* leaf is determined in the laboratory.
  
8.
  - (a) Explain what is meant by nutrition.
  - (b) Giving suitable examples describe the different modes of nutrition found among organisms.
  
9.
  - (a) Describe the structure of the cerebrum, of man.
  - (b) Briefly explain the functions of the cerebrum of man.
  
10. Write short notes on the following.
  - (a)  $C_4$  pathway of photosynthesis and its significance in plants.
  - (b) Major nitrogenous excretory products of animals
  - (c) Scientific method.