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MORA E-TAMILS 2021 | Tamil Students, Faculty of Engineering, University of Moratuwa | மொறட்டுவைப் பல்கலைக்கழக பொறியியற் பீட தமிழ் மாணவர்கள்
நடாத்தும் க.பொ.த உயர்தர மாணவர்களுக்கான 10வது
முன்னோடிப் பரீட்சை 2019

கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர) முன்னோடிப் பரீட்சை - 2019
General Certificate of Education (Adv.Level) Pilot Examination - 2019

உயிரியல் I Biology I	09 E I	*இரண்டு மணித்தியாலம்* *Two hours*

Instructions:

- ❖ Answer all the questions.
- ❖ Write your index number in the space provided in the answer sheet.
- ❖ In each of the questions **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)** in accordance with the instructions given on the back of the answer sheet.

1. Which of the following structural compound contains N along with C,H and O?
   1) Cellulose 2) Chitin 3) Glycogen
   4) Ovalbumin 5) Hemicellulose

2. In which of the following produce highest amount of CO_2 in cellular respiration?
   1) Cytosol
   2) Mesosome
   3) Cristae of mitochondria
   4) Matrix of mitochondria
   5) Inter membrane space of mitochondria.

3. A feature which is **not** common to both prokaryotic and eukaryotic cell,
   1) Plasma membrane
   2) 70s ribosome
   3) Circular DNA
   4) Vacuole
   5) Cell wall

4. Which of the following occurs in PS_{II} during light reactions of photosynthesis?
   1) NADPH is produced.
   2) Substrate phosphorylation.
   3) Photolysis of water.
   4) Catalyze of Rubisco.
   5) Cyclic flow of electrons.

5. Which of the following process can reduce the action of competitive inhibitors?
   1) Increase of concentration of substrate
   2) Increase of temperature
   3) Reducing the concentration of substrate
   4) Changing the pH level
   5) Increasing the concentration of enzymes.

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6. The person who introduced the taxon phylum in classification of organisms,
   1) introduced two Kingdom classification.
   2) introduced three Kingdom classification.
   3) introduced five Kingdom classification.
   4) introduced three Domain classification.
   5) introduced binomial nomenclature.

7. The special characteristics of plants (named as A, B, C and D) are given below.
   A - Dioecious gametophyte
   B - Rhizome
   C - Pollination
   D – Prianth in flowers

   The correct order of A, B, C and D is

   1) *Selaginella, Nephrolepis,* Coconut, *Cycas*
   2) Paddy, *Alocasia, Pinus*, Grass
   3) *Pogonatum, Nephrolepis, Cycas,* Coconut
   4) *Nephrolepis, Selaginella, Cycas, Rosa*
   5) *Pogonatum,Nephrolepis, Selaginella,* Paddy

8. Which of the following feature is found in the animal phylum which contains tentacles, radial symmetry and mostly marine habitat?
   1) Radula
   2) Gastro vascular cavity
   3) Antenna
   4) Pseudocoelom
   5) Mesoderm

9. The **incorrectly** paired chordate class-feature is
   1) Chondrichthyes- gills without operculum.
   2) Mammalia- diaphragm.
   3) Osteichthyes- placoid scales.
   4) Amphibia- skin without scales.
   5) Reptilia- egg shell made of calcium carbonate.

10. Human liver
    1) Contains hexagonal shaped hepatocytes as functional unit.
    2) Stores and releases bile.
    3) Regulated by hormones such as insulin and glucagon.
    4) Does not store water soluble vitamins.
    5) Does not involve in homeostasis.

11. Which of the following statements is **incorrect** regarding the regulation of normal respiration in human?
    1) The reduction of pH in arterial blood stimulate the chemo receptors in aortic body.
    2) Inspiration is inhibited due to the stimulation of stretch receptors in lungs.
    3) It is regulated by respiratory centers located medulla oblongata and Pons Varolii
    4) When expiratory center is stimulated, diaphragm relaxes.
    5) Impulse is sent to diaphragm due to the stimulation of inspiratory center in medulla oblongata.

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12. The transportation of water and minerals in plants.
    1) Occurs passively in radial direction in plant roots
    2) Occurs passively in xylem vessel element and tracheids
    3) Occurs passively in symplast pathway
    4) Occurs passively across endodermis
    5) Always occurs actively in apoplastic pathway

13. Cells named P and Q are found in stem of a dicot plant. The following features are given below.
    Cell P - Thin primary cell wall, narrow cytosol, does not contain cytoskeleton, living
    Cell Q - dense cytoplasm, contains plasmodesmata among adjacent cells, non-conductive cells, living
    Cells P and Q are respectively,
    1) Vessel element, tracheids
    2) Sieve tube element, tracheids
    3) Companion cells, transfer cells
    4) Tracheids, transfer cells
    5) Sieve tube element, Companion cells

14.
    a) Prawn b) Millipede c) Centipede
    d) Spider e) Octopus

    From the above animals open circulatory system and blood pigments found in
    1) b, c and d. 2) a and b. 3) a and d.
    4) e only. 5) a, d and e

15. Which of the following is correct regarding human blood pressure?
    1) Adrenal gland disorders cause hypertension.
    2) Systolic pressure arises due to the blood pumped through arteries due to the contraction of right ventricle.
    3) Increase of high density lipoprotein in humans may cause hypertension
    4) Malnutrition or fasting may cause hypertension.
    5) Blood pressure inside articles is 80mmHg.

16. Which of the following structure **does not** involve in the maintenance of human balance?
    1) Cerebellum. 2) Otolith. 3) Vestibular nerve.
    4) Cochlear canal. 5) Endo - lymph.

17. Which of the following are found in human lymph?
    1) Red blood cells and neutrophils.
    2) Damaged cells and chyle.
    3) Red blood cells and damaged cells.
    4) Plasma proteins and red blood cells.
    5) Lymphocytes and red blood cells.

18. Human hypothalamus
    1) is located right above the medulla oblongata.
    2) controls rate and depth of respiration.
    3) regulates water balance and thirst.
    4) coordinates visual and auditory reflexes.
    5) regulation of respiration along with medulla oblongata.

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19. Which of the following can be re-absorbed in the proximal and distal convoluted tubules in human kidney?
    1) Na^+ and K^+
    2) Na^+ and NH_3
    3) Cl^- and K^+
    4) Urea and water
    5) Na^+ and HCO_3^-

20. Which of the following statements is correct regarding action potential occurring in single cell of unmyelinated axon?
    1) Refractory period inhibits the generation of second action potential immediately after generation of first action potential
    2) Na^+/K^+ pump is essential for finishing of action potential
    3) The duration is 2ms
    4) After action potential, the outside axolemma is positive and inside is negative
    5) Eddy current is produced in area directly in front of the region where action potential occurs

21. Which of the following hormones is secreted by more than one organ?
    1) Erythropoietin 2) Parathormone 3) Adrenaline
    4) Insulin 5) Progesterone

22. Which of the bone **does not** make suture with temporal bone?
    1) Frontal bone 2) Parietal bone 3) Occipital bone
    4) Mandible 5) Zygomatic bone

23. Which of the following statements is correct regarding hydrostatic-skeleton?
    1) All animals which contain coelom have hydro skeleton.
    2) In nematods, pseudo coelom involves in formation of hydro skeleton
    3) Some molluscs have hydro skeleton.
    4) Animals with hydro skeleton can move fast.
    5) Hydro skeleton involves in osmotic balance.

24. Site where inhibin is secreted in human,
    1) only in testis
    2) only in epididymis
    3) only in seminal vesicles
    4) in testis and ovary
    5) in hypothalamus and anterior pituitary gland

25. Which of the following statements is correct regarding human fertilization?
    1) Before it occurs, ovule completes meiosis I and at prophase II state
    2) It occurs in lower $^1/_3$ of the fallopian tube
    3) It always occurs within 48-72 hours after ejaculation of sperm with in female reproductive tract
    4) After fertilization, ovum completes meiosis II.
    5) Fusion of pronuclei and of sperm and ovum is called as fertilization

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26. Which of the following is **not** related with regulation of human glucose level?
    1) Skeletal muscle
    2) Enterocytes
    3) Adrenal gland
    4) Nephron
    5) α cells of islets of Langerhans

27. Which of the following statements is correct regarding ovulation in females?
    1) It is the release of primary oozyte from matured follicles.
    2) Usually it happens during 12-13 days of menstrual cycle.
    3) LH stimulates ovulation.
    4) Ovulation occurs due to the stimulation of LH by progesterone.
    5) It immediately starts after parturition.

28. Female gametophyte of flowering plants is
    1) Pollen sac 2) Embryo sac 3) Nucellus
    4) Ovule 5) Gynoecium

29. Which of the following features related to life cycle of gymnosperms and angiosperms can be used to distinguish them from other vascular plants?
    1) Heteromorphic alternation of generation.
    2) Dominant sporophyte.
    3) Dependent gametophyte.
    4) Dispersal of spores by wind.
    5) Zygote develops into embryo.

30. In pea plants purple flowers (P) dominant to white flowers (p). Round shaped seeds (R) are dominant to wrinkled seeds (r). Following progeny was obtained from the cross between plants with purple flowers and round seeds and plants with white flowers and winkled seeds.

    Plants with purple flowers and round seeds - 170
    Plants with white flowers and round seeds - 176

    Genotypes of the plants participated in the above cross.
    1) PpRr x pprr 2) Pprr x pprr 3) PpRr x pprr
    4) PpRR x pprr 5) PPRR x pprr

31. Which of the following is not directly needed for the replication of DNA?
    1) DNA polymerase
    2) DNA templates
    3) RNA polymerase
    4) Helicase
    5) Ligase

32. **Incorrect** statement regarding the genetically modified organisms,
    1) The crops of soya which are resistant to glycophosphate weedicide are known as roundup ready crops
    2) Golden rice contains provitamin- A in more percentage
    3) Papaya species which are resistant to ringspot virus are genetically modified species
    4) Bt toxins are harmless to human
    5) Bt crops do not cause danger to non-target insects

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33. Correct statement about the protein synthesis
    1) DNA polymerase catalyzes the transcription process
    2) RNA polymerase catalyzes the translation process
    3) Every codon stands for more than one amino acid
    4) More than one codon stands for one amino acid
    5) Protein synthesis is stopped by Introns

34. The direct biological effect caused by usage of coal with higher sulphur content.
    1) Corrosion of marble buildings
    2) Changes of pH in marshy lands.
    3) Loss of soil fertility
    4) Destruction of forest
    5) Destruct the fresh water ecosystem

35. The organism which will be very quickly get extinct from earth according to IUCN red data book.
    1) May be an omnivorous organism.
    2) May be extinct in the wild.
    3) May be an endemic species.
    4) May be an indigenous species.
    5) May be an exotic species.

36. **Incorrect** combination regarding conventions and protocols?
    1) Montreal- Ozone layer protection
    2) Kyoto- Greenhouse gas control
    3) Basel- Management of trans boundary movement of hazardous toxic waste
    4) Ramsar - prevention of pollution by ships
    5) CITES - prevention of international trade on fauna and flora which are endangered

37. **Incorrect** statement regarding the bacteria which produce endotoxin.
    1) These contain the cell wall made up of lipo- polysaccharides.
    2) They make heat stable proteins.
    3) These show same signs of symptoms for diseases.
    4) *Salmonella typhi* is an endotoxin producing bacteria.
    5) Toxins are released when the bacteria die and cell wall breaks apart.

38. The method of injecting readymade serum against tetanus is
    1) Naturally acquired active immunity
    2) Naturally acquired passive immunity
    3) Artificially acquired active immunity
    4) Artificially acquired passive immunity
    5) Adaptive immunity

39. Microorganism **do not** belong to the species which cause disease in the digestive tract?
    1) Hepatitis- A- virus
    2) *Staphylococcus aureus*
    3) *Vibrio cholerae*
    4) *Salmonella typhi*
    5) Rubella virus

40. The substance/instrument that can be used in hot-air sterilization?
    1) Agar culture medium.
    2) Serum.
    3) Milk
    4) Petri dishes.
    5) Vitamins.

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❖ **Follow the instructions given below for the questions 41-50.**

A, B, D correct	A, C, D correct	A, B correct	C, D correct	Any other options
1st answer	2nd answer	3rd answer	4th answer	5th answer

41. The compounds which contain N and P along with C, H, O is/are?
    A) Phospholipid B) RNA C) NAD
    D) FAD E) DNA

42. Organelle/organelles involves/ involve with the oxidation reaction is/are,
    A) Peroxisome B) Glyoxysome C) Ribosome
    D) Mitochondria E) Central vacuole

43. The feature/features or structure/structures found in all Annelids,
    A) Coelom, segmentation, ventral nerve code
    B) Hydrostatic skeleton, cephalization, ganglion
    C) Parapodia, coelom, circumentaric connective
    D) Clitellum, seta, suckers.
    E) Suckers, coelom, cephalization.

44. Vitamin/vitamins which **cannot** be synthesized by the human body?
    A) Biotin B) Vitamin K C) Vitamin E
    D) Vitamin C E) Vitamin D

45. Which of the following structure/s of human brain involve/s in the movements related with skeletal muscles?
    A) Cerebellum B) Cerebrum
    C) Medulla oblongata D) Hypothalamus
    E) Corpus callosum

46. Correct statement/statements regarding human hormone - cortisol?
    A) It is secreted by adrenal cortex.
    B) It reduces the blood glucose level.
    C) It decreases the breakdown of protein
    D) CRH, ACTH both can regulate its secretion
    E) It helps to tolerate stress.

47. Special feature/features of tropical rain forest is/are?
    A) Annual rainfall between 2000 - 4000 mm
    B) Temperature range of 25°C - 29°C
    C) Contain a continuous layer of high emergent trees
    D) These forests found only in the region around equator of earth
    E) High bio-diversity of organisms are found.

48. Greenhouse gases is/are?
    A) Water vapour B) CO_2 C) NH_3
    D) N_2O E) Stratosphere Ozone

[See page eight

49. The techniques used in urban water treatment plant is/are?
    A) Sand filtration
    B) Trickling filter method
    C) Disinfection using Chlorine/Ozone
    D) Sedimentation
    E) Active sludge

50. The microorganism/s that can infect through the wounds on skin?
    A) *Clostridium tetani*
    B) *Leptospira interogans*
    C) Hepatitis-A-virus.
    D) *Salmonella typhi*
    E) *Plasmodium*

* * *

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உயிரியல் II Biology II	09 E II	மூன்று மணித்தியாலம் *Three hours*

Index No. :…..……...

- This question paper consists of 12 pages.
- This paper comprises of two parts **A and B.** The time allotted for the **two parts** is **three hours only**.

❑ **Part A – Structured Essay (Pages 2 - 9)**

- Answer all the questions on the question paper itself.
- Write your answers in the space provided for each question.
- Please note that the space provided is sufficient for the answer and that extensive answers are not expected.

❑ **Part B – Essay (Page 11)**

- Answer **four** questions only. Use the answer sheets provided for this purpose.
- At the end of the time allotted for this paper, tie the two papers together so that Part **A** is on top and hand them over to the Supervisor.
- You are permitted to remove only Part **B** of the question paper from the Examination Hall.

For Examiner's Use Only

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

Final Marks

In Numbers	
In Letters	

Code Numbers

Marking Examiner 1	
Marking Examiner 2	
Checked by :	
Supervised by :	

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Part A – Structured Essay

Answer **all four** questions on this paper itself.
(Eachquestioncarries**10** marks)

Do not write anything here.

1. (A) (i) Give a suitable chemical compound for the followings.

a) The compound consist of many polypeptides of sulphur bridges and Ionic bonds.

……...

b) Single stranded compound having phospho-disaster band.

…….....

c) The food storage compound in animals having 1-4, 1-6 glycosidic bonds.

……...…….....

(ii) a) Name a carbohydrate which involves translocation in plants.

……...

b) Name the components of the carbohydrate given by you in question ii) a) and state a special feature of it.

……...……

(iii) State two features found only in Eukaryotic cells.

……...……

……...……....

(iv) Write the importance of mitosis

……...……

……...……

……...……

……...……

(v) State the organelle which is found in higher amount in the following cells.

a) Neutrophils ……...

b) Thyroid gland cells ……

c) Companion cell in phloem tissue ..……..

(B) (i) The following are the some structure of invertebrates.

a) Endoskeleton
b) Radula
c) Tentacles
d) Antenna
e) Suckers
f) Compound eye

Which of the following structure are found in the following animals.

[See page three

Do not write anything here.

1. Prawn ……
2. Garden snail……
3. Cuttlefish ……
4. Star Fish……

(ii) State the vertebrate classes that have internal fertilization and homoeothermic.

……

……

……

……

(iii) Give 2 vertebrate classes that have external fertilization and their excretory product is urea?

……

(C) (i) What are the major parts of human stomach?

……

……

(ii) State the hormone which inhibits the functions of stomach.

……

(iii) What is peristalsis?

……

……

(iv) What are the benefits of intake of high amount of fibres in the diet?

……

……

(v) Mention the places where the enzymes responsible for the protein digestion are secreted and indicate their respective enzyme/enzymes.

……

……

……

2. (A) (i) What is the main function of ventilation in human?

……

(ii) What is the average respiratory rate of a healthy adult human at rest?

……

(iii) What is meant by respiratory pigment?

……

……

(iv) Mention the importance of respiratory pigments in complex organisms.

……

[See page four

Do not write anything here.

(v)

a) Name the two parts in human respiratory tract where secretion of mucus occurs?

……

b) State two functions of mucus which is secreted on respiratory tract.

……

……

(vi) Name the cells which form alveoli?

……

(vii)

a) What do you mean by tidal volume?

……

b) What is the importance of functional residual volume?

……

……

(B) (i) Mention the type of circulatory system found in each animals given below.

a) Earthworm ……

b) Star fish ……

c) Crocodile ……

(ii) Name the tissue layer which forms the wall of heart.

……

……

……

……

(iii) a) Name the components which make conduction system of human heart.

……

……

b) Mention the components of nervous system and hormones which affects on the rate of heart beat in human.

……

……

(iv) Events which are taking place during a cardiac cycle given below: if that particular event is correct write as "correct" and if it is wrong write as "wrong" in the given brackets.

a) During Cardiac systole the aortic pressure is less than that of ventricular pressure (……)

b) When the heart is in a complete cardiac diastole, small amount of blood enters into ventricle (……)

c) Time duration of our cardiac systole is 0.01 seconds.(……)

[See page five

Do not write anything here.

(C) (i) Write the excretory structure/structures of the given animals.

a) Leech……

b) Seaturtle .....……

c) Human…….....……

(ii)

a) What is glomerulus?

……

……

b) What is ultrafiltration taking place in nephron?

……

c) What is the modification in glomerulus for the process ultrafiltration described in part (b) above.

……....

(iii) State the places in human nephron where the reabsorption of water occurs without the influence of hormones.

……....

(iv) State the location in human nephron where Na^+ ions are passively reabsorbed?

……

3. (A) (i) What is the meant by synapse?

……..……

…….....

(ii) How neurotransmitters differ from hormones?

……..……

……..……

(iii) What should happen to stop signals when a nerve impulse is transmitted through synapse and reach post synaptic membrane?

……..……..

……..…….....

(iv) a) What is the functional unit of nervous system of vertibrates?

……

b) What are the components of the functional unit that you have mentioned in (iv)(a).

……

…….....

(v) Name the chemoreceptors found in human body?

……

……

[See page six

Do not write anything here.

(vi) Name the cells found in the three layers of human retina.

Outer layer ….……....

Middle layer ..……...

Inner layer ……

(B) (i) a) Define the internal and external fertilization.

Internal fertilization

……..……

……..……

External fertilization

……

……..……

b) Give the invertebrate phyla which show only internal fertilization?

……

(ii) a) What are the hormones related to ovulation in human females?

……

……....

b) What are the functions of progesterone hormone in non-pregnant women?

……

……

(iii) In human female fertilization is followed by implantation. What do you understand by implantation?

……

……

(iv) Name one hormone produced by embryo and give function of this hormone?

…….....……

(C)

(i)

a) Give two animal phyla which have hydrostatic skeleton?

…….....……...……

b) Give two disadvantages by the existence of hydrostatic skeleton in the above mentioned animal phyla?

……...

(ii) State the relevant bones to the following description.

a) Presence of largest spinal canal .....……...……..

b) Presence of four neural foramen .....…….....

[See page seven

Do not write anything here.

c) Single cranial bone which lacks air sinuses ……

(iii) Mention two secondary curvatures found in human vertebral column and give the duration they are formed?

……

……

(iv) Name the deficiency syndrome occurs in skeletal system related to menopause.

……

(v) What is the meant by genetic code?

……

……

(vi) Mention the involvement of RNAs in protein synthesis in correct order?

……

……

(vii)

a) What is the meant by DNA fingerprinting?

……

……

b) State two importance of DNA fingerprinting?

……

……

4.

(A)

(i) What is mutation?

……

……

(ii) Mention two gene mutations in sex chromosomes?

……

(iii)

a) A plant with genotype AaBbCcdd was involved to the test cross. What is the probability of obtaining a plant with completely recessive genotype among the off springs?

……

……

b) How many different phenotypes are possible among the off springs when the above plant is involved to the self pollination?

……

[See page eight

Do not write anything here.

……

(iv) State the natural contributions of following enzymes involved in DNA replication

a) DNA helicase

……

b) DNA polymerase

……

c) Ligase

……

(B)

(i) a)What is the meant by biomes?

……

……

b) Mention the biome which covers 20% of total land surface?

……

(ii)

a) What is the international convention corresponding to the conservation of wetlands?

……

b) Mention two places in Sri Lanka which are conserved under the above convention?

……

……

(iii) What is the IUCN red data book?

……

……

(iv) What is meant by bio diversity hotspots?

……

……

(v) Mention one example, for each of following species in Sri Lanka.

a) Flagship Species……

b) Relict Species ……

c) Invasive Species……

(C)

(i) What is meant by sterilization?

……

……

(ii) Give one method for sterilization of given substances.

a) Potato dextrose agar ……

b) Petri dishes ……

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c) Enzymes .....

(iii) State the enzymes involving in the following microbial processes.

a) Production of lactic acid.....

b) Extraction of metals from low-grade metal ores

.....

c) Bakery products.....

(iv) Micro-organisms can produce various toxins. mention the two types of toxins and the major organic substances which they are made of.

.....

.....

(v) State the antibiotic which inhibits the synthesis of bacterial cell membrane.

.....

Do not write anything here.

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உயிரியல்	II
Biology	II

09 E II

Part B - Essay

Instructions:

- ❖ Answer **four** questions only.
- ❖ Give clear labelled diagrams when necessary.

(Each question carries **15** marks)

5. a) Describe the Eukaryotic cell cycle.
   b) Briefly describe the importance of meiosis.

6. a) What is plant growth hormone?
   b) State the plant growth substances and explain their functions.

7. Describe how human body temperature is maintained homeostatically. Your answer should contain the contribution of nervous system and blood circulatory and muscular system.

8. a) What is "Recombinant DNA technology"?
   b) Explain how human insulin is produced using Recombinant DNA technology?

9. Explain how we can protect environment from pollution by industrial waste water and waste water treatments.

10. Write short notes on the followings
    a) Fermentation
    b) Human Placenta
    c) Conservation of bio diversity

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