Candidate's Name:……

Signature: …… Date ……

UACE Pre -mock Examination - 2019
BIOLOGY (THEORY)
Paper 1
2hours 30minutes

INSTRUCTIONS TO CANDIDATES:

*Answer all questions in both sections **A** and **B.***
SECTION A
Write answers to this section in the boxes provided.
SECTION B
Write answers to this section in the spaces provided.
No additional sheets of paper should be inserted in this booklet.

FOR EXAMINERS' USE ONLY		
Section	**Marks**	**Examiner's Signature**
A: 1-40		
B: 41		
42		
43		
44		
45		
46		
Total		

SECTION A (40 MARKS)

1. The flow of the respiratory medium over the respiratory surface during ventilation is unidirectional in the
   A. Mammals B. frogs C. birds D. insects

2. Which one of the following chromosome mutations in plants can induce increase in fruit size?
   A. translocation B. inversion
   C. deletion D. duplication

3. The greater the variation among members of a population, the greater is its potential to:
   A. grow fast. B. increase gene flow.
   C. produce more offspring. D. adapt to changes in the environment
   .

4. Plant species M has a diploid number of 12. Plant species N has a diploid number of 16. A new species P arises as an allopolyploid of hybridization of M and N. The diploid number of P would be
   A. 12 B. 28 C. 56 D. 16

5. Possession of a post anal tail in a Nile perch confirms that it belongs to
   A. Class Osteichthyes B. Phylum Chordata
   C. Subphylum Vertebrata D. Superclass Gnathostomata

6. Which one of the following describes the body structure of a flat worm?
   A. triploblastic, coelomate, radially symmetrical
   B. triploblastic, acoelomate, bilaterally symmetrical
   C. diplobastic, acoelomate, radially symmetrical
   D. diploblastic, coelomate, radially symmetrical

7. Which one of the of the following is not a neural-transmitter substance?
   A. Atrophine. B. Noradrenaline.
   C. Cholinesterase. D. Acetylcholine.

8. Which one of the following is true about the sympathetic nervous system?
   A. Nerve endings produce nor-adrenaline
   B. Nerve endings produce acetylcholine
   C. Preganglionic fibers are longer than the postganglionic fibres
   D. Ganglia are embedded in the walls of the effectors organs

9. Which one of the following is an adaptation of a kidney in a fresh water fish?
   A. Large glomeruli B. Long loop of Henle.
   C. Well developed collecting duct. D. Few glomeruli

10. The first stable product of carbon dioxide fixation in a C4 plant is:
    A. Oxaloacetate B. phosphoglyceric acid
    C. phsphoenol pyruvate D. ribulose biphosphate

11. An adaptation of plants to obtain nitrogen includes all the following except:
    A. mycorrhiza on roots. B. bacteria in root nodules.
    C. possession of aerial roots. D. being insectivorous.

12. Which one of the following changes occur during the dark stage of photosynthesis?
    A. $ADP + P \longrightarrow ATP$
    B. $H_2O \longrightarrow 2H^+ + O_2 + 2e^-$
    C. $NADPH_2 \longrightarrow NADP + 2H$
    D. $6H_2O + 6CO_2 \longrightarrow C_6H_{12}O_6 + 6O_2$

13. Which one of the following type of cells in the gastric pit of the stomach wall produces hydrochloric acid?
    A. Chief cells. C. Oxyntic cells
    B. Neck cells D. Endocrine cells.

14. Contraction of the gall bladder to release bile juice into the duodenum is triggered by:
    A. nervous stimulation C. presence of secretin
    B. presence of cholecystokinin D. the acidic in the stomach

15. The layer of the stomach wall where the gastric glands are situated is the
    A. mucosa B. submucosa
    C. serosa D. Muscularis mucosa

16. Which of the following types of epithelia experiences the highest rate of wearing?
    A. Stratified B. Columnar C. Glandular D. Ciliated

17. Which one of the following sets consist of cells that continue to play their roles in a plant when they are dead?
    A. Collenchyma and xylem B. Sclerenchyma and xylem
    C. Xylem and Parenchyma D. Parenchyma and Collenchyma

18. Examples of fibrous proteins include the following except
    A. Keratin B. Elastin C. Globulin D. Collagen

19. The final electron acceptor in the electron transport pathway that function in the oxidative phosphorylation is
    A. oxygen B. water C. NAD^+ D. ADP

20. In an experiment to determine the population of a species of animals using the capture-recapture method the following results were obtained:
    Number of animals marked and released = 210;
    Number captured in the second collection = 240;
    Number recaptured = 24.
    What is the estimated total population of the animals?
    A. 474 B. 1890 C. 2100 D. 1860

21. In a eukaryotic cell, most of the enzymes of the Krebs cycle are located in the
A. plasma membrane B. inner mitochondrial membrane
C. mitochondrial matrix D. inter membrane space.

22. Which of the following is true about an osmoconformer?
A. It loses much energy in osmoregulation
B. It maintains constant internal osmotic environment
C. Its body fluids are in osmotic balance with its environment.
D. It can live in a wide range of habitats with varied osmotic environments.

23. Which one of the following changes occurs during electrons flow along the electron transport chain of the mitochondrion?
A. NAD^+ is oxidized
B. the electron gains free energy
C. The cytochromes phosphorylate ADP to ATP
D. The pH of the matrix increases

24. Which one of the following physiological roles of phytochromeP_r and phytochrome$P_{fr}$is **NOT** correctly matched?

	Physiological process	**P_r**	**P_{fr}**
A	Flowering in long-day plants	Inhibits	Promotes
B	Flowering in short-day plants	Promotes	inhibits
C	Leaf expansion	Promoted	inhibited
D	Elongation of internodes (etiolation)	promoted	inhibited

25. A person's blood group is type **AB** if his/ her:
A. red blood cells carry both antigens **A** and **B**
B. blood plasma contains both antigens **A** and **B**
C. red blood cells carry neither antibody **a** nor **b**
D. blood plasma contains neither antibody **a** nor **b**

26. The unwinding of DNA double helix during transcription process requires the enzyme called:
A. DNA ligase B. DNA polymerase
C. RNA polymerase D. Helicase

27. Which one of the following processes would continue to take place in a living plant cell when the Golgi apparatus has been destroyed?
A. Formation of polypeptides
B. Autolysis of redundant organelles.
C. Formation of primary cell wall.
D. Production of extra cellular enzymes.

28. In HIV virus, the role of enzyme, 'reverse transcriptase', is to:
A. make DNA from RNA
B. unite viral DNA with host's DNA
C. release viral RNA to make proteins
D. transfer DNA from the host into the virus.

29. In mosses, gametes are produced by the
A. gametophytes through mitosis. B. sporophytes through meiosis
C. sporophytes through mitosis D. gametophytes through meiosis

30. Active uptake of potassium ions by the guard cells during stomata opening is triggered by
A. activation of ATPase in light
B. out flux of hydrogen ions from the cells
C. Influx of chloride ions into the cells
D. net conversion of starch into malate

31. Which one of the following will builds highest take off propulsive force during locomotion in a human?
A. Increasing the angle of contact between the leg and the ground.
B. Reducing the angle of contact between the leg and the ground.
C. Rising the centre of gravity of the body off the ground
D. Reducing the angle of contact between the foot and the ground.

32. The following are hydrolytic enzymes in the small intestine of human alimentary canal **EXCEPT**.
A. lipase B. entrokinase C.amylaseD. trypsin

33. Which of these make carbon dioxide have the greatest influence on global warming compared to other greenhouse gases? It
A. retains more heat
B. has acidic properties
C. stays longer in the atmosphere
D. has a higher concentration in the atmosphere

34. During excretion in insects, the following enter the Malpighian tubules passively
A. salts and water B. Uric acid and water
C. carbon dioxide and water D. potassium and sodium ions

35. The products of the first meiotic division are two
A. identical cells each with a diploid chromosome number
B. identical cells each with a haploid chromosome number.
C. non-identical cells each with a haploid chromosome number
D. non-identical cells each with a diploid chromosome number.

36. When a plant cell is at incipient plasmolysis, its
A. pressure potential is zero.
B. pressure potential is negative.
C. water potential is zero
D. osmotic potential equals to its pressure potential.

37. Given that two genes are linked and no crossing over occurs between them. What would be the phenotypic ratio of the offspring if a homozygous recessive individual was crossed with the one who is heterozygous for both genes?
A. 1:3 B.1:1:1:1 C. 9:3:3:1 D. 1:1

38. A genetic analysis of a population of mice revealed that 60% of its gametes carry the **M** allele. What percentage of mice had the genotype **Mm**, given that the population is at Hardy Weinberg equilibrium?
A. 36 B. 40 C. 48 D. 60

39. Photosynthetic bacteria differ from green plants in that
A. they lack photosynthetic pigments.
B. their source of carbon is from compounds other than carbon dioxide.
C. they obtain energy through oxidation of inorganic compounds.
D. their source of hydrogen is from compounds other than water.

40. $\text{Ethanal} + NADH_2 \xrightarrow{\text{ENZYME X}} \text{Ethanol} + NAD^+$ In the chemical reaction above, the enzyme X can be classified as,
A. a hydrolase B. a transferase
C. an oxidoreductase D. an isomerase

SECTION B (60 marks)

41. (a) Describe the structural adaptations that maximize the rate of diffusion between the alveolus and blood within the lungs. (3marks)

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(b) Explain the possible effect of decreasing environment temperature on the rate of gaseous exchange in:
(i) a well-illuminated foliage leaf. (2marks)

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(ii) a small mammal (2marks)

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(c) Explain the possible effect of a decrease in light intensity on the rate of gaseous exchange in a previously well-illuminated foliage leaf.
(4marks)

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45. The diagram below shows the metabolic pathway in which substrate A is eventually converted into the end product D, with under the influence of the enzymes labeled x, y and z.

A*enzyme x***B***enzyme y***C** *Enzyme z***D**

(a) Explain what would happen to the rate of production of the end product, D if:

(i) the concentration of substrate A was reduced. (2marks)

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(ii) the concentration of *enzyme x* was increased but the concentration of other enzymes remained constant. (2 marks)

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(iii) the temperature was increased from 25^0C to 35^0C. (2 marks)

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(b) Explain how substance D can work as an end product inhibitor in this metabolic pathway. (2marks)

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(c) Explain how an enzyme may be denatured by heat. (2marks)

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43. (a) What is a sex-linked trait? (2marks)

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(b) (i) Why are sex-linked traits most common in males among humans?

(2marks)……

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(ii) Haemophilia is a condition caused by a recessive gene carried on the sex chromosome. Determine the phenotype of the children from a carrier mother and a normal father. (6marks)

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44 (a)The evolution of organisms from simple unicellular form into large multicellular formscame up with advantages and some challenges.

(i) Identify any two of thesechallenges of a multicellular organism.(2marks)

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(ii) Explain how each of the challenges you have listed in a(i) above have been solved in a large animal. (2marks)

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(b) An annelid, such as an earthworm is described as a **triploblasticcoelomate** with a **bilateral** body symmetry. Explain the meaning of the descriptive terms underlined.

(i) a triploblastic coelomate: (2marks)

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(ii) a bilateral body symmetry (1mark)

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(d) What is the importance of a coelom to the animal. (3marks)

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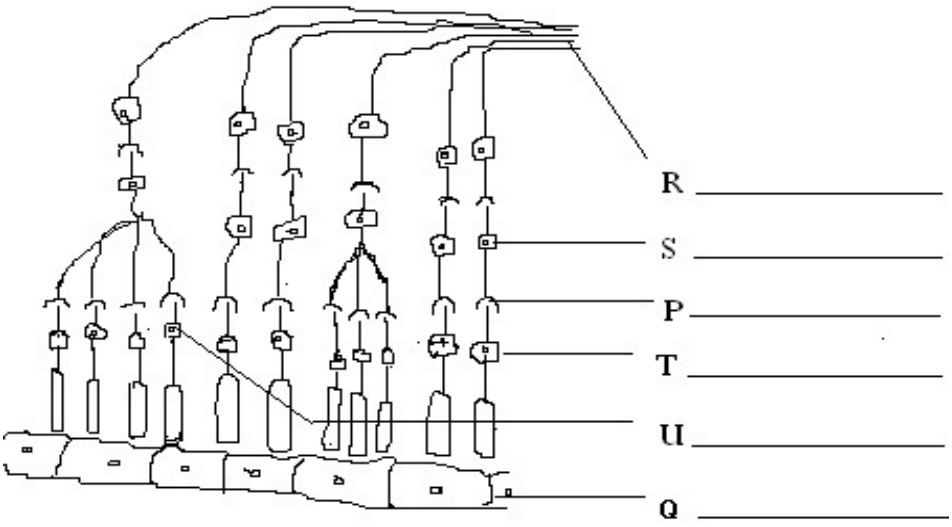
45. The figure below is a diagram of a section through the retina and choroids of a human eye.



(a). Name the structures labeled P, Q, R, S, T and U on the diagram. (3marks)

(b) (i) Indicate by means of an arrow the direction of light to the retina. (1mark)

(ii) Mark with a letter**X** on one of the cells, the part that contains the light sensitive pigment. (1mark)

(c). Briefly, outline the process which leads to building up of an impulse in the light sensitive cell. (3marks)

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(d) Using the information provided in the diagram, explain how a person is able to: (i) see in dim light. (2marks)

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(ii) see in bright light (2marks)

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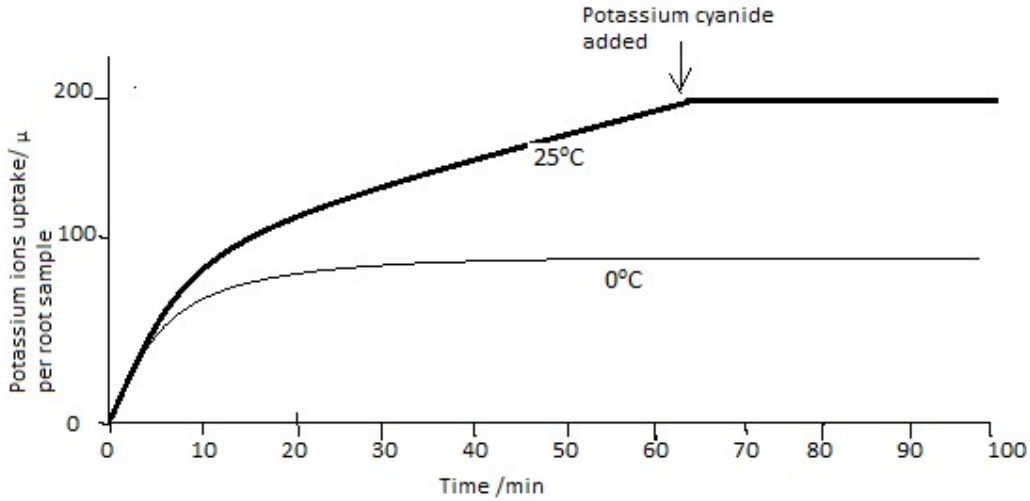
46. The figure below shows the uptake of potassium (K^+) ions by young cereal roots which had previously been washed thoroughly in pure water. After 65 minute a respiratory inhibitor, potassium cyanide was added to the solution.



(a) Compare the uptake of potassium ions at 0^0C and 25^0C. (3marks)

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(b) Explain the differences described in (a) above, and the effect of potassium cyanide. (3marks)

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(c) Describe the loading and unloading of mineral ions into and out of the xylem
(4marks)

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