NAME…………………………………………………………………………………………………….

CENTRE/INDEX…………………………………………….SIGN………………………………….

P530|1

**BIOLOGY (THEORY)**

**Paper 1**

July/August 2019

2½ hours.



WESTERN JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education

**BIOLOGY (THEORY)**

**Paper 1**

2 hours 30 minutes.

**INSTRUCTIONS TO CANDIDATES:**

* This paper consists of sections **A** and **B**.
* Answer **all** questions in both sections
* Answers to questions in section **A** should be written in the boxes provided.
* Answers to questions in section **B** should be written in the spaces provided.

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| --- | --- | --- | --- |
| **FOR EXAMINER’S USE ONLY** | | | |
| SECTION | | MARKS | EXAMINER’S INITIALS |
| A: 1 - 40 | |  |  |
| B: | 41 |  |  |
| 42 |  |  |
| 43 |  |  |
| 44 |  |  |
| 45 |  |  |
| 46 |  |  |
| **TOTAL** | |  |  |

**SECTION A**

1. The cell structure lacking elaborate internal structures is the:
2. Mitochondrion B. Centriole

C. Lysosome D. Endoplasmic reticulum

2. Movement of ions and larger polar molecules across the plasma membrane is repelled by:

A. Cholesterol B. Glycolipid

C. Phospholipido D. Channel protein

3. The most important factor determining how much oxygen is carried by haemoglobin is the:

A. level of oxygen in the blood C. temperature of the blood

B. level of carbondioxide in the blood D. level of ions in the blood

4. The synthesis and assembly of cell wall components is a function of the:

A. Golgi body B. microtubules

C. Ribosomes C. cell membrane

5. During carbondioxide transport the movement of chloride ions from the plasma into red blood cells is aimed at:

A. Restore its water potential

B. maintain the blood PH

C. Restore electro-neutrality of the cell

D. Maintain a larger diffusion gradient for ions

6. The diameter of the glomerular capillaries is much less than that of the arterioles in order to:

A. Eliminate glucose from the filtrate C. Eliminate proteins from urine

B. Raise the filtration pressure D. Slow down the process of filtration

7. The following are the effects of territorial behavior except:

A. Reduced reproductive fitness C. Reduced competition

B. Increased variation D. Increased in breeding

8. Which of the following groups of plants inhabit areas where water is scarce?

A. Halophytes B. Hydrophytes

C. Mesophytes D. Xerophytes

9. Which of the following is NOT a mechanism for bringing materials into a cell?

A. Endocytosis B. Phagocytosis

C. Pinocytosis D. Exocytosis

10. Which one of the following is not true of sieve tubes?

A. They lack nuclei

B. Their endwalls are perforated

C. They are metabolically inactive

D. They have their cytoplasm even at maturity

11. The hormone which enables plants to respond to drought is:

A. Gibberelins B. Abscisic acid

C. Auxins D. Cytokinin

12. Which one of the following processes does not affect the biochemical oxygen demand in an environment?

A. Nitrification B. Ammonification

C. Nitrogen fixation D. Denitrification

13. Photorespiration does not occur in plants because they:

A. Use phosphoenol pyruvic acid for fixing carbondioxide

B. Mainly grow at high altitudes

C. Are more abundant in cold regions

D. Have succulent leaves which lower the internal temperature.

14. Three counts of 103, 46 and 20 of a plant species were made using a quadrant of 25. The density of the plant per is;

A. 169 B. 56.3 C. 22520 D. 676

15. Which of the following types of epithelial cells is likely to be found in body surfaces where diffusion of materials takes place?

A. Transition B. Squamous

C. Colummar D. Cuboidal

16. Rapid conduction of a nerve impulse in vertebrates is attributed to:

A. The diameter of the axon

B. The nodes of ranvier in the myelin sheath.

C. The abundant synapses

D. The high permeability of neural membranes to ions.

17. The air that remains in the lungs after maximum expiration is known as the:

A. Residual air B. Dead air space

C. Vital capacity D. Expiratory reserve volume.

18. Which of the following terms refers to the site of crossing over during meiosis?

A. Synapsis B. Diakinesis

C. Chiasma D. Centromere

19. When the extent of inhibition in an enzyme controlled reaction depends entirely on the concentration of the inhibitor, it indicates that inhibition is:

A. Competitive B. Reversible

C. Irreversible D. Non-competitive

20. Contraction of the intercostal muscles results into:

A. Increased pressure in the chest cavity

B. Ribs moving inwards and downwards

C. Increased volume of the chest cavity

D. Flattering of the diaphragm

21. Which of the following tissues contributes most in strengthening the stem of a young plant?

A. Xylem B. Collenchyma

C. Schlerenchyma D. Phloem

22. Which of the following processes is involved in the absorption of mineral salts from the soil by a plant?

A. Diffusion B. Osmosis

C. Active transport D. Pinocytosis

23. The follicle cells surrounding the ova at the time of ovulation form the:

A. Corona radiata B. Vitelline membrane

C. Zona pellucida D. Fertilization membrane

24. Which of the following processes occur in the bundle sheath cells?

A. Fixation of carbondioxide by PEP C. Regeneration of PEP from pyruvate

B. Formation of pyruvate from malate D. Formation of malate from oxalate

25. Which one of the following cells is the most vulnerable to HIV?

A. T-Killer cells B. T-Suppressor cells

C. T-Helper cells D. Memory cells

26. After an action potential, repolarization of the membrane begins by:

A. Entry of sodium ions into the cell C. Entry of potassium ions into the cell

B. Sodium ions diffusing out of the cell D. Potassium ions diffusing out of the cell

27. Which of the following show divergent evolution?

A. Wings of a cockroach and a bat C. Fore limbs of a pigeon and a monkey

B. Skeletons of a mouse and a Cray fish D. Eyes of a locust and a kite

28. Which one of the following sets of characteristics is an adaptation in mammals to desert conditions?

A. Uric acid production and short loop of Henle.

B. Short loop of Henle and Urea production

C. Ammonia production and long loop of Henle

D. Long loop of Henle and Urea production

29. The basic structure of a nucleo tide is:

A. Phosphate-Ribose-inorganic base C. Phosphate-Purine-Pyrimidine

B. Ribose-Guanine-Uracil D. Phosphate-Ribose-Organic base

30. If the solute potential of the external solution is higher than that of the cell, the external solution is said to be:

A. Hypotonic to the cell solution

B. Hypertonic to the cell solution

C. Isotonic to the cell solution

D. of lower osmotic pressure than the cell solution

31. Gene mixing during meiosis occurs during

A. Zygotene B. Diplotene C. pachytene D. Leptotene

32. A rhesus positive foetus whose mother is rhesus negative may not be born alive because the:

A. Mother’s baby produces antigens against foetal antibodies

B. Foetus lacks antibodies against the mother’s antigens

C. Mother’s red blood cells mix with the foetal blood

D. Mother’s body produces antibodies against the foetal antigens

33. The graph below shows variation of oxygen concentration and ammonium ions () in a stream.

Ammonium ions

Oxygen

Point of sewage Distance

Discharge down stream

Which of these is the correct reason for the trend of oxygen concentration from the point of sewage discharge?

1. Oxygen escapes to the atmosphere
2. Aerobic bacteria use oxygen to oxidize ammonium ions to nitrates
3. Ammonium ions dissolve all the oxygen in the water
4. Aquatic plants cut off oxygen supply to the stream

34. In which of the following organisms is an open blood system found?

A. Cephalopod molluscs B. Echinoderms C. Annelids D. Arthropods

35. The process of metamorphosis in amphibians is initiated by the hormone:

A. Thyrotrophin releasing hormone C. Thyroxine

B. Thyroid stimulating hormone D. Ecdysone

36. The figure below shows the concentration of antibodies in the blood of a person over a period of time.

Concentration of antibodies

in blood(arbitrary units)

*Time(days*)

First Second

exposure exposure

The type of immunity shown is:

1. Natural active B. Natural passive

C. Artificial active D. Artificial passive

37. Blood groups in humans is an example of:

A. Incomplete dominance B. Co-dominance

C. Qualitative inheritance D. Pleotropy

38. Which type of natural selection does artificial selection resemble?

A. Progressive selection B. Kin selection

C. Disruptive selection D. Stabilizing selection

39. Bryophytes are more vulnerable to air pollution than pteridophytes because Bryophytes:

A. Lack a waxy leaf cuticle

B. Cannot tolerate higher concentrations of pollutants

C. Lack special cells for storing pollutants

D. Are mainly distributed in industrial centres

40. The main function of kupffer cells of the liver is to:

A. Eliminate sex hormones B. Form red blood cells

C. Eliminate haemoglobin C. Destroy old red blood cells

**SECTION B (60 MARKS)**

**Answer ALL the questions in the spaces provided.**

41.(a) What is meant by transpiration? (01 mark)

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(b) Explain how the following factors affect the rate of transpiration.

(i) Temperature (03 marks)

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(ii) Sunken stomata in leaves (03 marks)

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(c) What is the effect of water stress on plants? (03 marks)

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42. The figure below shows changes in lipid and sugar content of castor oil seeds during germination in the dark.

Total dry mass

40

Mass per 100 seedlings/*g*

30

Sugar

20

Lipid

10

0

0 2 4 6 8 10 12

*Time from sowing/days*

1. Describe the relationship between the sugar and lipid content of the seedlings.

(03 marks)

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1. Explain the relationship between the sugar and lipid content of the seedlings as described above. (04 marks)

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1. Explain the changes in the total dry mass of the seedlings. (03 marks)

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43. (a) Distinguish between a cofactor and coenzyme. (02 marks)

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(b) Describe how end-product inhibition works. (03 marks)

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(c) The figure below shows the effect of two types of inhibition on the rate of an enzyme-catalyzed reaction.

Maximum rate of reaction at a given

enzyme concentration

Rate of reaction

Inhibitor B present

Inhibitor A present

*Substrate concentration*

(i) Suggest the nature of inhibitor:

A. .…………………………………………………………..………..……………… (½ mark)

………………………………………………………………………………………..…………

B. ……………………………………………………………………………..…. (½ mark)

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(ii) Suggest a reason in each case for your answers in C(i) above.

1. ………………………………………………………………………………....… (01 mark)

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1. ……………………………………………………………………………….… (01 mark)

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(ii) Briefly explain how inhibitor B works (02 marks)

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44. (a) State two human activities that increase the levels of carbondioxide. (02 marks)

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(b) What is the effect of high levels of each of the following gases in the atmosphere?

(07 marks)

(i) Carbon dioxide

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(ii) Sulphur dioxide …………………………………………………………………………………………..……………..

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(c) State one indicator in the environments where there is prevalence of high levels of sulphur dioxide in the atmosphere. (01 mark)

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45. The figure below shows the changes in potential difference (p.d) across the membrane of a neurone over a period of time. The membrane was stimulated at time A and time B with stimuli of different intensities.

+60

Potential difference across

Membrane of a neurone /mV

+40

C D

+20

0

-20

-40

Threshold

-60

-80 E

0

0 1 2 3 4 5

*Time/ms*

Stimulus Stimulus

A B

1. Describe what is occurring at: (02 marks)

C …………………………………………………………………………………………..…...…

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D (02 marks) …..............................................................................................................................................................................................................................................................................................................................................................................

E (02 marks) ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

(b) Suggest why stimulus A did not result in an action potential being produced while stimulus B did. (02 marks)

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(c) What is the role of a myelin sheath in the transmission of a nervous impulse?

(02 marks)

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46. The graph below shows the fluctuations in blood levels of three hormones during

pregnancy.

Blood levels of the hormones

Human Chorionic Gonadotrophin (HCG)

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**x**

**x x**

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Oestrogen

.

.

**x x**

.

Progesterone

.

.

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.

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.

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**x x**

**x**

**x**

**x**

**x**

**x**

**x**

0 4 8 12 16 20 24 28 32 36 40

Gestation period/weeks

1. Compare the variation in the levels of human chorionic gonadotropin with progesterone. (04 marks)

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1. Explain the chief effects of the three hormones during pregnancy. (04 marks)

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1. Basing on the above effects, suggest how a miscarriage could be induced in a pregnant woman. (02 marks)

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**END**