**Name:…………………………………………………………………**

**Combination: ……………………………………………………..**

**P530/1**

**BIOLOGY**

**THEORY**

**PAPER 1**

**2 ½ HRS**

**UGANDA ADVANCED CERTIFICATE OF EDUCATION**

**PRE-REGISTRATION EXAMINATIONS 2016**

**BIOLOGY**

**PAPER 1**

**TIME:**

**Instructions**

* *Answer all questions in both Sections A and B*
* *Answers to Section A questions must be written in the boxes provided and answers to Section B should be written in spaces provided.*
* *No additional sheet(s) of paper should be inserted.*

**FOR EXAMINERS USE ONLY**

|  |  |
| --- | --- |
| **Section** | **Marks** |
| A ( 1 – 40) |  |
| B 41 |  |
| 42 |  |
| 43 |  |
| 44 |  |
| 45 |  |
| 46 |  |
| **Total** |  |

**SECTION A (40 MARKS)**

1. The phenotype resulting from a cross between red eyed and white eyed flies depends on which fly is red eyed. This means that the gene for eye colour is

A. Polygenic B. Sex limited

C. Sex linked D. Epistatic

2. In a unit membrane, cholesterol is found

A. attached to glycoprotein B. between the lipid molecules

C. attached to the glycolipids D. bound to membrane proteins

3. Which of the following is an example of positive feedback?

A. regulation of glucose

B. end product inhibition

C. secretion of oxytocin during labour

D. regulation in concentration of thyroxin in blood

4. The hormone which enables plants to respond to drought is

A. gibberellins B. Abscisic acid

C. Auxins D. cytokinin

5. Which of the following would occur to a plant requiring at least 14 hours of dark period daily in order to flower?

A. No flowering occurs if dark period is interrupted with a flash of light.

B. Flowering occurs if the days are 14 hours long

C. No flowering occurs if the dark period is more than 14 hours

D. Flowering occurs if the dark period is interrupted with a flash of light.

6. C3 plants are less efficient than C4 plants in fixing Carbon dioxide at low Carbondioxide and high Oxygen partial pressures because

A. C3 plants use mono energy

B. in C3 plants, energy is lost

C. RUBP Carboxylase is inactivated by high Oxygen partial pressures

D. PEP Carboxylase has a high affinity for Oxygen

7. Which of the following is the significance of etiolation in plants?

A. allows small sized leaves to break through the soil

B. leads to rapid elongation of hypocotyl in monocotyledonous plants

C. allows maximum growth in length using the available food resources

D. enables plants to grow in darkness

8. Which of the following features characterizes the omnivore gut?

A. large divided stomach

B. poorly developed appendix and ceacum

C. long pouched colon

D. short ileum and colon

9. Figure 1 shows a glandular tissue

In which part of the mammalian body is the tissue likely to be found?

1. Ileum B. Lungs

C. Stomata D. Skin

10. Which of the following changes in a cell would increase its water potential?

A. Decrease in turgor pressure B. Increase in solute potential

C. Decrease in osmotic potential D. Increase in pressure potential

11. The major similarity between active transport and facilitated diffusion is that both

A. use energy

B. transport materials against a concentration gradient

C. use carrier proteins

D. involve movement of polar molecules

12. High concentration of Carbondioxide in tissues leads to

A. increase in affinity for oxygen by haemoglobin

B. increase in the loading tendance of haemoglobin

C. lowering of affinity for Oxygen by haemoglobin

D. Shifting of the oxygen dissociation curve to the left

13. Which of the following has a direct effect on all organisms?

A. light B. humidity

B. Temperature D. rainfall

14. When colchicine is added to a cell, division would immediately stop when the cell reaches

A. metaphase B. prophase

C. anaphase D. telophase

15. When a lipid is combined with a phosphate group, it becomes

A. saturated B. a complex molecule

C. water soluble D. amphoteric

16. Which of the following animal groups have segmented body and closed circulatory system?

A. Crustacea B. Platyhelminthes

C. Annelida D. Insecta

17. Which one of the following has the greatest biomass?

A. primary consumers B. primary producers

C. secondary producers D. tertiary consumers

18. Which one of the following path ways offers the least resistance to water flow?

A. A poplast B. vascular

C. symplast D. cytoplasmic

19. Which one of the following is the major role of helper T-cells in cell mediated response?

A. production of antibodies

B. suppress activity of other T cells

C. activate B cell proliferation

D. phagocytosis

20. The respiratory pigment found in some insects’ blood is

A. Haemocrythrin B. chlorocuorin

C. haemoglobin D. haemocyanin

21. The homeostatic role of the gut is the removal of

A. water B. bile pigments

C. salts D. undigested food

22. Which of the following is not an adaptation for photosynthesis in shade plants?

A. High chlorophyll content B. low compensation point

C. thick leaves D. thin leaves

23. The biological role of proteins in cells depends on the

A. sequence of amino acids in them

B. pattern of folding of amino acids

C. other organic molecules with which it is associated

D. the specific three dimensional shape

24. Multicellular, nucleated heterotrophs which always obtain food by absorbing nutrients from the environment belong to kingdom

A. Plantae B. monera

C. fungi D. animalia

25. In the chloroplast, complex carbohydrates are made in the

A. intermembranal space B. inner membrane

C. stroma D. thyrakoid

26. Genes P,Q,R and S are located on the same chromosome. Cross over values between them are; P-Q=20%, P-R=30%, P-S=15%, Q-R=15%, Q-S=30%, R-S=40%. What is the sequence of these areas on a gene map?

A. S,P,Q,R B. R,P,Q,S

C. P,R,S,Q D. Q,S,R,P

27. Which of the following polysaccharides contain amino acids group?

A. murein B. chitin

C. cellulose D. glycogen

28. The following are physiological adaptations of parasites except

A. organ degeneracy B. Anaerobism

C. coagulant formation D. chemosensitivity

29. Skin colour is an example of inheritance through

A. systematic genes B. sex linkage

C. polygenes D. multiple alleles

30. Which of the following is not a role of the larval stage in animal development?

A. dispersion B. asexual reproduction

C. feeding D. sexual reproduction

31. Which of the following is not a function of haustorial of the parasitic phytophthora infestans?

A. digestive enzyme section B. filamentous hypha production

C. absorption of soluble food materials D. Penetration of the host cell

32. In a prokaryotic cell, DNA is

A. associated with protein B. inform of a double spiral

C. in circulation D. enclosed in a membrane system

33. When the pressure in the ventricles is maximum,

A. both semilunar and atrioventricular valves close

B. semilunar valves close and atrioventricular valves close

C. semilunar valves open while atrioventricular valves close

D. both semilunar valves and atrioventricular valves close

34. A certain gene of a bacterium codes for a protein 129 amino acids long. How many nucleotides are needed to code for this polypeptide?

A. 30 B. 40 C. 360 D. 480

35. During secondary growth in plants, the epidermis is replaced by activity of

A. phellogen B. phellem

C. phelloderm D. secondary medullary rays

36. Structurally, the tunica media in the wall of blood vessels is composed of

A. collagen fibres and endothelial cells

B. elastic fibres and smooth muscles

C. collagen fibres and elastic fibres

D. smooth muscles and endothelial cells

37. In which of the following responses does the role of Auxins and gibberellins show synergism?

A. fruit growth B. apical dominance

C. root growth D. stomatal opening

38. Which of the following types of selection results into adaptive radiation?

A. stabilizing selection B. direction selection

C. disruptive selection D. artificial selection

39. In the chloroplast, the proton gradient established between intermembranal space and the matrix dries the

A. light phase B. ATP formation

C. Carbondioxide fixation D. transamination

40. In a non-dividing cell, 26% of the bases in a DNA is guanine. What is the percentage of Adenine bases in this DNA molecule?

A. 52 B. 26

C. 48 D. 24

**SECTION B (60MARKS)**

41. A small amount of Oxygen diffuses from blood into the small intestines of a mammal. Some parasitic Platyhelminthes living in the small intestines can make use of this Oxygen. The graph below shows the Oxygen dissociation curves for human haemoglobin and for the parasitic Platyhelminthes haemoglobin.

Parasitic haemoglobin

Percentage saturation

with oxygen

Human haemoglobin

Partial pressure of oxygen

a) Explain the relative position of the curves for parasitic and human haemoglobin. (2 marks)

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b) State any other two physiological adaptations of haemoglobin. (2 marks)

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c) Explain the effect of;

i) increase in temperature on dissociation of haemoglobin (2 marks)

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ii) facial immersion on heart rate. (2 marks)

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d) State two factors that ensure continuous flow of blood in veins. (2 marks)

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42. a) Define the term alkaline tide. (1 mark)

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b) How are fatty acids modified in order to reach the blood stream in mammals? (4 marks)

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c) State three differences between active and passive absorption of materials. (3 marks)

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d) State four biological importances of amino acids in animals. (2 marks)

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43. Carbohydrates and lipids are useful energy sources in cells.

a) Explain the difference in the energy values of Carbohydrates and lipids. (3 marks)

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b) The graph below shows the respiratory quotient (R.Q) values of a mouse at different air temperatures.

**0.90**

**0.85**

**R.Q**

**0.80**

**0.75**

**30**

**25**

**20**

**5**

**0**

**Air temperature in 0C**

**15**

**10**

i) Using the information given, explain the relationship between air temperature and R.Q. (3 marks)

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ii) State two circumstances under which R.Q values rise over 1.0. (2 marks)

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c) State two reasons why the theoretic R.Q values of the different food substances are not realistic. (2 marks)

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44. a) What is meant by the term alternation of generations? (2 marks)

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b) What is the significance of alternation of generations in the life cycle of an organism? (3 marks)

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c) How are ferns better adapted in colonizing terrestrial habitats than mosses? (3 marks)

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d) Angiosperms and conifers were originally grouped together as spermatophytes. Sate two reasons why this grouping was possible. (2 marks) ………………………………………………………………………………………………..……………………………………………………………………………………………………..

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45. Define the term pure line. (1 mark)

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b. Explain;

i) The importance of rearing identical twins in different environments.

(1 mark)

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ii) Why F1 hybrids do not breed true. (1 mark)

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c) A pure breeding tall tomato plant with green leaves was crossed with a pure breeding dwarf plant with mottled leaves. All the F1 generation had tall green leaved individuals.

i) Using genetic symbols, explain the appearance of a test cross of F1 generation. (3 marks)

ii) The actual results of the test cross were as follows;

Tall with green leaves = 43

Tall with mottled leaves =7

Dwarf with green leaves =5

Dwarf with mottled leaves =45

Calculate the cross over value. (2 marks)

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d) State two useful effects of mutations in organisms. (2 marks)

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46. The graph below shows transimition speed of myelinated and non myelinated axons of an organism.

Conduction speed (arbitrary units)

5

myelinated

4

3

2

Non - myelinated

1

1

2

3

4

5

Diameter of nerve fibre (arbitrary units

a) Compare transmission speed of myelinated and non myelinated axons. (4 marks)

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b) Explain the effect of myelinated sheath on transmission speed. (3 marks)

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c) State two other factors that affect speed of transmission of an impulse in organisms. (2 marks)

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d) What is the significance of a high transmission speed to the survival of an organism? (1 mark)

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