Name:……..Index Number …….....

P53/1
BIOLOGY
Paper 1
2 ½ hours

MATIGO MOCK EXAMINATIONS 2022

UGANDA ADVANCED CERTIFICATE OF EDUCATION

BIOLOGY

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

*Answer **all** questions in both sections **A** and **B***

SECTION A: *Answers to this section must be written in the answer sheet provided at the end of this section.*

SECTION B: *Answers to this section should be written in the spaces provided and not anywhere else.*

No additional sheets of paper should be inserted in this booklet.

For Examiner's Use Only

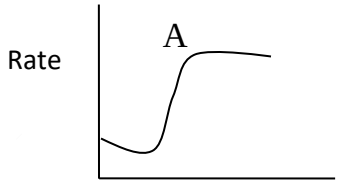
SECTION	MARKS
Section A: 1-40	
Section B: 41	
42	
43	
44	
45	
46	
TOTAL	

SECTION A

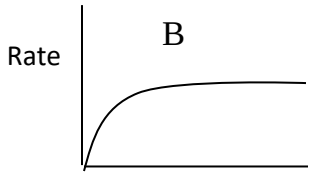
Choose the most correct alternative

1. Which of these organelles has a transport function?
   A. Ribosome and golgi apparatus
   B. Golgi apparatus and endoplasmic reticulum
   C. Mitochondrion and endoplasmic reticulum
   D. Mitochondrion and ribosome

2. Which of these graphs shows the effect of increasing carbon dioxide concentration on the rate of photosynthesis?



CO_2 concentration 1%



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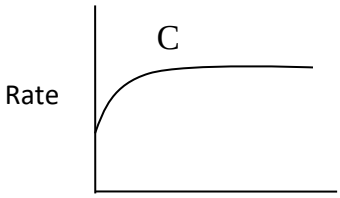
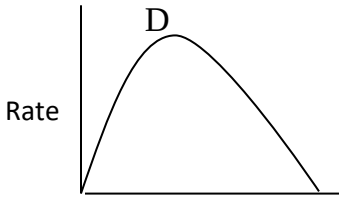


CO_2 concentration 1%



CO_2 concentration 1%

3. Which of the following components is an eukaryotic chromosome?
   A. One DNA molecule and one large protein
   B. Many DNA molecules and many proteins
   C. One DNA molecule and many proteins
   D. Many DNA molecules and one large protein.

4. Which of these would lead to sickle cell anemia?
   A. Errors in the translation of mRNA
   B. A base substitution mutation in mRNA
   C. A transcription error that replaces A and U
   D. A mutation that leads to glutamic acid instead of valine.

5. Recombination of unlinked genes would normally occur by?
   A. Crossing over in prophase 1
   B. Failure of spindle formation

C. Random chromosome assortment
D. Random gene mutations

6. Which of these would trigger the uptake of ca2+ in synaptic transmission?
   A. The influx of sodium ions only
   B. Release of neurotransmitter
   C. Depolarization of post synaptic membrane
   D. Arrival of nerve impulse in the pre- synaptic neuron.

7. The part of the kidney where most glucose is re-absorbed from glomerular filtrate is;
   A. Loope of henle
   B. Glomerulus
   C. Proximal convulated tubule
   D. Distal convulated tubule

8. Prokaryote cells divide by;
   A. Mitosis
   B. Meiosis
   C. Budding
   D. Binary fission

9. The extra cellular matrix of cells is made of;
   A. Polysaccharide
   B. Polysaccharide and protein
   C. Glycoprotein and phospholipids
   D. Phospholipids, glycoprotein and polysaccharide.

10. Oxides of nitrogen are looked at as green house gases because they;
   A. Trap long wave radiation
   B. Prevent short wave radiation from reaching the ground
   C. Dissolve in water to produce acid rain
   D. Are not naturally produced like CO_2 and methane

11. Antibiotics are ineffective against bacteria and not viruses because?
   A. Viruses can hide inside host cells
   B. Bacteria are recognized as pathogens but viruses are not
   C. Enzymes of bacteria can be inhibited by antibiotics
   D. Viruses are resistant to antibiotics

12. The tertiary structure of protein would best be described by;
    A. Interaction of polypeptide sub units and prosthetic groups
    B. Interactions forming hydrogen bonds between amino acids
    C. The sequence of amino acids in the polypeptide chain
    D. The structure formed from interaction between the amino acid side groups.

13. In the chloroplasts, complex carbohydrates are made in;
    A. The inter- membrane space
    B. The stroma
    C. The inner membrane
    D. The thylakoid space

14. HCG in early pregnancy stimulates
    A. FSH secretion
    B. Degeneration of corpus luteum
    C. Ovarian oestrogen and progesterone secretion
    D. Uterine contraction

15. Which of the following is true about a polar amino acid and cellulose? Both;
    A. Are polysaccharides
    B. Contain nitrogen
    C. Are hydrophobic
    D. Contain hydrogen atoms

16. If 15% of a sample of DNA is thymine, what percentage of the DNA is guanine?
    A. 15%
    B. 30%
    C. 35%
    D. 70%

17. When pathogen is ingested by a phagocyte, the first event that occurs is?
    A. T- cell activation
    B. Memory cell proliferation
    C. Antigen presentation by the phagocyte
    D. B- cell activation

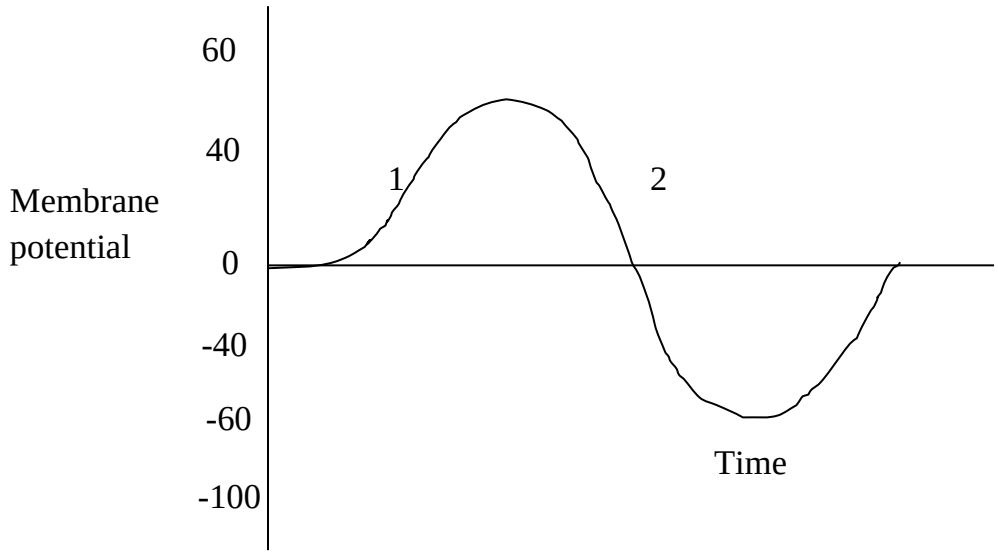
18. Which one of the following is not a function of a membrane protein?
    A. Hormone binding site
    B. Cell adhesion
    C. Cell cohesion
    D. Acts as a pump for active transport

19. Which of the following takes place during either interphase or mitosis in animal cells?
    A. Reformation of nuclear membrane
    B. Reformation of nuclear membrane and pairing of homologous chromosomes
    C. Pairing of homologous chromosomes and DNA replication
    D. Reformation of nuclear membrane and DNA replication

20. An animal has radial symmetry, a sac-like body with only one opening and tentacles. The animal is a member of?

A. Annelid
B. Cnidaria
C. Mollusca
D. Polifera

21. The figure below shows membrane potential during an action potential. What occurs at stages 1 and 2?



A. Na+ ions diffuse in and K+ ions diffuse out
B. K+ ions diffuse out and Na+ ions diffuse in
C. Na+ ions diffuse out and K+ ions diffuse out
D. Na+ ions diffuse in and K+ ions diffuse in

22. In males testosterone;

A. Stimulates FSH production and growth in puberty
B. Pre- natal development of genitalia and development of secondary sexual characteristics
C. Development of pre-natal genitalia and development of pre- natal secondary sexual characteristics
D. Stimulates FSH production and pre-natal development of secondary sexual characteristics.

23. Cells in a multi cellular organism differentiate because;

A. They express some of their genes but not others
B. They all have a different genetic composition
C. Different cells contain a different set of chromosomes
D. Different cells do not have some of the genes.

24. Skin colour is an example of inheritance through;
    A. Sex linkage
    B. Multiple allele
    C. Systemic genes
    D. Polygenes

25. If mRNA has a codon CAU, what is the corresponding anti-codon on the tRNA molecule?
    A. CAT
    B. GUA
    C. CAU
    D. GTA

26. In what sequence do the hormones reach their maximum level in the human menstrual cycle?
    A. LH, progesterone, FSH, oestrogen
    B. FSH, progesterone, LH, oestrogen
    C. LH, oestrogen, FSH, progesterone
    D. FSH, oestrogen, LH, progesterone

27. What prevents a long day plant from flowering during winter?
    A. Too much Pfr is converted to Pr during night
    B. Too much Pfr is converted to Pr during the day
    C. Too much Pr is converted to Pfr at night
    D. Too much Pr is converted to Pfr during day

28. Which processes have the greatest effect in determining which members of a population are more likely to survive until reproductive age?
    A. Evolution
    B. Natural selection
    C. Meiosis
    D. Hybridization

29. Colchicine disrupts microtubule assembly. What activity would most be affected by colchicine?
    A. Photosynthesis
    B. Replication
    C. Movement of chromosomes to the pole during mitosis
    D. Active transport of membrane proteins

30. In opening and closing of the stomata, the osmotic theory is associated with;
    A. Conversion of starch into sugar in the guard cells
    B. Accumulation of salts in the guard cells
    C. Synthesis of abscisic acid
    D. Production of starch during photosynthesis

31. Birds reared by a foster mother of another species , attempt to mate with birds of the foster mothers species as a result of;
    A. A simple reflex
    B. Conditioned reflex
    C. Imprinting
    D. Trial and error learning

32. Which part of an amoeba is concerned with active intake of water?
    A. Ectoplasm
    B. Contractile vacuole
    C. Pseudopodia
    D. Cell membrane

33. Which of the following cell types are unlikely to be found in the mammalian intestine?
    A. Columnar
    B. Ciliated
    C. Striated
    D. Squamous

34. Crossing over exchanges alleles between;
    A. Non- homologous chromosomes
    B. Non- homologous chromatids
    C. Non- sister chromatids
    D. Sister chromatids

35. A stable community of organisms in equilibrium with the natural environmental conditions is?
    A. Pioneer community
    B. Seral community
    C. Biotic community
    D. Climax community

36. An accidental discharge of a very acidic waste occurred near a small lake. Which of the following is most likely to happen?
    A. Eutrophication of the lake
    B. Increased water turbidity
    C. Gill damage in fish
    D. An algal bloom

37. Enzymes that catalyze the removal of water molecules from a substrate are known as;
    A. Reductases
    B. Dehydrogenases
    C. Dehydrases
    D. Hydrases

38. Which of the following is considered to be passive in the body?
    A. Water loss from the stomata
    B. DNA transcription
    C. Uptake of mineral salts
    D. Muscular contraction

39. Facilitated diffusion and active transport both require;
    A. Adenosine triphosphate
    B. Protein carriers
    C. Unidirectional movement of solutes
    D. That the solute be soluble in lipid

40. If two species with similar niches and share a limited resource are forced to co-exist indefinitely;
    A. Both species would be expected to co-exist
    B. Both would become extinct
    C. The species that uses the resources more efficiently would drive the other to extinction
    D. Both would become similar to one another.

SECTION B

41. In cats short hair is dominant over long hair, the gene involved is autosomal. Another gene which is sex linked produces yellow coat colour, its allele produces black coat colour and the heterozygous combination produces tortoise shell colour.
    a) If a long haired male is mated with a tortoise shelled female homozygous for short hair, what kind of offspring will be produced in F_1? *(8 marks)*

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b) i) If the F1 cats are allowed to interbreed freely among themselves, what are the chances of obtaining long haired females? *(1 mark)*

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ii) Apart from being sex linked, what else can you say about the inheritance of the gene for coat colour? *(1 mark)*

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42. The relative sizes of the head of an eight weeks foetus is bigger than an adult of twenty five years old.

a) Suggest **three** reasons for the differences? *(3 marks)*

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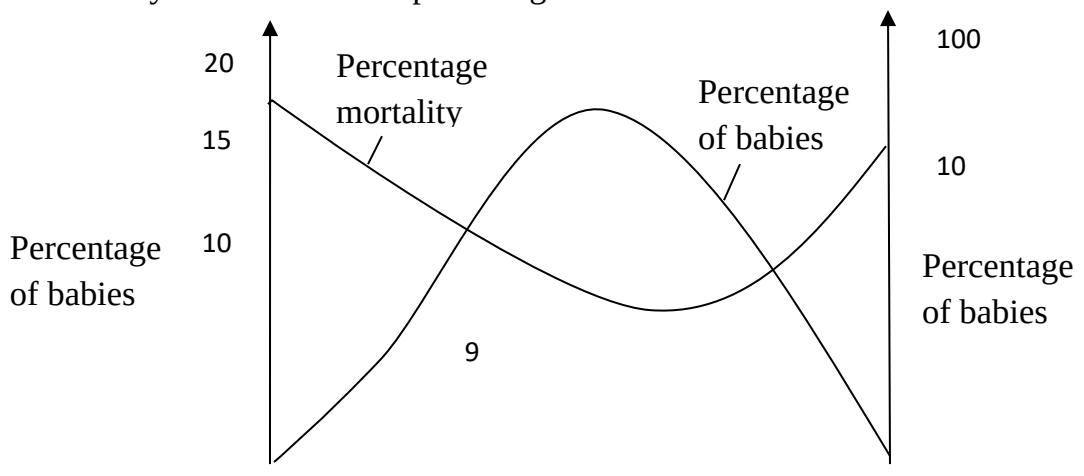
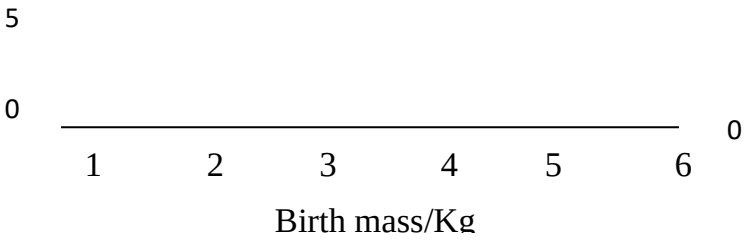
b) The graph below shows the relationship between birth mass and percentage mortality in relation to the percentage of babies born.





i) Describe the relationship between the birth mass and mortality. *(3 marks)*

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ii) Explain the evolutionary significance of the relationship above. *(4 marks)*

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43. a) Using examples in each case, distinguish between competitive and non competitive inhibitors. *(6 marks)*

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b) Explain how allosteric inhibition occurs. *(3 marks)*

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c) State **one** way in which enzyme inhibition has been put to use my man. *(1 mark)*
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44. a) State **two** characteristics of learned behavior. *(2 marks)*
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b) With an example in each case, explain the following forms of associative learning.
i) Conditioning *(2 marks)*
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ii) Trial and error learning. *(2 marks)*
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c) State the importance of each type of associative learning to animals in their natural environment. *(2 marks)*
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d) Explain why unlike innate behavior, learned behavior varies among members of the same species. *(2 marks)*

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45. The table below shows the volume of blood from the left ventricle to various parts of the body in one minute at rest and during heavy exercise.

Organ	**Volume of blood/cm^3**	
	Rest	**Exercise**
Brian	750	750
Heart muscle	250	750
Skeletal muscle	1200	1250
Skin	500	1900
Kidney	1100	600
Other organs	2000	1000

a) i) Calculate the percentage increase in blood flow from rest to exercise in skeletal muscle. *(2 marks)*

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ii) State **three** ways in which the increase in (a) (i) above is achieved. *(3 marks)*

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b) Explain the changes in volume of blood flow from rest to exercise to these parts of the body.

i) Kidney. *(2 marks)*

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ii) Heart muscle. *(2 marks)*

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iii) Brain. *(1 mark)*

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46. a) i) What is meant by the term extinction? *(1 mark)*

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ii) State one natural cause of extinction. *(1 mark)*

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b) Suggest three ways human activities have accelerated the rate the rate of extinction in present times. *(3 marks)*

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c) Suggest measures that can be put in place to prevent extinction of species.
(3 marks)

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d) Explain why large predators e.g birds of prey are prone to extinction. *(2 marks)*

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END