SECTION A (40 MARKS)

Write the letter corresponding to the most correct answer in the box provided on the right of each question.

1. Potassium cyanide is known with the formation and use of ATP in cell metabolism. If the use of potassium cyanide resulted in an accumulation of a solute in a cell, it may be deducted that the solute enters by;
   A. Active transport
   B. Diffusion
   C. Osmosis
   D. Pinocytosis

   [B]

2. Which of the following properties of water is the main contributory factor enabling homoiotherms to adapt to a range of environments?
   A. It has a high heat of vaporization.
   B. It has a low viscosity.
   C. It has its maximum density at 4°c.
   D. It has a high surface tension.

   [A]

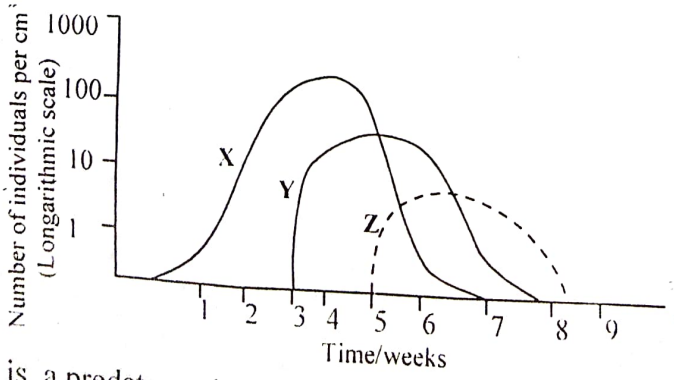
3. Which of the following statements could explain the absence of native placental mammals in Australia?
   A. The environmental conditions were unsuitable for the evolution of placental mammals.
   B. Geographical isolation prevented the invasion by placental mammals.
   C. Wide spread diseases eradicated placental mammals in Australia at an early stage in their evolution.
   D. There is a slower rate of evolution due to the lower background radiation in the southern hemisphere.

   [B]

4. What is the phenotype of a fruit fly whose genotype is g^+g^+ vsvs (where g = grey body and vs = vestigial wings)?
   A. Grey body, vestigial wings
   B. Grey body, normal wings
   C. Black body, vestigial wings
   D. Black body, normal wings

   [A]

5. An experiment pond was set up by filling a bowl with a complete culture solution made-up with distilled water and exposing it to the atmosphere. Various organisms X, Y and Z were subsequently found and the interrelationships were observed between them. The curves above refer to the changes in their populations. Which one of the following deductions about the inter relationships of **X**, **Y** and **Z** best fits the data given.



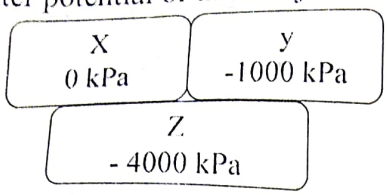
   A. X is a predator, y is a prey, Z is a primary producer.
   B. X is a prey, y is a primary producer, Z is a terminal consumer.
   C. X is a predator, Y is a primary consumer and Z is a primary producer.
   D. X is a primary producer, **Y** is a primary consumer, and Z is a predator.

   [D]

6. The most successful of all animal groups are the:
   A. Chordates
   B. Arthropods
   C. Annelids
   D. Molluses

B

7. The water potential of three adjacent cells is shown below.



Water molecules are likely to move from;
   A. cell X to cells Y and Z
   B. cell Y to cells X and Z
   C. cell Z to cell X
   D. cell Z to cell Y

A

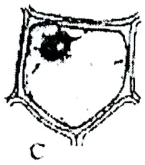
8. Certain nerve gases developed for military purposes work by producing convulsive muscular contractions upon the slightest stimulation. This suggests that their function is to inhibit the function of;
   A. Acetylicholine
   B. Atropine
   C. Cholinesterase
   D. Naradrenaline

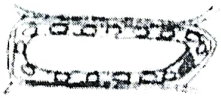
C

9. Which one of the typical angiosperm cells illustrated below is primarily involved in the synthesis of organic materials?

A. 

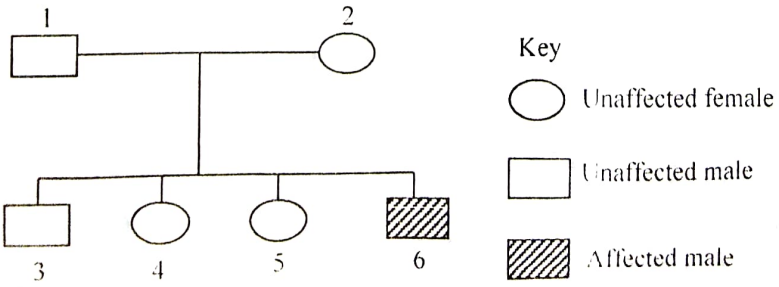
B. 

C. 

D. 

D

10. The diagrams show the inheritance of hemophilia in a family, if daughter 4 married a normal male, what is the probability that their first child would suffer from hemophilia?



A/B

   A. 0
   B. 0.25
   C. 0.125
   D. 0.5

11. It has been found that an aqueous suspension of a certain type of compound .Which type of the oxygen if illuminated in the presence of a certain type of compound .Which type of the compound and which colors of light are required for maximum oxygen evolution?

	Type of compound	Colors of light at which maximum evolution occurs
A	Electron acceptor	Blue and green
B	Electron acceptor	Blue and red
C	Electron donor	Blue and green
D	Electron donor	Blue and red

B

12. Radioactive carbon dioxide ($^{14}Co_2$) is added to a suspension of a photo synthesizing green alga. Which compound will be labelled first with 14^c ?
A. Glucose
B. Ribulose biphosphate
C. Glycerate -3-phosphate
D. Triose phosphate

C

13. Etiolated seedlings grow;
A. towards red light.
B. straighter than non-etiolated seedlings.
C. towards far red light.
D. more slowly than non-etiolated seedlings.

A

14. Which of the following will cause stomata to open?
A. Wilting.
B. Decrease in carbon dioxide concentration.
C. Darkness.
D. Very high temperatures.

B

15. The condition that is needed by most seeds to break dormancy is.
A. exposure to heat.
B. exposure to cold.
C. abrasion of the seed.
D. exposure to moisture.

D

16. If the adrenal cortex was producing high levels of aldosterone. It would cause urine to have;
A. high Na^+ and low K^+ concentrations.
B. low Na^+ and high K^+ concentrations.
C. high Na^+ and high k^+ concentrations.
D. low Na^+ and low K^+ concentrations.

B

17. The change in the coloration of a peppered moth is an example of a population
A. with destructive selection.
B. with directional selection.
C. with stabilizing selection.
D. in equilibrium.

B

18. Using the molecular record to determine phylogenetic relationships is based on the assumption that;
A. nucleotide sequences do not change over time.
B. nucleotide sequences change at a fairly constant rate over time.
C. nucleotide sequences change randomly and erratically overtime.
D. evolutionally changes occur in phenotypes but do not in genotypes.

B

19. The similarities between the skeletal structure of moles, monkeys and whales lead to a conclusion that they;
A. belong to the same class.
B. originate from the same environment.
C. descend from a common ancestor.
D. evolved accordingly.

C

20. Sucrose is a non-reducing sugar because it?
A. is fully digested.
B. lacks reducing groups.
C. is disaccharide molecule.
D. is a ketose sugar.

B

21. What is the best definition of polygenes?
A. Recessive genes that have accumulated effects on the organism.
B. Genes that affect only one character.
C. Dominant genes that have no effect when in recessive form.
D. Genes with separate cumulative effects which together control continuous variation.

D

22. If it was desired to observe the true colour of a coral polyp of diameter 0.02mm it would be best to use;
A. the un aided eye.
B. a light microscope.
C. a binocular.
D. an electron microscope.

B

23. Why can't grasshoppers be drowned by keeping their heads under water?
A. It breathes through openings in its abdomen.
B. The spiral units head filter out oxygen.
C. It can hold its breath for hours.
D. The maxillae and mandibles serve as an air tight valve.

A

24. Messenger RNA is important in protein synthesis because it;
A. carries the code from DNA to nucleus.
B. carries the code from DNA to Ribosomes.
C. is transmitted to the nucleotides.
D. contains pyrimidine base tymine.

B

25. Water has comparatively high surface tension and boiling point compared to other substances with similar sized molecules because its molecules are;
A. covalent.
B. polar.
C. ionic.
D. large.

B

26. A long thin thread like structure used to propel a cell is known as;
A. Plasmid.
B. Mesosome.
C. A tail.
D. Large.

C

27. Rapid transport of minerals within the cytoplasm is associated with the presence of;
A. spindle fiber in the dividing cell.
B. an extensive endoplasmic reticulum.
C. many plasma membrane pores.
D. extensive golgi apparatus.

D

28. What is the main source of energy in aerobic cell respiration?
A. Oxygen
B. A.T.P
C. Heat
D. Organic compounds

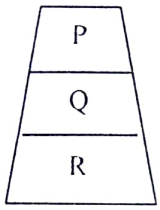
D

29. Where is pyruvate produced and used in a cell respiring aerobically.
A. Cyloplasm, cytoplasm
B. Cytoplasm, mitochondria
C. Mitochondria, cytoplasm
D. Mitochondria, mitochondria

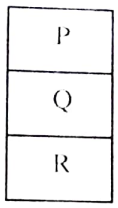
B

30. Which of the figures below show age structure pyramids of plants found in a grassland habitat at different times of the year.
Key: P - long establishing plants Q - Maturing R - Mature plants

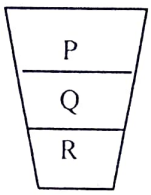
A.



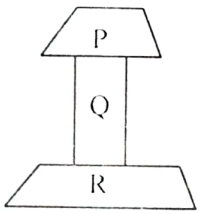
B.



C.



D.



D

31. Which of the following organisms has the greatest amount of energy?
A. Herbivores
B. Carnivores
C. Omnivores
D. Decomposers

A

32. Which of the following organelles are found in cells of higher plants?
1. centrioles 2. golgibodies 3. flagella 4. mitochondrion
A. 3 and 1
B. 1 and 2
C. 2 and 4
D. Only 4

C

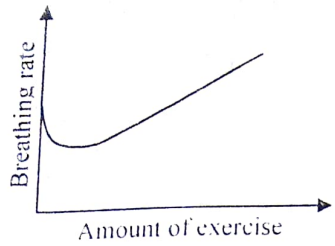
33. Kidney dialysis machines remove waste products from the;
A. urine using a partially permeable membrane.
B. blood using a partially permeable membrane.
C. blood replacing it with fresh blood.
D. bladder directly.

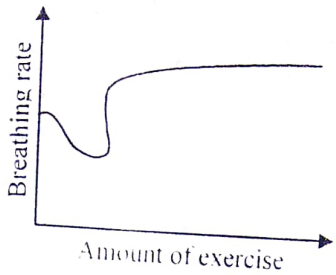
B

34. Transfer of human genes into bacteria to produce human insulin is an example of;
A. Infection.
B. Vaccination.
C. Hybridization.
D. A transgenic technique.

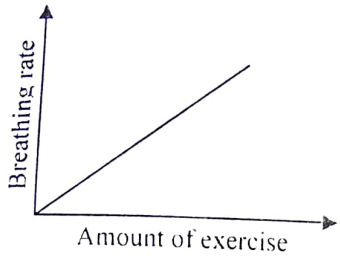
D

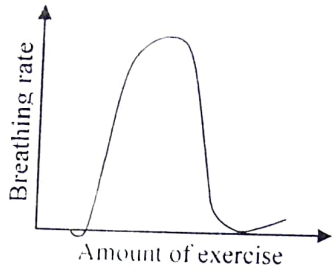
35. Which of the following graphs shows the rate at which an athlete would breathe with increasing sustainable exercise.

A.


B.


B

C.


D.


36. The main blood vessels are arteries, veins, and capillaries, in order of decreasing blood pressure, these should be arranged as;
A. Arteries, veins, capillaries.
B. Veins, capillaries, arteries.
C. Capillaries, arteries, veins.
D. Arteries, capillaries, veins.

D

37. Mosses and liverworts are members of the phylum bryophita. They absorb water through their;
A. Stems.
B. Roots.
C. Leaves.
D. Whole surfaces.

D

38. The main cause of the "o zone hole" is thought to be:
A. The green house effect.
B. The release of chlorofluoro carbons into the atmosphere.
C. The release of carbon dioxide into the atmosphere.
D. The release of o zone into the atmosphere.

B

39. Which one of the following is not a major function of lipids in the body of a human?
A. Short term energy store.
B. Synthesis of hormones.
C. Long term storage of energy.
D. Insulation.

A

40. Differentiation results in cells,
A. transcribing some of their DNA.
B. using all their DNA during replication.
C. changing type when they replicate.
D. mutating.

C

(a) (i) Define the term turgor pressure.

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(04 marks)

(ii) State **four** roles of Turgidity in plants.

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(b) Explain the effects of the following on stomata opening and closure in a leaf.

(i) Darkness in a carbon dioxide free atmosphere. (02 marks)

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(ii) Light in a Carbon dioxide free atmosphere. (02 marks)

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(a) State **three** characteristic features of all arthropods. (03 marks)

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(b) Describe the roles of the coelom in animals. (04 marks)

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(c) Explain the disadvantages associated with the presence of an exoskeleton.

(03 marks)

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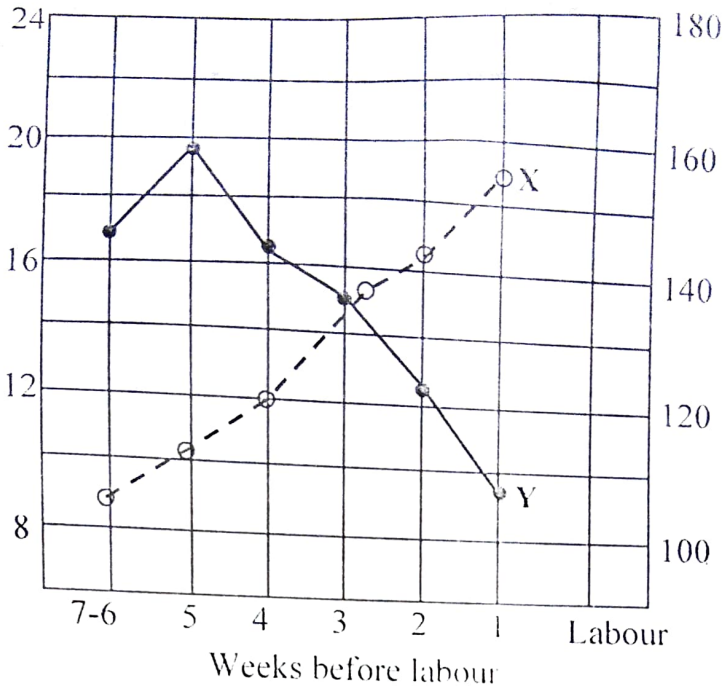
43. The graph shows the concentration of two ovanan enermoch in the last weeks towards the onset of labour.



(a) Identify the two hormones;

(i) X ..... (01 mark)

(ii) Y ..... (01 mark)

(b) (i) Explain how the variation in levels of hormones brings about birth. (04 marks)

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(iii) State the role of the two hormones in the last days of pregnancy. (02 marks)

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(c) Both males and females produce FSH and LH. Explain why there is no sexual cycle in the males. (02 marks)

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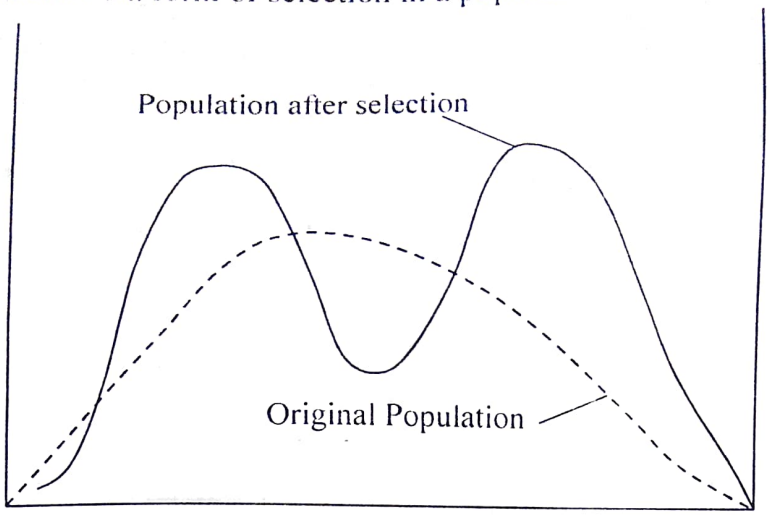
45. The graph shows a form of selection in a population



(a) (i) Identify the type of selection shown. (01 mark)

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(ii) Explain how the selection shown increases the rate of evolution. (04 marks)

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(b) Explain how increased population size may lead to evolution of a new species. (05 marks)

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46. (a) State **three** ways in which appropriate concentrations of solutes are essential in maintaining life processes. (03 marks)

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(b) Explain why excretion in plants is of less significance than that in animals. (04 marks)

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(c) Explain why the vasa recta supplies materials to the medulla without affecting its Osmotic gradient. (03 marks)

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END

WAKISSHA JOINT MOCK EXAMINA
MARKING GUIDE
Uganda Advanced Certificate of Education
UACE August
BIOLOGY P530/1

1	B	11	B	21	D	31	A
2	A	12	C	22	B	32	C
3	B	13	A	23	A	33	B
4	C A	14	B	24	B	34	D
5	D	15	D	25	B	35	B
6	B	16	B	26	D C	36	D
7	A	17	B	27	B D	37	D
8	C	18	B	28	D	38	B
9	D	19	C	29	B	39	A
10	C A/B	20	B	30	D	40	C

SECTION B

hydrostatic/force.

41. (a) (i) Is the pressure exerted by the protoplasm against the cell wall ;

(ii) Maintains shape and form of plant ;
Holds herbaceous plants upright ;
Holds plant leaves in a flat and horizontal position ;
Important in cell enlargement and consequently stretching of stems ;
Control opening and closing of stomata ; for gaseous exchange.

(b) (i) Stomata remain closed ; as $C0_2$ accumulates in the leaf because of no photosynthesis ; accept the osmotic theory idea.
Stomata remain open ; as $C0_2$ produced inside the leaf is used in photosynthesis ;

42. (a) Triploblastic coelamate; have jointed appendages (reject jointed limbs)
Metameric segmentation ; bilaterally symmetrical accept Segmented body.
Exoskeleton ; open circulatory system.

t without They have.

(b) Muscular movements of the gut wall can be separated from muscular movement of the body, as coelom separates gut from body wall.
Provide a cavity in which organs can grow, and function independent of each other.
Increase in size and complexity is possible ;
Acts as a hydrostatic skeleton in annelids ,
Coelmic fluid may circulate food and waste materials ;

(c) Final body size is limited, as surface area to Volume ratio decreases, restricts growth. because it is rigid exo skeleton.
It restricts growth ;moulting is required if the animal is to grow, Which makes animal vulnerable to attack by predation,

43. (a) (i) X oestrogen ;
Y Progesterone ;

(b) (i) The levels of oestrogen increase ; While those of progesterone decrease ;
Increase in the levels of oestrogen makes the uterine walls more sensitive to oxytocin, Which makes the uterine muscles contract ,
(ii) Bring about growth of the mammary glands , in readiness for lactation ;

(c) In the male the hormones are produced uniformly all the time ,
Whereas in females they are produced in waves ; C give rise to the menstrual cycle.

44. (a) having various thresholds ,
Adaptation,
Spontaneous activity , enable it make a response to astimuli of very low intensity.
Summation ,

(b) (i) Rate of conduction is faster in Rats than lizards ; as Rats are endothermic; Maintaining a higher body temperature , for diffusion of ions,
accept warm blooded.
(ii) myelination increases rate of conduction of impulse , as the myelin sheath is an insulator , impulses jump from one node of ranvier to another;

45. (a) (i) disruptive selection ;
(ii) Selection favours individuals at the extremes ,
And eliminates intermediates ,
Giving rise to two phenotypic forms ,
Which increase variation,

(b) Increased size leads to increased selection pressure ; on food space mates etc
Organism better adapted survives and pass on their genes to the next generation; While the less adapted are eliminated ;
Over time those that survive become the majority and give rise to a new species ;

46. (a) important for activity of enzymes, / Ensures optimum enzyme activity.
Important for formation and action of hormone,
Muscular contraction , promoting muscular contraction / brings out muscular contraction
Nerve impulse transmission , / proper impulse transmission or effective

(b) Plants have a lower metabolic rate , - incorporate the waste products and shade them off.
Plants synthesise organic compounds as material become available ,
Structure of plants based on carbohydrates rather protein , / less toxic waste.
$C0_2$ and H_20 easily excreted by gaseous diffusion,
- Re-use the waste products / Recycle.

(c) The vessels run parallel to the loops of Henle , As a result blood in the vasa recta comes into equilibrium with solute in each part of the medulla, so blood gains ions ~~in the~~ descending loop and gives it in the ascending loop;
in vasa recta
from the

END