

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.

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

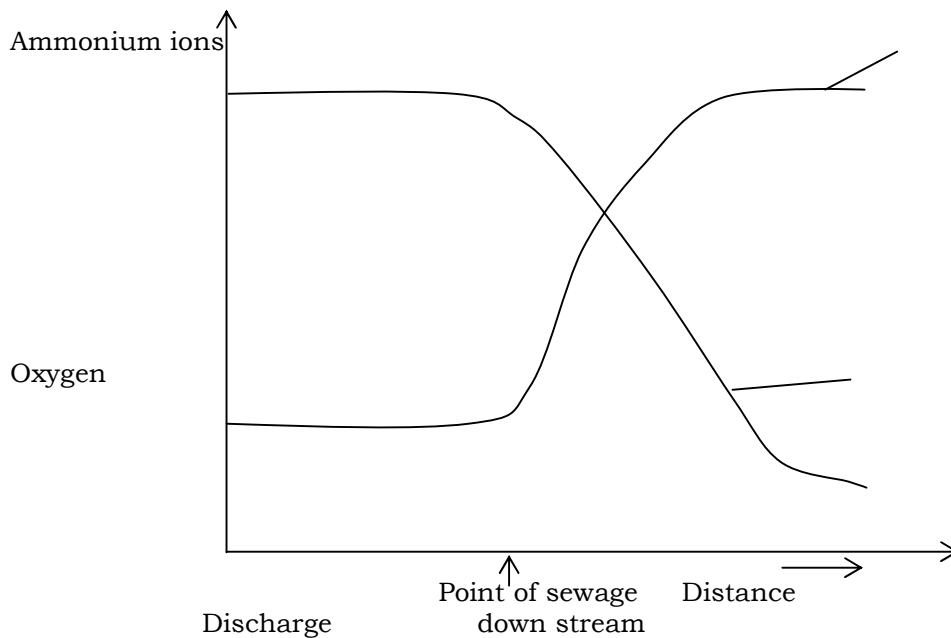
SECTION A

- The cell structure lacking elaborate internal structures is the:
A. Mitochondrion
B. Centriole
C. Lysosome
D. Endoplasmic reticulum
- Movement of ions and larger polar molecules across the plasma membrane is repelled by:
A. Cholesterol
B. Glycolipid
C. Phospholipido
D. Channel protein
- The most important factor determining how much oxygen is carried by haemoglobin is the:
A. level of oxygen in the blood
B. level of carbondioxide in the blood
C.temperature of the blood
D.level of Ca^{2+} ions in the blood
- The synthesis and assembly of cell wall components is a function of the:
A. Golgi body
B. microtubules
C. Ribosomes
C. cell membrane
- 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
- The diameter of the glomerular capillaries is much less than that of the arterioles in order to:
A. Eliminate glucose from the filtrate
B. Raise the filtration pressure
C.Eliminate proteins from urine
D.Slow down the process of filtration
- The following are the effects of territorial behavior except:
A. Reduced reproductive fitness
B. Increased variation
C.Reduced competition
D.Increased in breeding
- Which of the following groups of plants inhabit areas where water is scarce?
A. Halophytes
B. Hydrophytes
C. Mesophytes
D. Xerophytes
- Which of the following is NOT a mechanism for bringing materials into a cell?
A. Endocytosis
B. Phagocytosis
C. Pinocytosis
D. Exocytosis
- 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
- The hormone which enables plants to respond to drought is:
A. Gibberelins
B. Absciscic 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 C_4 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 $25cm^2$. The density of the plant per M^2 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. Columnar | 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 nucleotide 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 (NH_4^+) in a stream.



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

- A. Oxygen escapes to the atmosphere
- B. Aerobic bacteria use oxygen to oxidize ammonium ions to nitrates
- C. Ammonium ions dissolve all the oxygen in the water
- D. 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

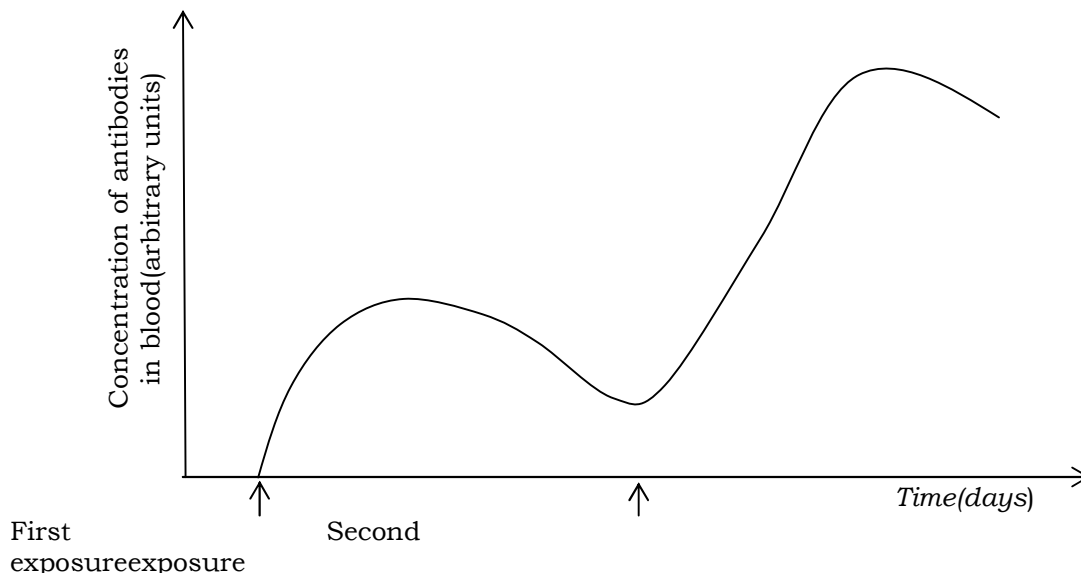
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35. The process of metamorphosis in amphibians is initiated by the hormone:

- A. Thyrotrophin releasing hormone
- B. Thyroid stimulating hormone
- C. Thyroxine
- D. Ecdysone

☐

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



The type of immunity shown is:

- A. 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. Pleiotropy

☐

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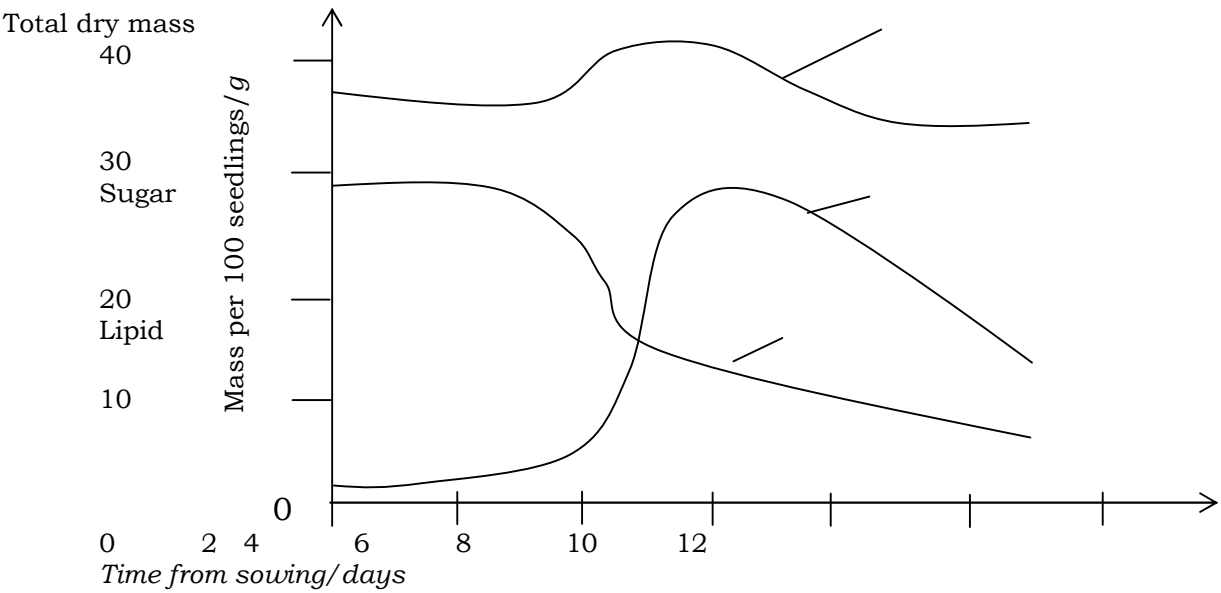
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(c) What is the effect of water stress on plants? (03 marks)

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(a) Describe the relationship between the sugar and lipid content of the seedlings.
(03 marks)

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

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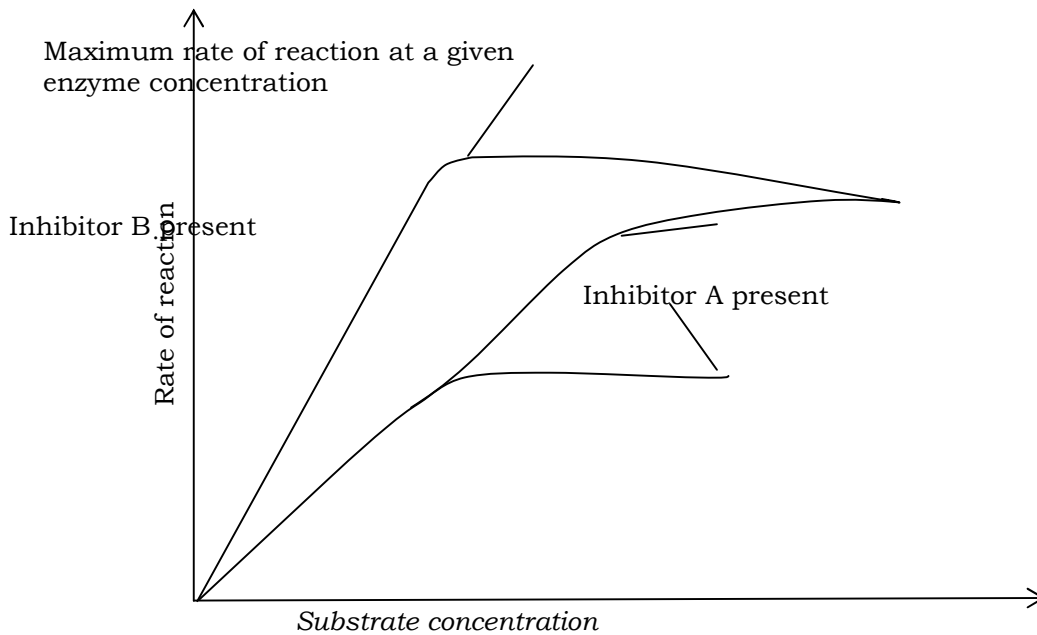
(b) Describe how end-product inhibition works. (03 marks)

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



(i) Suggest the nature of inhibitor:

A. (½ mark)

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B. (½ mark)

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

A. (01 mark)

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B. (01 mark)

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(ii) Briefly explain how inhibitor B works(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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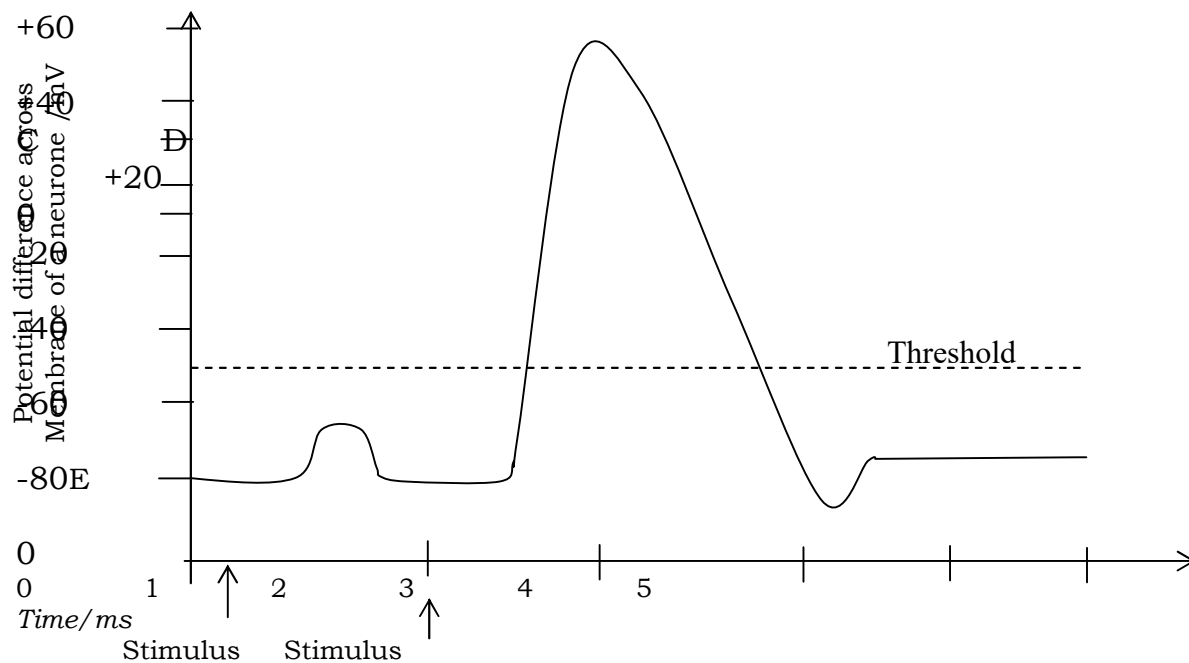
c) State one indicator in the environments where there is prevalence of high levels of sulphur dioxide in the atmosphere.
(01 mark)

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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.



C

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D (02 marks)

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E (02 marks)

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

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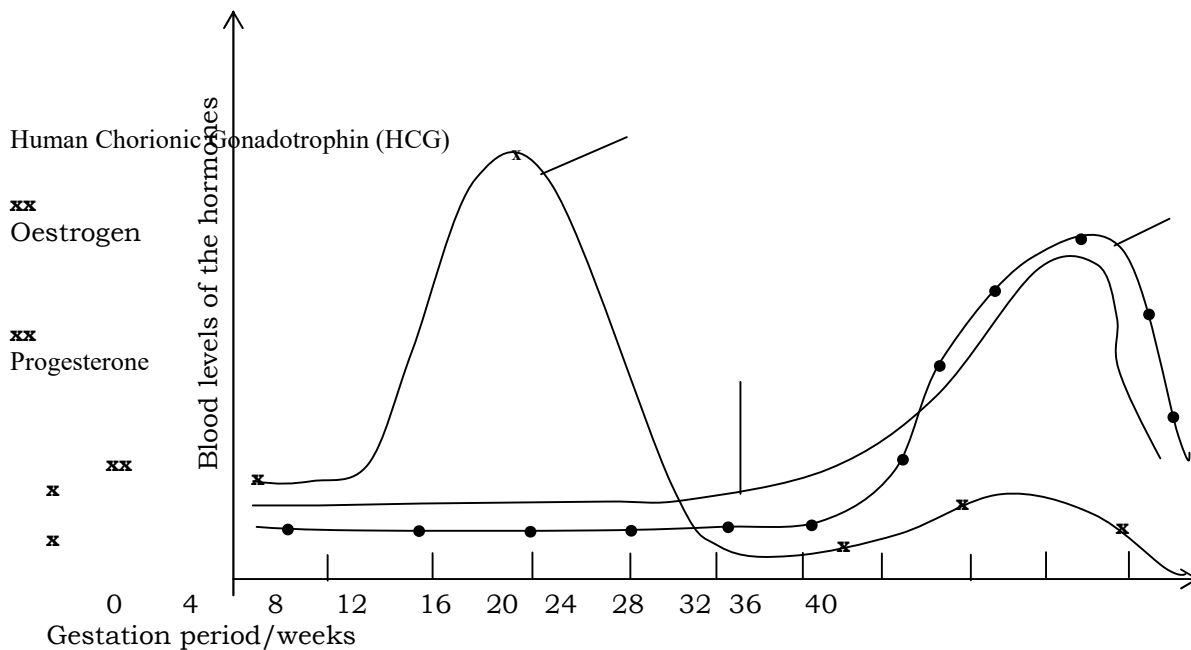
(c) What is the role of a myelin sheath in the transmission of a nervous impulse? (02 marks)

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



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

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

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

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END