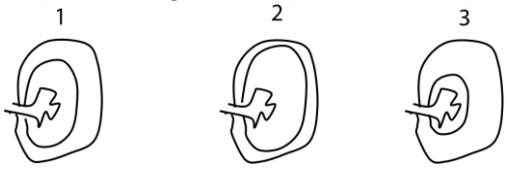
Uace biology paper 1

Time 2 hours:45mins

Instruction: answer all questions

1. Blood plasma contains proteins, but glomerular filtrate does not. Why does this difference in composition occur?
   A. Blood osmotic pressure is maintained by the presence of plasma proteins
   B. Proteins are actively transported from the kidney tubule back into the blood capillaries
   C. Proteins cannot pass through the membrane of the glomerular capillaries
   D. There is high hydrostatic pressure in the blood within the glomerular capillaries.

2. The diagram below shows vertical section of kidneys of three mammals, coypu, brown rat and kangaroo rat, showing the relative sizes of cortex and medulla.



Coypu occur in fresh water and never short of water to drink. Brown rats are able to go some days without drinking. Kangaroo rats are able to live in desert without drinking at all. Which kidney belongs to which animal?

	1	2	3
A	Brown rats	Coypu	Kangaroo rats
B	Kangaroo rats	Coypu	Brown rats
C	Brown rats	Kangaroo rats	Coypu
D	Kangaroo rats	Brown rats	Coypu

3. Hydrophytes do not have wax-covered leaves because
   A. They need much air for respiration
   B. They do not need to conserve water
   C. The wax would make the leaves heavy and sink
   D. Their leaves cannot synthesize wax

4. Which one of the following is a method used by marine bony fish to overcome the problem of possessing body fluids that are hypotonic to the surrounding?
   A. Increase in glomerular filtrate
   B. Extensive reabsorption of salts
   C. Retention of urea
   D. Elimination of nontoxic nitrogenous wastes

5. Which one of the following is a way of **minimising** water loss in a desert animal?
   A. Drinking a lot of water
   B. Possession of few glomeruli
   C. Feeding on succulent vegetation
   D. Having a short loop of Henle.

6. Counter current flow in bony fish achieves a high level of gaseous exchange because it
   A. Increases the concentration gradient
   B. Decreases the distance across which gases diffuse.
   C. Increases the speed of water flow over the gills
   D. Maintains a high concentration gradient

7. Where in the host is a parasite lacking sense organ and osmoregulatory devices likely to be located?
   A. On the skin
   B. Under the hair
   C. In the alimentary canal
   D. In the intercellular fluid

8. Which of the following is an advantage of excreting nitrogenous waster in form of uric acid?
   A. is less soluble and less toxic
   B. Is excreted in semisolid state
   C. Cannot be stored in the body for long time
   D. Requires plenty of tater for its removal

9. Which of the following methods is used by marine fish to overcome the problem of dehydration?
   A. Increase in glomerular filtration rate
   B. Extensive reabsorption of salts from renal fluid
   C. Extrusion of salts by chlorine secretory cells
   D. Elimination of nitrogenous wastes in form insoluble compounds

10. *Chiloleples*, the desert frog flourishes in the desert because it
   A. It has a water proof skin
   B. Is nocturnal
   C. Has few and small glomeruli
   D. Reabsorbs metabolic water

11. Which of the following is not a function of progesterone?
   A. Increasing the sensitivity of the uterine muscle
   B. Inhibiting release of follicle stimulating hormone
   C. Inhibiting release of prolactin
   D. Promoting growth of mammary glands

12. The significance of vascularization of endometrium before implantation in mammals is to
   A. Ensure firm attachment of the foetus on to the uterine wall
   B. Prevent menstruation
   C. Assist in producing hormones which maintain pregnancy
   D. Facilitate food and oxygen supply to the foetus

13. Which of the following structure is haploid?
   A. Primary oocyte
   B. Spermatogonium
   C. Secondary oocyte
   D. Germinal epithelium

14. Prolonged menstrual period may be caused by
    A. High levels of progesterone
    B. A decrease in production of follicle stimulating hormone
    C. Deficiency in oestrogen
    D. High level of luteinising hormone.

15. The amount of progesterone in blood increases steadily from ovulation to menstruation, then it begins to decline because.
    A. Luteinising hormone inhibits its production
    B. It is washed out with blood during menstruation
    C. Implantation of zygote occurs
    D. Its work of repairing the uterine wall gets complete

16. Which one of the following hormones helps to guard against miscarriage in pregnancy?
    A. Oestrogen
    B. Progesterone
    C. Oxytocin
    D. Prolactin

17. In the mammalian menstrual cycle, the decline in the level of progesterone is due to
    A. Successful conception
    B. Formation of corpus luteum
    C. Degeneration of corpus luteum
    D. Maturation of Graafian follicle

18. All the following are stimulated by the luteinising hormone **except**
    A. Proliferation of the uterine wall
    B. Development of the corpus luteum
    C. Stimulation of the corpus luteum to produce progesterone
    D. Ovulation

19. Which of the following foetal blood vessel carries the most oxygenated blood?
    A. Pulmonary artery
    B. Dorsal aorta
    C. Posterior vena cava
    D. Umbilical vein

20. Which one of the following conditions would most likely result in a miscarriage in humans?
    A. High level of progesterone and low level of oestrogen in blood
    B. High level of oestrogen and low level of progesterone in blood
    C. Low levels of progesterone and oestrogen in the blood
    D. High level of progesterone and oestrogen in blood

21. The importance of phototropism in plants is to enable
    A. Plants to grow towards mineral salts and water
    B. Climbing plants to get grip on their support

C. Plants in shade grow faster and get exposed to light
D. Plant roots gain anchorage

22. The movement of maggots to dark areas when exposed to light is an example of
E. Phototaxis
F. Reflex action
G. Phototropism
H. Conditioned reflex

23. When the tip of a maize coleoptile is covered with an Aluminium foil and then illuminated on one side, it grows straight because
A. The foil kills the hormones in the coleoptile
B. The tip does not receive the light stimulus
C. Hormones in the coleoptile move to the zone of elongation
D. The foil activates the hormones in the coleoptile

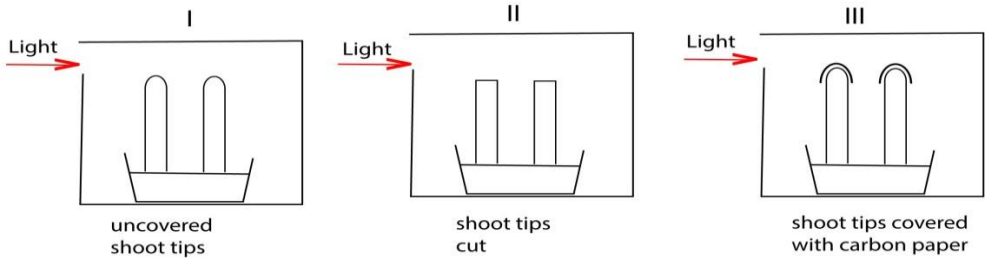
24. When a seedling is fixed on a rotating clinostat and placed in a horizontal position, the shoot continues to grow in a horizontal position because
A. Auxins accumulate on the lower side of the shoot
B. Production auxins stops
C. Auxins are uniformly distributed in the shoot
D. Auxins accumulate on the upper side of the shoot

25. The growth of a plant shoot towards light is induced by
A. Lack of auxins on the dark side
B. A higher concentration of auxins on the light side
C. A high concentration of auxins at the tip of the shoot
D. A higher distribution of auxins on the dark side

26. A radicle of a seedling grows downwards because he concentration of auxins is
A. higher on the lower side, promoting growth on that side
B. lower on its lower side, promoting growth on that side
C. higher on its upper side, promoting growth on that side
D. lower on its upper side, promoting growth on that side

27. Which one of the following is a nastic response?
A. Bending of shoot towards light
B. Folding of plant leaflets when touched
C. Growing of plant roots towards water
D. Bending of plant root towards gravity

28. The figure below is a setup of an experiment to show the effect of unilateral lighting on plant shoots



In which experiments would the shoot grow straight?

A. I and II
B. I and III
C. II and III
D. III only

29. Which of the following is directional growth response?
    A. Taxis
    B. Reflex
    C. Tropic
    D. Nastic

30. If a long-day plant has a critical night length of 10 hours, which one of the following conditions would allow flowering in the plant?
    A. 8 hours light and 16 hours darkness.
    B. 16 hours light and 8 hours darkness.
    C. 12 hours light and 12 hours darkness.
    D. 10 hours light and 14 hours darkness.

31. Onset of depolarization of an axon occurs when the axoplasm temporarily become
    A. more negative
    B. less negative
    C. more positive
    D. less positive

32. Wearing a coarse shirt causes a tickling sensation but the sensation disappears. Which of the following is **not** explanation of this observation?
    A. Supply of transmitter substances get exhausted
    B. The discharge of impulses at afferent nerve ceases
    C. The membrane surrounding the generator region becomes lesspermeable to sodiumions
    D. Generator potential falls below threshold values

33. A person who walks unsteadily may have a defect in the
    A. Cerebrum
    B. Cerebellum
    C. Medulla oblongata
    D. Hypothalamus

34. Which one of the following describes the sodium-potassium pump?
    A. Active pumping potassium ion out of the axon and sodium ions into it.
    B. Equal concentration of the ions on either side of the axon when at rest
    C. Inability of the axon to absorb the two ions passively
    D. Active pumping sodium ion out of the axon and potassium ions into it.

35. Which one of the following is not a transmitter substance?
    A. Acetylcholine
    B. Cholinesterase
    C. Atropine
    D. Noradrenaline

36. The principle function of the autonomic nervous system is to
    A. Innervate the internal organs
    B. Control the contraction of skeletal muscles.
    C. Regulate and control the peripheral nervous system
    D. Transmit impulses from the brain to the central nervous system

37. Which of the following represent the correct order of events that occurs at the synapse during impulse transmission?
    A. Ca^{2+} ion influx, release of transmitter substances, depolarization
    B. Depolarization, release of transmitter substance, Ca^{2+} ion influx
    C. Release of transmitter substances, Ca^{2+} ion influx, depolarization
    D. Release of transmitter substances, depolarization, Ca^{2+} ion influx

38. A likely effect of inhibiting the action of acetylcholinesterase at a synapse is
    A. Cessation of impulse transmission
    B. Speeding up of impulse transmission
    C. Continuous impulse transmission
    D. Slowing down of impulse transmission

39. Which one of the following occurs to the axon membrane during an action potential? It is
    A. Polarized with inside negative outside positive
    B. Depolarized with inside negative while outside positive
    C. Depolarized with inside positive while outside negative
    D. Polarized with inside positive while outside negative

40. Myelinated axons of a frog conduct impulses three times less fast as those of the same diameter in rat because the
    A. Myelin sheath in axons of frogs are thinner
    B. Rats are endothermic
    C. Neuron of a frog have more synapses
    D. Frog lives in water which is cold

Section B (Structured question)

41. When extensive lakes that existed in Bunyoro were reduced to isolated pools many years ago, four species of fish evolved as a result

(a) Suggest how the drying up of the lake system to isolated pools have resulted in evolution of the four new fish species. (4marks)

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(b) Describe how environmental factors act as stabilizing forces to natural selection in an isolates pool after the evolution of a new species. (03marks)

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(c) Suggest what would happen to the fish species if water levels rose and the isolated pools once again formed an extensive lake system. (03marks)

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42. (a) What is meant by negative feedback mechanism in the body process? (03marks)

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(b) Describe how each of the following affects the metabolism of carbohydrates

i. Insulin. (03marks)

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ii. adrenaline (03marks)

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(c)Describe how hormones from the ovary and pituitary gland interacts to control the human menstruation cycle. (06marks)

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43. Explain the factors that influence the type of nitrogenous waste excreted by animals. (16marks)

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(b) Describe osmoregulation in terrestrial insects. (04 marks)

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44. Write an essay on the gametes and their formation. (20 marks)

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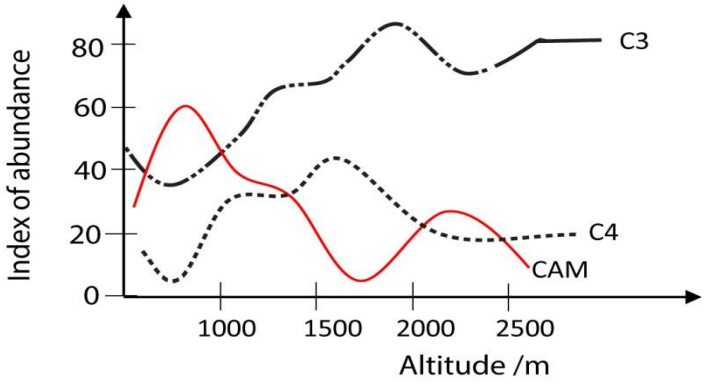
44. Figure below shows the distribution of C3, C4 and CAM plants at altitudes



(a) Suggest reasons for the trends in the distribution of each of the plants

(i) C3 plants. (02 marks)

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(ii) C4 plants. (02 marks)

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(iii) CAM plants. (02 marks)

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(b) State **four** physiologic differences between C3 and C4 plants. (04 marks)

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45. (a) Draw a fully labelled diagram of a neurotransmitter junction. (08 marks)

(b) Explain how the impulse are transmitted across the junction in (a) above. (07 marks)

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(c) How is the transmission across the synapse controlled? (04 marks)

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END