UNEB UACE BIOLOGY 2007

PAPER ONE

Answer all questions in both sections A and B.

SECTION A.

1. Which one of the following is a simple branched tubular gland?
a. Brunner's gland
b. Salivary gland
c. Sweat gland
d. Mammary gland

2. Which one of the following activities does not contribute to global warming?
a. Use of pesticides
b. Deforestation
c. Burning fossil fuels
d. Use of CFCs.

3. The significance of etiolation to a germinating seed in the soil is that it
a. Leads to rapid elongation of the hypocotyls in monocotyledonous plants.
b. Allows maximum growth in length with minimum use of food reserves.
c. Allows the seedling to grow in the dark
d. Ensures that leaves remain small to break through the soil.

4. Dioecious plants are rare inspite of having the advantages of cross pollination because
a. Anthers and stigmas mature at different times
b. The male and female plants are usually apart
c. Half of the individuals do not produce seeds
d. Only few agents of dispersal are involved

5. Which one of the following substances would be produced by plants under conditions of water stress?
a. Indoleacetic acid
b. Ethane
c. Bibberellins
d. Abscisic acid

6. Which one of the following does not lead to change in allele frequency of a population?
a. Mutation
b. Selection
c. Sexual recombination
d. Genetic drift

7. Birds learn to ignore a scare crow that is left in the same spot for a long time. This type of behavior is called?
a. Habituation
b. Associative learning
c. Imprinting
d. Conditioning

8. Mendelian expected probabilities of genotypes in a cross occur when
a. Small numbers of offspring are produced
b. Migrations occur in a population
c. Mutations arise
d. Fertilization is random

9. Which one of the following is not correct about the cells of a tissue?
a. Have similar function
b. Are of same origin
c. Are of one type
d. Have physical linkage

10. When a foetus receives antibodies from the mother through the placenta, it acquires
a. Active immunity
b. Long term immunity
c. Passive immunity

d. Artificial immunity

11. Worker bees are
a. Sterile females developed from fertilized eggs
b. Fertile males developed from unfertilized eggs
c. Sterile males developed from unfertilized eggs
d. Fertile females developed from unfertilized eggs.

12. The process of changing the information on mRNA into formation of polypeptides is known as
a. Transcription
b. Translation
c. Transduction
d. Transformation.

13. Which one of the following is an essential feature for successful terrestrial life of flowering plants?
a. Reduction of gametophyte to spores.
b. Development of pollen tube to transfer male gametes
c. Possession of well developed vascular system
d. Reduction of sporophyte to seeds

14. Which one of the following movements In fish is counteracted by the vertical horizontal fins?
a. Rolling
b. Backward drag
c. Pitching
d. Yawing

15. During which transfer of energy is most energy lost in an ecosystem?
a. Producers ----> primary --------> consumers
b. Primary ----> consumers ----> secondary ----> consumers
c. Secondary ----> consumers ----> tertiary ----> consumers
d. Tertiary ----> consumers ----> decomposers

16. The role of oestrogen during birth is
a. Causing contraction of the uterine wall
b. Increasing the sensitivity of the uterine muscles to oxytocine
c. Inhibiting the production of progesterone
d. Promoting milk production in the mammary glands.

17. Which one of the following does not contribute to the movement of water from the root system to the leaves in a flowering plant.
a. Root pressure
b. Cohesion forces
c. Transpiration pull
d. Atmospheric pressure.

18. Arthropods have a lower visual acuity compared to vertebrates because
a. The ommatidia are less sensitive than rods and cones
b. Compound eyes contain fewer rods and cones
c. The ommatadia are big and only few are packed in an equal area
d. The ommatidia contain photochemical pigments which are less readily bleached.

19. High carbondioxide concentration in respiring tissues is important because it causes
a. Local vasodilation, allowing more blood into the tissues
b. Low PH in the tissues leading to unloading of oxygen
c. Local vasoconstriction creating high blood pressure
d. Increased heart beat

20. A major difference between respiration and burning is that
a. No heat is produced during respiration
b. Burning Is a faster process
c. Burning is a chemical process
d. Chemical energy is stored in respiration

21. Which one of the following is the main form of the photosynthetic product transported through the phloem?
a. Starch
b. Amino acid

c. Sucrose
d. Glucose

22. Which one of the following structures supplies oxygenated blood to the foetus?
a. Umbilical cord
b. Umbilical vein
c. Placenta villi
d. Umbilical artery

23. Which one of the following best describes basal metabolic rate?
a. Average amount of energy produced by the body
b. Average amount of energy produced when at rest
c. Amount of energy produced by an average body
d. Amount of energy produced when all voluntary movements have ceased.

24. A property of cells in a multicellular organism is that they are
a. Small sized
b. Less functional
c. Less specialized
d. Dependant

25. Which one of the following tissues has the least power of regeneration?
a. Blood tissues
b. Epithelium tissue
c. Bone tissue
d. Nerve tissue

26. Which one of the following is likely to occur if a photosynthesizing plant was suddenly removed from light?
a. Reduction in PGA
b. Accumulation of PGAL
c. Accumulation of PGA
d. No change in amount of PGAL

27. Which one of the following molecules is represented in figure 1?

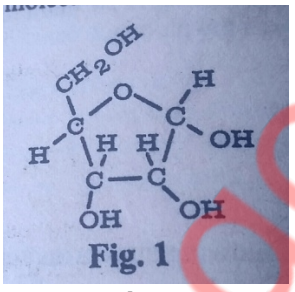


Fig. 1

a. Fatty acid
b. Deoxyribose
c. Glucose
d. Ribose

28. Establishing the genotype of an organism by crossing it with a homozygous recessive individual is carrying out a
a. Test cross
b. Dihybrid cross
c. Back cross
d. Monohybrid cross

29. In guinea pigs, the allele for rough coat (R) is dominant over one for smooth coat (r) and that for black (B) is dominant over one for white coat (b). the alleles for coat type and color are not linked. Across between rough black guinea pig and rough white one produced 28 rough black, 31 rough white, 11 smooth black and 10 smooth white. Which one of the following could be the genotype of the parents?
a. RrBb x Rrbb
b. RRBB x RRbb
c. RRBb x Rrbb
d. RrBB x Rrbb

30. Which one of the following is the reason why insects' eggs usually hatch rapidly into larvae?

a. Eggs have little York
b. Hatching is controlled by external factors
c. It is a way of avoiding predators
d. Due to excessive production of juvenile hormone

31. Higher concentrations of some ions in the cell sap of some fresh water algae compared to the external water is due to?
a. Diffusion
b. Active transport
c. Pinocytosis
d. Osmosis

32. Mixing of oxygenated and deoxygenated blood in amphibians is minimized by?
a. Rapid contraction of the ventricle
b. Spongy nature of heart muscles
c. Spiral valve in the trances arteriosus
d. Columnae carnae in the ventricular walls

33. Which one of the following describes the state of the membrane during resting potential?
a. Polarized
b. Neutral
c. Depolarized
d. Discharged

34. Which one of the following tissues would be stained deepest red by a dye that stains nuclei red?
a. Sieve tube
b. Tracheid
c. Collenchyma
d. Cambium

35. In which one of the following parts of chloroplast are water splitting enzymes mostly located?
a. Stroma
b. Intergrana
c. Cytoplasm
d. Grana

36. In which of the following may sporophytes contain haploid, diploid and triploid cells at some stage?
a. Conifers
b. Mosses
c. Flowering plants
d. Ferns

37. Compared to carbohydrates, fats have higher energy value because fats
a. Have long chains of fatty acids
b. Have a higher proportion of hydrogen
c. Are more compact in structure
d. Have a high proportion of oxygen

38. Which one of the following would delay flowering in a short day plant?
a. Twelve hours of darkness
b. More than ten hours of light
c. Interruption of dark period with a flash of light
d. Less than twelve hours of darkness

39. Which one of the following nitrogenous wastes is suitable foe elimination by a fresh water fish?
a. Urea
b. Uric acid
c. Ammonia
d. Trimethylamine oxiode

40. Which one of the following is correct about the sympathetic nervous system?
a. Nerve endings produce nor-adrenaline.
b. Preganglionic fibres are long and post ganglionic fibres are short
c. Nerve endings produce acetylcholine
d. Ganglia are embedded in the walls of the effector organs

SECTION B

41. Figure 2 shows oxygen dissociation curves for haemoglobin of two animals x and y, living in different habitats.

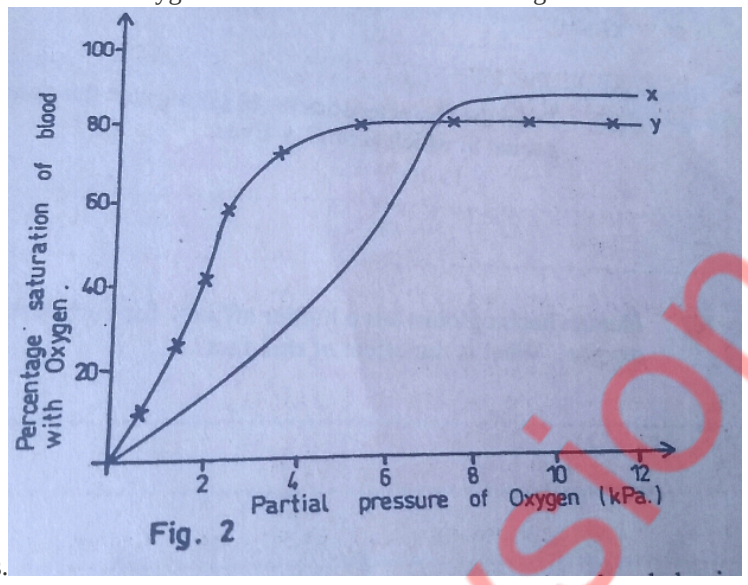


Fig. 2

a. From the figure, state three differences in the behavior of haemoglobin of the two animals.

b. (i) outline the characteristics of the haemoglobin of animal y.
(ii). From the characteristics in b) (i) suggest the nature of the habitat in which animal y lives.

c. Human haemoglobin has a higher affinity for carbonmonoxide than oxygen. What is the effect of this fact?

42.Differentiate between respiratory quotient (RQ) and basal metabolic rate (BMR)
b. Table 1 shows the respiratory quotient in germinating seeds under different treatments.
Table 1

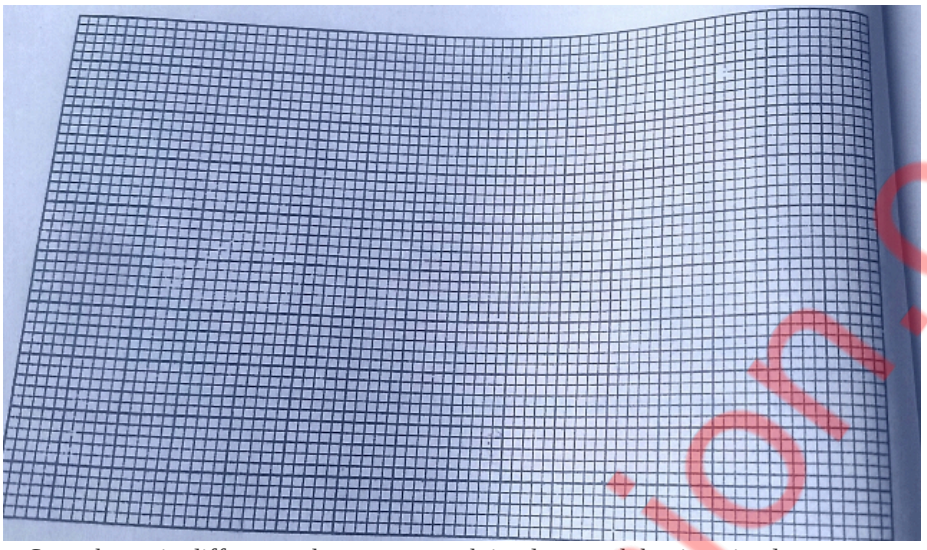
	Treatment	RQ
i.	4 hr soaking in water	6.0
i.	4 hr soaking then 4 hr exposure to air	1.8
i.	4 hr soaking then 24 hr exposure to air	1.0

Explain the different respiratory quotients of the germinating seeds under the different treatment.
C. Explain why the BMR varies with the age of the individual.

43. Table 2 shows the increase in size of a leaf of a plant with time.
T**able 2**

Days	Area of leaf (cm^2)	Rate of growth (cm^2 day^{-1})
0	0	
5	40	
10	200	
15	250	
20	250	

a. Complete the table by working out the growth rate at 5 days intervals.
b. In the space provided, plot actual growth and growth rate curves.



c. State the main differences between growth in plants and that in animals
d. What are the limitations of measuring leaf area as a way of measuring growth in a plant?

44. (a) (i) describe how the quadrat method can be used to determine species density.
(ii) State the advantage and disadvantage of the method.

(b) (i) Why is it important to estimate population size?
(ii) in estimating the number of fish in a small lake, 625 fish were caught, marked and released. After one week, 920 fish were caught and of these, 150 had been marked. What was the estimated size of fish population?
(iii). In using the method of b (ii) to estimate the population size of fish, state two assumptions that were made.

45. (a) With reasons, give examples of animals which produce each of the following excretory products:
(i) Ammonia
(ii) Uric acid

b. State
(i) Why the pH of the body fluids in a human body is kept constant.
(II) Three ways of keeping pH in b (i) constant.

46 (a) What is placenta activity?

(b) state the ecological importance of each of the following forms of behavior.
(i) Territorial behavior
(ii) Courtship behavior

C . Give two ways in which animals avoid predation.

PAPER TWO

Answer questions one in section A plus three others from section B.

1. Two groups of maize seeds were germinated and grown in different culture solutions. Group A were provided with a complete nutrient solution while group B were provided with a solution lacking magnesium. An extract of photosynthetic pigments was made from leaves of each group of seedlings the end of three week. Figure 1 is the absorption spectra obtained from the extracts.

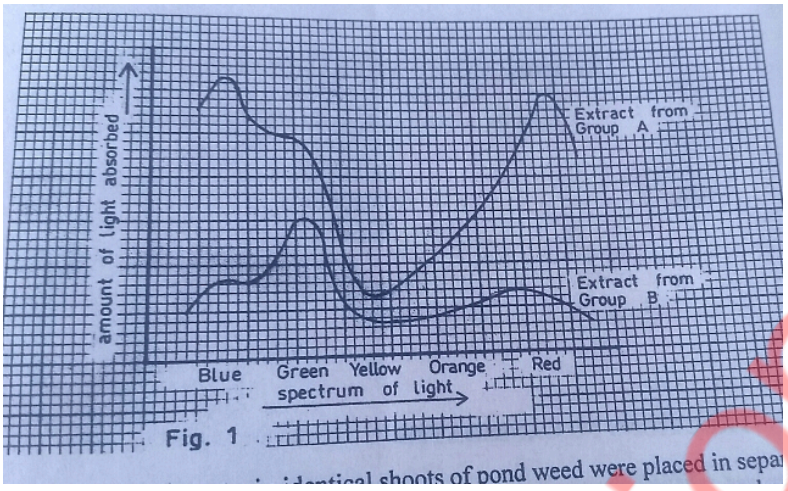


Fig. 1

identical shoots of pond weed were placed in sepa

In another experiment, six identical shoots of pond weed were placed in separate test tubes of pond water in which a dilute solution of sodium hydrogen carbonate had been added. Each test tube was then exposed to light which had passed through a different colored filter. The light in all cases was from a 40 watt bulb, placed 40 cm from the test tube. The time taken for 20 bubbles to leave cut end of each shoot was recorded three times and the average results are recorded in Tble1.

Table 1

Colour of filter	Average time taken to release 20 bubbles in seconds	Number of bubbles released per minute
Violet	58	
Bleu	40	
Blue-green	62	
Green	132	
Yellow	96	
Orange-red	70	

Use the information to answer the questions that follow.

a. Compare the light absorption by extract from A and that from group B across the light spectrum.

b. Explain the light absorption across the light spectrum for each extract

c. How does a colored filter affect light passing through it

d. (i) Copy and complete Table 1 by calculating the number of bubbles released by each shoot per minute.
(ii). Plot a graph to show the relationship between the color of the filter and the rate at which bubbles are released.

e. (i) compare your graph with that in figure 1 and state the relationship between the two.
(ii). What conclusion can you draw from the relationship?

f. State what would be absorbed if the distance between the bulb and the test tubes was gradually reduced. Explain your answer.

g. Explain why
(i) They type of bulb and the distance of the bulb from the test tubes were kept constant
(ii) A dilute solution of sodium hydrogen carbonate was added to pond water in the test tubes.
(iii) There were three measurements made on each shoot rather than a single one.
(iv) Measuring the rate of photosynthesis by counting bubbles is not an accurate method.

Section B

2. (a) What is meant by negative feedback in body processes?
(b) Describe how each of the following affects the metabolism of carbohydrates
(i). Insulin
(ii) Adreline

(c) Describe how hormones from the ovary and the pituitary gland interact to control the human menstrual cycle.

3. Explain how the epithelia tissue is adapted for it's functions

4. (a) Describe the structure of guard cells in a plant leaf
(b) Explain how stomatal opening occurs according to:
(i) Starch ------ sugar interconversion.
(ii) Photosynthetic theory

5. Outline the functions of cell nucleus
a. Describe the changes that occur in a nucleus during meiosis
b. Explain the significance of mitosis and meiosis in organisms

6. Explain the meaning of the following
(i) Genetic isolation
(ii) Reproductive isolation
(b). Explain how the gene frequency of a population may be altered.