

TERTIARY ENTRANCE EXAMINATION, 1986 - QUESTION/ANSWER BOOKLET

BIOLOGY

Please place one of your student
identification labels in this box

STUDENT NUMBER - In figures

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In words

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TIME ALLOWED FOR THIS PAPER

Reading time before commencing: Ten minutes
Working time for paper: Three hours

MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER

See Page 2

FOR MARKERS' USE ONLY

SECTION	Q. NO.	1ST MARKER	2ND MARKER	SECTION	Q. NO.	1ST MARKER	2ND MARKER
B	31			C	39a		
	32				39b		
	33				39c		
	34				40a		
	35				40b		
	36				40c		
	37						
SUB TOTAL B				SUB TOTAL C			

TOTAL	1ST MARKER =	2ND MARKER =	FINAL TOTAL =
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SEE PAGE 2

MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER

TO BE PROVIDED BY THE SUPERVISOR

This Question/Answer Booklet comprising 39 pages and 40 questions
Separate Multiple Choice Answer Sheet

TO BE PROVIDED BY THE CANDIDATE

Standard Items

Pens, pencils, eraser, ruler

Special Items

A '2B' pencil for the Separate Multiple Choice Answer Sheet

IMPORTANT NOTE TO CANDIDATES

No other items may be taken into the examination room.

It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. Please check carefully and if you have any unauthorised material with you hand it to the supervisor BEFORE reading any further.

INSTRUCTIONS TO CANDIDATES

Marks will be allocated as follows: SECTION A - 30 marks

SECTION B - 46 marks

SECTION C - 24 marks

Write your number on the front of this QUESTION/ANSWER BOOKLET.

Attempt all questions in Section A on the Separate Multiple Choice Answer Sheet, which will be collected separately by the Supervisor.
Use a '2B' PENCIL. Do NOT use a ball point or ink pen.

Marks are not deducted for wrong answers.

Answer Sections B and C in the places provided in the QUESTION/ANSWER BOOKLET. Draw graphs in pencil before inking in the lines.

Do NOT copy the question when writing an essay (Section C). Merely write the number of the question in the margin.

Use a blue or black PEN (not pencil) when answering Sections B and C.

You MUST NOT take this QUESTION/ANSWER BOOKLET away from the examination room.

SEE PAGE 3

SECTION A

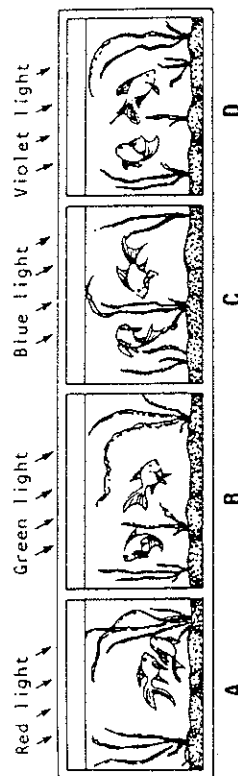
Suggested time: 40 minutes (30 marks)

Record each answer for questions 1-30 by marking your choice of alternatives on the Separate Multiple Choice Answer Sheet using a '2B' pencil.

If you want to change an answer, rub out your first answer and mark your new one.

The Separate Answer Sheet for this Section will be collected separately by the Supervisor.

1. A pet shop proprietor set up a novel display of goldfish in tanks illuminated by coloured lights as shown below.



Despite his experience, and the care he took to ensure that each tank had the correct proportions of fish and plants, he found that in one tank, after a few days, the plants became unhealthy and the fish began to die. This tank would have been

- (a) tank A.
- (b) tank B.
- (c) tank C.
- (d) tank D.

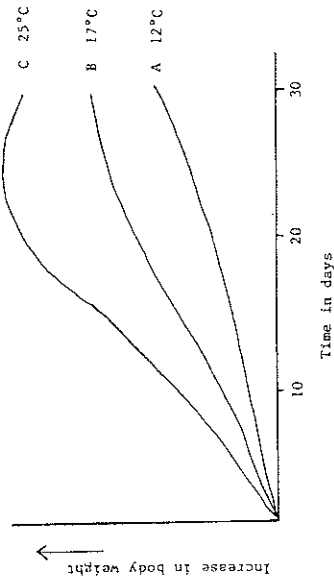
2. There is a breed of cats in which genes for black or white hair colour do not show dominance or recessiveness. If a cat carrying only genes for black hair colour is bred to a cat carrying only genes for white hair, all of the offspring have grey hair. If two of these grey cats reproduce, the expected ratio of the progeny would be

- (a) either all black or all white.
- (b) 1/2 black, 1/2 white.
- (c) 1/2 grey, 1/4 white, 1/4 black.
- (d) 1/3 each of black, white and grey individuals.

SEE PAGE 4

5. The following graph summarises the growth of 3 batches (labelled A, B and C) of insect larvae over a period of 30 days. The larvae were obtained from eggs laid by a single female and each batch was raised at a different temperature.

Graph of larval growth with time



Which of the following statements is best supported by the graph?

- (a) The larvae in batch C would have matured before larvae in the other batches.
 (b) Growth of the larvae reached a maximum at 30 days.
 (c) The three batches each had different optimum temperatures for growth.
 (d) Growth of the larvae was influenced by temperature.

6. A species of insect has the following life cycle:

egg → larva 1 → larva 2 → larva 3 → pupa → adult

If a gland, the corpus allatum, is removed from a stage 1 larva, that larva moults into a small pupa instead of a larva of stage 2. However, if a corpus allatum from a young larva is ground up and injected into a stage 3 larva, the latter moults to form a larger larva rather than a pupa.

There is evidence that the corpus allatum produces a substance which

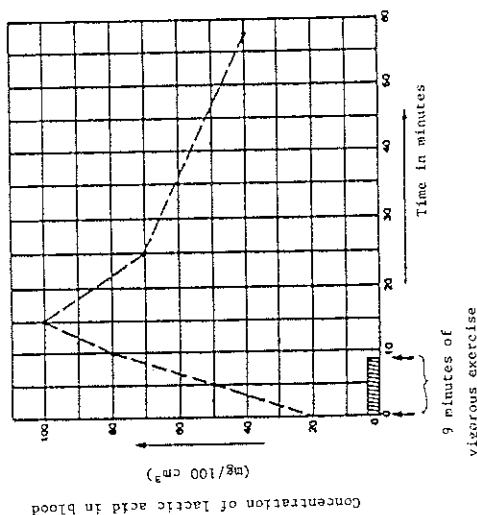
- (a) stimulates moulting.
 (b) inhibits moulting.
 (c) stimulates differentiation of larval tissue to pupal tissue.
 (d) inhibits larval tissue from differentiating to pupal tissue.

SEE PAGE 6

Question 3 is based on the following information.

3. A man carried out vigorous exercises for 9 minutes. During and after the exercise regular blood samples were taken and analysed. One compound, lactic acid, was found to vary greatly in its concentration, as seen in the graph below.

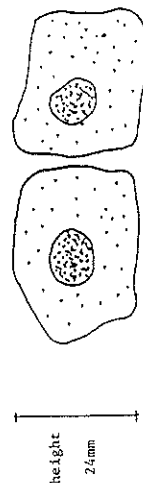
Changes in blood lactic acid levels with exercise.



What was the concentration (in mg/100 cm³) of lactic acid in the body 21 minutes after the end of vigorous exercise?

- (a) 60
 (b) 66
 (c) 70
 (d) 83

4.

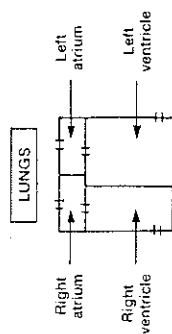


Two cells observed by students under high power of a microscope, using a X10 ocular and a X40 objective, appeared to be of the height shown above. If the same ocular and a X10 objective had been used, what would have been the apparent height of the cells?

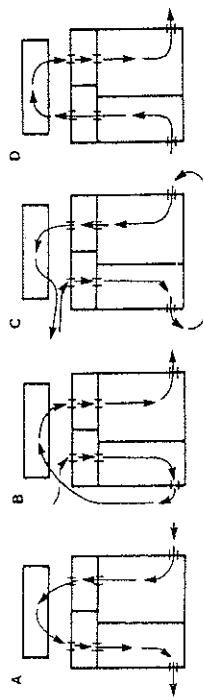
- (a) 6mm
 (b) 24mm
 (c) 48mm
 (d) 96mm

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7.



Using the above model as a key, which of the diagrams below correctly illustrates the flow of blood from the body to the heart and lungs and back to the body in mammals?



- (a) Diagram A
(b) Diagram B
(c) Diagram C
(d) Diagram D

8. The Fat-tailed Dunnart, *Sminthopsis crassicaudata*, is a small nocturnal marsupial which has large eyes and ears. It feeds on insects. The Marsupial Mole, *Notoryctes typhlops*, is also insectivorous but has no eyes and only a small earhole on each side of its head.

The differences in their sense organs are probably due to differences in their

- (a) locomotory habits.
(b) diets.
(c) nocturnal, compared to diurnal, behaviour.
(d) methods of avoiding high temperature.

SEE PAGE 7

9. An ordinary fish cannot live in salt solutions more concentrated than sea water because

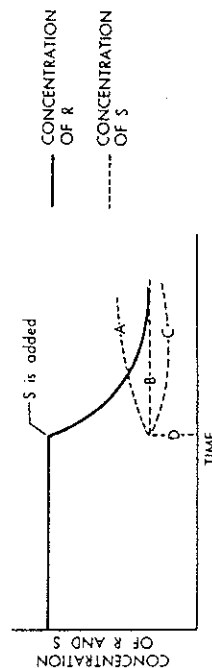
- (a) most ponds of salt water are too shallow.
(b) its kidneys do not have the ability to excrete salt.
(c) water leaves tissues too rapidly by osmosis.
(d) the increased density of the water would cause the fish to float.

10. Phenylketonuria (PKU) is an inherited human disease which causes mental deficiency in infants. The condition is due to the lack of an enzyme which normally converts the essential amino acid, phenylalanine, to another amino acid, tyrosine. The accumulation of phenylalanine damages developing brain tissue but, if PKU infants are fed on a special diet which is low in phenylalanine, they will show normal brain development.

The special diet for PKU infants would have a carefully-regulated intake of

- (a) lipids.
(b) carbohydrates.
(c) proteins.
(d) vitamins.

11. The following graph shows changes in the concentration of a substance, R, when another substance, S, is added to it. The graph also shows four possible ways in which the concentration of S might change on being added to R.

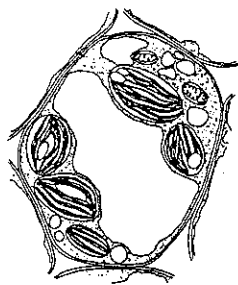


If S is an enzyme, the line describing its concentration is most likely to be

- (a) line A.
(b) line B.
(c) line C.
(d) line D.

SEE PAGE 8

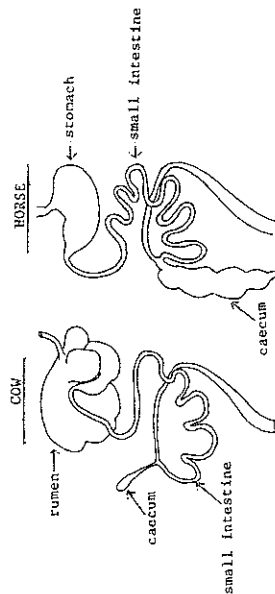
16. The diagram below shows a cell of a multicellular organism.



In general, organisms containing cells such as the one shown

- must digest their nutrients before taking them into the cell.
- synthesize their own organic materials from inorganic materials in the environment.
- require complex molecules already synthesized by other organisms.
- require no external energy source since they synthesize their own high energy compounds.

17.



Cellulose-digesting micro-organisms are found in the alimentary canals of cows and horses. In cows they live in the rumen (a chamber of the 'stomach') but in horses they are found in the caecum at the end of the small intestine. The products of cellulose digestion by micro-organisms are fatty acids.

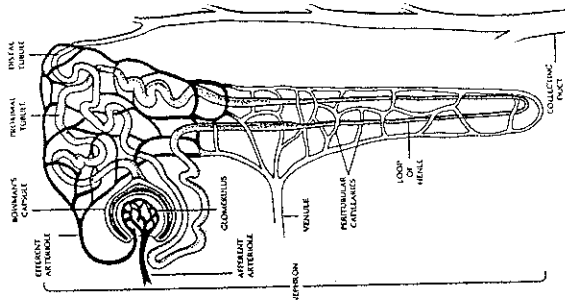
Cows obtain more nutrition than horses from the symbiotic relationship because

- fatty acids can be broken down more easily in the stomach.
- most absorption takes place in the small intestine.
- grass is low in cellulose.
- fatty acids are lower in energy value than carbohydrates such as cellulose.

SEE PAGE 10

12. The Loop of Henle forms part of the nephron, the excretory structures found in the kidney. The Loop of Henle extracts certain ions from the fluid passing through it. If the concentration of the solution of these ions within the tube is less than that in cells of the tube wall, by what process would ions pass into these cells?

- Active transport.
- Diffusion.
- Osmosis.
- Random movement of ions.



13. The nephron is surrounded by, and intertwined with, blood vessels which arise from the renal artery and lead to the renal vein. Of the following, which best describes the function of this blood supply?

- It only supplies O_2 for the cells.
- It only removes wastes from the cells.
- It supplies O_2 for, and removes waste from, the kidney cells.
- It supplies O_2 for the cells and brings waste for removal.

14. How can you decide most easily whether certain cells being examined under the microscope are plant cells or animal cells?

- Note whether the cells are cuboidal, spherical or flattened and tile-like.
- Note whether or not the cells are ciliated.
- Note the thickness and character of the cell boundaries.
- Note whether or not the cells have spores.

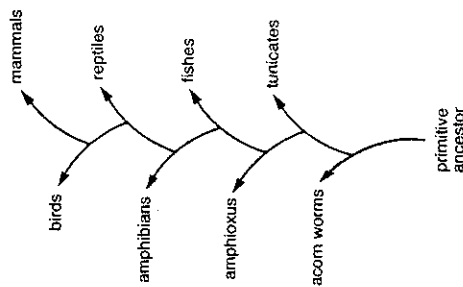
15. If saliva is added to starch solution at $30^\circ C$, one would expect the starch to be converted to sugar by an enzyme

- more slowly than if the mixture were boiled.
- more slowly than if the mixture were kept at $0^\circ C$.
- rapidly at first, but more and more slowly as the enzyme is used up.
- until practically all the starch has been converted.

SEE PAGE 9

18. From the following statements, select the one which gives the LEAST support to the modern theory of evolution.
- Fossil organisms similar to those found today differ from present-day forms in certain features.
 - All chordates have structural similarities.
 - All mammals develop gill pouches during their embryonic stages.
 - There are still protozoans in the world today.

19. After examination of fossil evidence, a researcher constructed the following diagram to represent a possible phylogenetic tree for chordates.



Which of the following suggestions is NOT supported by the above relationships?

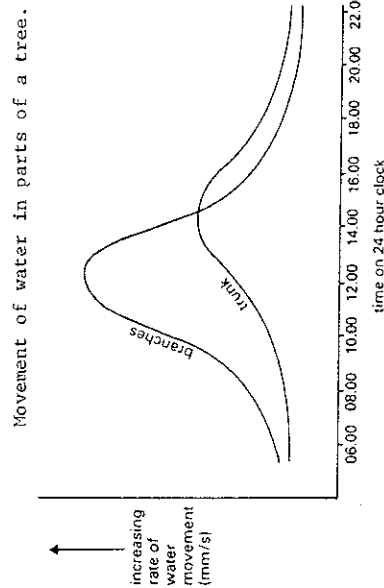
- Acorn worms and amphioxus are more alike than acorn worms and tunicates.
- Amphioxus appears in the fossil record before fishes.
- The relationship between fishes and amphibians is similar to that between birds and mammals.
- Fishes have more characteristics in common with the primitive ancestor than do birds.

20. One of the major medical problems of this century is the speed with which bacteria become resistant to new antibiotics. For such a bacterial species, which of the following would NOT always be true?
- The bacteria differ in their inheritable ability to withstand antibiotics.
 - A dominant gene controls the mechanism which achieves resistance to the antibiotic.
 - The bacterial population is able to evolve in response to a changing environment.
 - Resistant bacteria survive the new antibiotic.

SEE PAGE 11

21. Blockages in the lymph vessels in a limb will cause it to swell up with fluid. The swelling is due to
- the drainage of the intercellular fluid from the limb is blocked.
 - the capillaries in the limb swell up.
 - more blood escapes from the blood vessels.
 - the limb becomes infected.

Question 22 is based on the following graph.



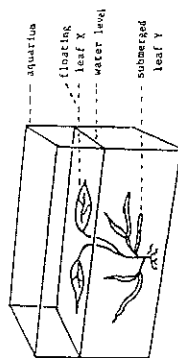
22. The results presented in the graph support the theory that
- the greatest rate of transpiration normally occurs at 14.00 hours.
 - the rate of water movement in the branches is not related to that in the trunk.
 - the leaves provide the driving force for the upward movement of water.
 - a larger amount of water passes through the branches than the trunk.
23. The role of natural selection is diminishing in the human population primarily as a result of today's
- increasing mutation rate in human beings.
 - increased medical and biological understanding.
 - population explosion and an increase in world travel.
 - reduced death rate in advanced countries.

SEE PAGE 12

Questions 24 and 25 refer to the following table of possible answers and to the diagram of the pondweed *Potamogeton*.

Table of possible answers

	Number of stomata on upper surface	Number of stomata on lower surface
A	many	many
B	many	none
C	none	many
D	none	none



24. Which description in the table refers to leaf X?

- (a) Description A.
- (b) Description B.
- (c) Description C.
- (d) Description D.

25. Which of the following statements is UNTRUE?

The submerged filamentous leaves such as Y

- (a) offer little resistance to rapid water flow.
- (b) do not take in oxygen through stomata.
- (c) possess many xylem vessels for support.
- (d) contain normal amounts of chlorophyll.

26. It was found by experiment that the heat loss per unit weight of a small mammal was greater than that of a large mammal, although their body temperatures were identical.

Which one of the following conclusions can be drawn from this result?

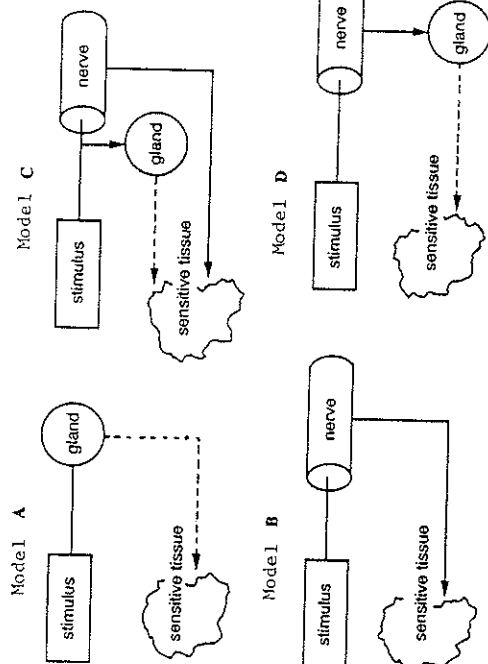
- (a) Small mammals are more active than large mammals.
- (b) Large mammals are better adapted to their physical environment than are small mammals.
- (c) Small mammals have a higher metabolic rate than do large mammals.
- (d) Large mammals have a greater surface area than do small mammals.

SEE PAGE 13

27. The toad, *Xenopus*, is observed to change the depth of colour of its skin with the darkness of its background. Biologists found that cutting the toad's nerve supply to the sensitive tissue in the skin had no effect, but cutting the nerve from the eye to the brain did prevent colour change occurring. After removing the pituitary gland, a dark toad became light but when it was injected with pituitary gland extract, it darkened again.

Which one of the following models fits the above experimental data?

[----- = hormone - - - - - = nerve impulse]



- (a) Model A.
- (b) Model B.
- (c) Model C.
- (d) Model D.

28. A hummingbird hibernates every night because

- (a) its metabolic rate is so low that it becomes exhausted.
- (b) its natural environment is cold by day and by night.
- (c) it feeds on nectar from flowers whose petals close at night.
- (d) its relatively large surface area would lead to its losing too much heat.

SEE PAGE 14

29. The sex of a fruit fly is determined by a mechanism very similar to that in a mammal. It follows therefore that

- sperms produced by the males are of two sorts. When combined with an egg, approximately half produce male flies and half produce female flies.
- eggs produced by the female are of two sorts. Approximately half produce male flies and half produce female flies.
- the sex of the young flies is determined by the way the egg and the sperm combine.
- male flies have fewer chromosomes than do female flies.

Question 30 is based on the following table.

Time from start of experiment in minutes	Units of nitrate ions taken up by plant tissue under the following conditions		
	sugar absent, oxygen present	sugar present, oxygen absent	sugar and oxygen present
0	0	0	0
30	0	30	100
60	0	50	150
90	0	70	180
120	0	70	200

30. The results in the above table indicate that ion uptake by plant tissue

- is greater under aerobic respiration.
- is greater under anaerobic respiration.
- is not affected by O_2 levels.
- is not affected by sugar concentration.

SEE PAGE 15

SECTION B

Suggested time: 90 minutes (46 marks)

Attempt all questions in the section.

Write your answers in the spaces provided.

Use a black or blue pen or biro when answering Sections B and C.

31. (5 marks)

In flowering plants, (i) the transport of water and dissolved mineral ions and (ii) the transport of organic food substances are two fundamentally different processes.

- Name the tissue concerned with water transport.

- State the direction(s) of water movement.

- Name the tissue concerned with food transport.

- State the direction(s) of food movement.

- For which of the two processes (i) and (ii) does the plant have to supply the greater amount of energy?

- Explain your answer to (e).

- A biologist placed part of a transpiring shoot under a microscope and isolated one water-conducting vessel. He then pierced the vessel with a needle and found that the water column in the vessel snapped back in both directions. Put forward a hypothesis to account for this observation.

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32. (continued)

(a) What leaf temperature is optimum for PHS in

(i) the C_3 plant?(ii) the C_4 plant?

(b) Which of these two plants is most likely to be found in cool temperate environments? Explain.

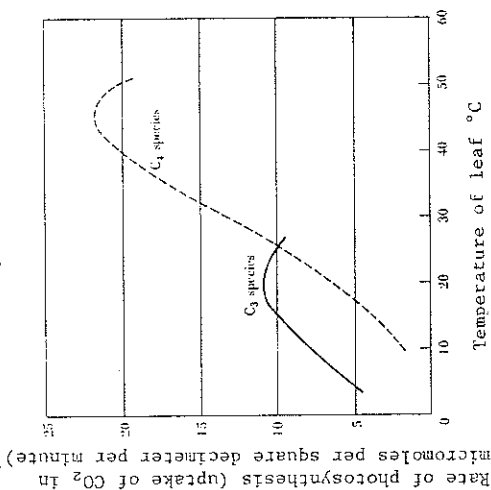
(c) Some important crop plants, e.g. sugar cane, maize, millet, use the C_4 cycle. In which regions of the world might these plants have originated?(d) It is found that among the world's 18 most prolific weeds, 14 are C_4 plants. How could a C_4 cycle benefit these successful plants?(e) How could an understanding of the C_4 pathway help in developing herbicides to control these weeds?

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32. (7 marks)

Research by scientists in New Zealand in 1965 showed that some plants fix atmospheric CO_2 by a " C_4 " cycle in which a 4-carbon substance, rather than a 3-carbon substance is first produced. The C_4 cycle may increase by up to a hundred times the CO_2 uptake by leaf cells compared with the amount used in plants which have a C_3 cycle. Photosynthesis (PHS) in C_3 and C_4 plants is compared in the following graph and table.

Graph of rate of PHS for a C_3 plant (*Deschampsia*) and a C_4 plant (*Tidestromia*) at different temperatures.



Characteristic of plants	Type of photosynthesis	
	C_3	C_4
Enzymes used in CO_2 fixation	RuDP carboxylase	PEP carboxylase and then RuDP carboxylase
Transpiration rate	high	low
Response of PHS to increasing light intensity at optimum temp.	maximum rate at about 1/4 to 1/3 full sunlight	maximum rate at full sunlight
Dry matter produced (tonnes/hectare/year)	22	39

SEE PAGE 17

33. (4 marks)

The food-catching response of *Hydra* to potential food organisms in water may be due to chemicals produced by the prey or to the vibrations the latter makes in the water.

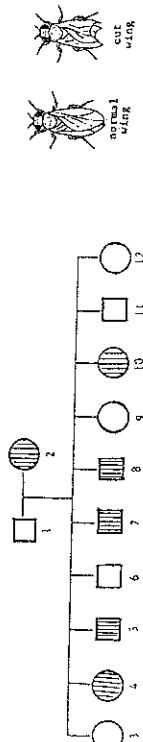
Describe an experiment to investigate these two possible stimuli.

SEE PAGE 19

34. (6 marks)

An agricultural officer investigating the genetics of fruit fly in Bridgetown, Western Australia, found that a cross between a pure strain showing "cut wing" and normal flies produced only normal flies in the first generation. If these normal flies were again crossed with "cut wing" flies, a pedigree similar to the following could be drawn up.

○ = female, □ = male and shading indicates cut wing.



(a) What are the genotypes of flies 1, 2, 10 and 11? Use N for normal and n for cut wing.

Fly 1

Fly 2

Fly 10

Fly 11

(b) If flies 6 and 9 were mated, what proportions of cut wing and normal flies would be expected from the cross?

Normal

Cut wing

During the year following the Bridgetown experiment, the officer continued his research in Kununurra in tropical Western Australia. Using the same stocks as before, he found that this time the offspring of the crosses were normal wing flies in every generation.

(c) Explain what could be causing the change in the phenotypes of the flies in the Kununurra experiment.

(d) Suggest an experiment by which the researcher could test for the presence of the cut wing gene in the flies at Kununurra.

SEE PAGE 20

35. (4 marks)

An experiment was set up to investigate the digestive processes in the small intestine. Five test tubes were prepared, each containing 5ml of fresh cream and the indicator, phenol red, which turns from pink to yellow in the presence of acid. To each tube were added water, bile salts and an extract from the pancreas (pancreatin), as shown in the table below. A pinch is the amount held on the flat end of a toothpick.

Tube No.	H ₂ O	Bile salts	Pancreatin	Time taken to turn yellow
1	5ml	pinch	-	no change
2	-	pinch	5ml fresh	8.5 minutes
3	-	-	5ml fresh	45 minutes
4	-	pinch	5ml boiled	no change
5	5ml	-	-	no change

(a) What reaction causes the colour change in the phenol red in this experiment?

(b) What is the role of the pancreatin in this experiment?

(c) Suggest what role the bile salts played in the reaction.

(d) Which of the test tubes was included to control for the presence of pancreatin as a variable? Explain your answer.

SEE PAGE 21

36. (6 marks)

Both mammals and typical plants lose water from their surfaces.

(a) Name the process by which water is lost from the surface of

(i) a terrestrial plant

(ii) a mammal

(b) What function(s) is (are) served by water loss in

(i) the plant?

(ii) the mammal?

(c) What structures are involved in control of water loss in a plant and how is the loss controlled?

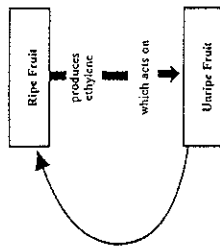
(d) What structures are involved in water loss from the surface of a mammal and how is the loss controlled?

SEE PAGE 22

37. (continued)

b) Account for the changes in masses during the course of the day.

c) Ripe bananas produce the gas ethylene which stimulates ripening in other fruit. This is represented simply in the following diagram.



(i) In what way is this process similar to the process of the control of calcium levels in the blood?

(ii) In what way is it different?

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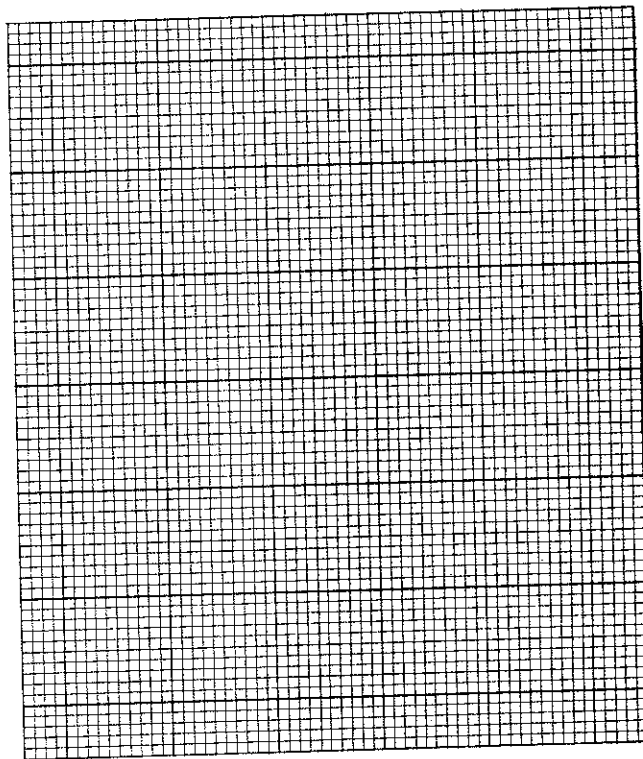
37. (10 marks)

An investigation was conducted on the rate of photosynthesis of a banana plant during the course of a whole day from 5 a.m. till 11 p.m. The techniques used involved the determination of the dry mass of a sample of leaf discs cut from the growing leaves at 2-hourly intervals. The data obtained are shown in the following table.

Dry masses of leaf discs

Sampling time (h)	Mass (g)	Sampling time (h)	Mass (g)
5.00	3.01	15.00	3.80
7.00	3.04	17.00	3.95
9.00	3.16	19.00	4.02
11.00	3.40	21.00	4.00
13.00	3.66	23.00	3.86

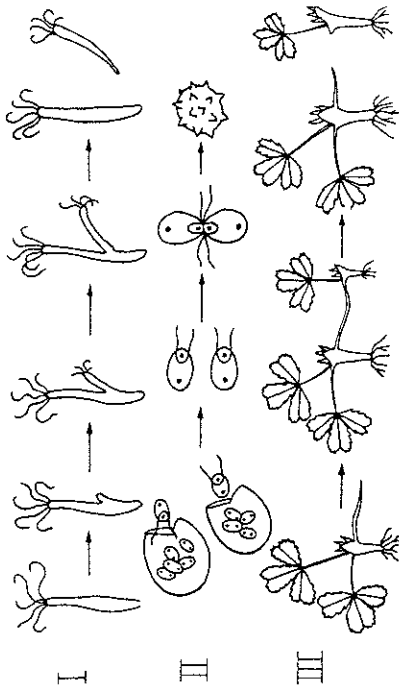
a) Graph these data on the graph paper below. The spare graph on page 39 may be used if you spoil this one.



SEE PAGE 23

38. (4 marks)

The following sketches illustrate reproduction in three different organisms.



(a) In which organism(s) is (are) the progeny genetically different from the parent generation?

(b) In which of the situations is meiosis part of the cycle?

(c) List the differences between the processes of mitosis and meiosis which result in genetic variation. Explain how this variation is achieved.

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SECTION C

Suggested time: 50 minutes (24 marks)

There are three alternatives to each question. Choose ONE alternative from each question.

Each question is worth 12 marks. Answer both questions in essay form. Write your answers on the sheets provided at the end of this section. Where possible, support your answers with labelled diagrams. TWO marks may be deducted from each answer which is poorly presented, set out in point form or written with other than a blue or black pen or biro.

39. EITHER

(a) What problems are faced by terrestrial animals in order to obtain sufficient oxygen for their body needs?

Compare and contrast the structure and functions of the organs used by

- (i) land-living vertebrates
 - and (ii) land-living arthropods
- for oxygen intake.

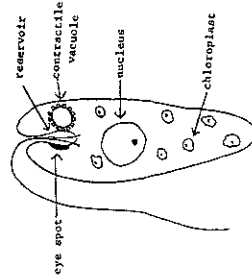
OR

(b) "There is always, at every moment, a delicate interplay between the hormonal system and the nervous system acting together on the glands, muscles and other target organs of the body and so enabling the body to integrate and co-ordinate its responses to changes in internal and external environments."

Discuss this statement with reference to the homeostatic control of body temperature in an endothermic vertebrate such as a bird or a mammal.

OR

(c)



Euglena (see diagram above) is commonly an autotroph, although it may function as a heterotroph if placed in certain environments.

Describe

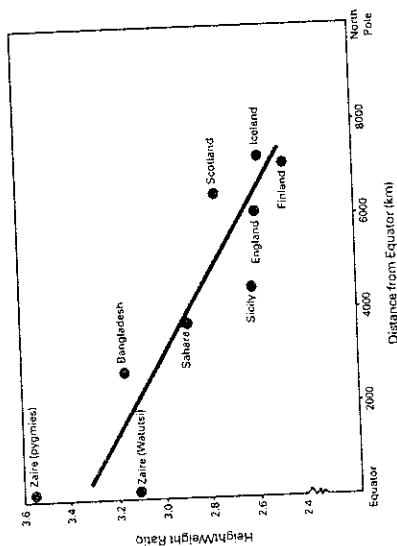
- (i) the differences in cellular inputs and outputs under these different environmental conditions
- and (ii) the changes in the relative frequency and activity of cell organelles in the change from an autotrophic to a heterotrophic function.

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40. EITHER (a) OR (b) OR (c)

(a)(i) The human species shows structural, physiological and behavioural variations which are often associated with environmental differences. Discuss the above statement in relation to the information you can derive from Figure 1.

Figure 1 shows a possible relationship between human build and environmental temperature. Human build can be described roughly by dividing height by weight. Temperature is indicated roughly by distance from the Equator.



(ii) The application of scientific knowledge and of technology to human ways of life has led to cultural changes, but often at the cost of greater energy consumption in order to produce the same amount of food.

By reference to Table 1 and Figure 2, discuss the factors which might have led to the changing efficiency of energy consumption and explain how these factors could increase the problems facing less developed countries in future years.

Table 1. Corn Production in U.S.A.

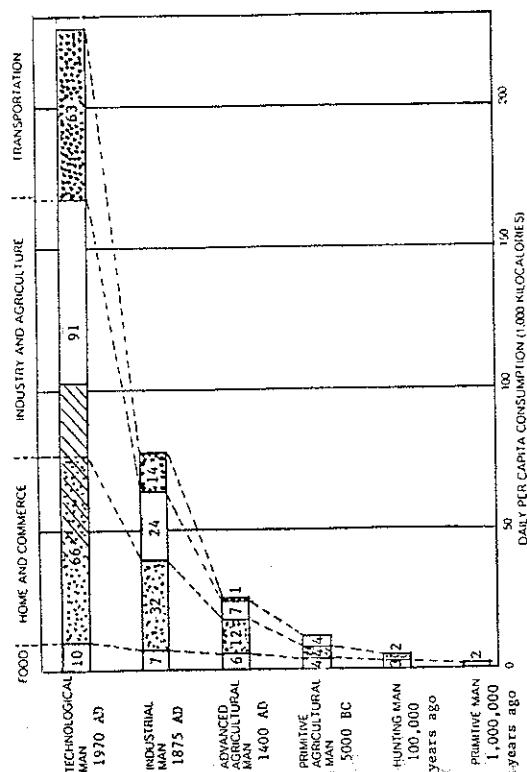
	1945	1954	1970
Total energy input (units)	925,000	1,548,300	2,896,800
Corn yield (energy units)	3,427,200	4,132,800	8,164,800
Ratio	3.70	2.67	2.82

[40(a) is continued on next page.]

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40. (a) (continued)

Figure 2 shows the daily consumption of energy for each person (per capita) calculated for six stages in human development. The diagonally hatched area represents the amount of electricity used.



(iii) Suggest feasible ways in which man could reverse the trend illustrated in Figure 2.

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40. (continued)

OR

- (b) Ponds found on granite outcrops in South-West Australia may be compared with oceanic islands. The granite outcrops are separated from one another by large tracts of dry country which are barriers to the dispersal of small animals such as midges. Thus the populations within the ponds on one outcrop are likely to be isolated from those on other outcrops. Jones (1971) discovered that the midges in one area were often of a different species from those of neighbouring districts.

Explain the process by which such differences might arise. How could Dr Jones have determined that the midges were of different species?

OR

- (c) The wild blue lupin shows signs of human cultivation in its possession of large seeds. However, these seeds have a very hard coat, are green in colour and have a bitter taste. The pods shatter when dry, scattering the seeds widely.

Genetic research overseas and at the University of Western Australia has produced white-flowered lupin varieties with soft, white seeds lacking bitter alkaloids, which are held in non-shattering pods. The latest varieties are even resistant to fungus diseases, mature earlier and grow into taller plants. These characteristics are often each controlled by one or two genes, some of which occur in the wild populations.

In order to achieve these research results the procedures used were:- selection, cross-breeding, exposure to X-rays, chemical mutagens, field testing in cold and damp conditions and in the presence of fungus disease.

- (i) Explain how these procedures were used to produce a change in the characteristics of the lupin plant.
- (ii) Suggest why geneticists have also been careful to produce white flowers in the new cultivated varieties.
- (iii) Why do you consider the characters of the wild blue lupin would have made it unsuitable for grazing or harvesting?

END OF PAPER