

Name:.....Stream.....

.....

553/1

BIOLOGY

(Theory)

Paper 1

2 ½ hrs

BETHANY HIGH SCHOOL NAALYA

S.4 BIOLOGY

Paper 1

2 hrs

INSTRUCTION

This paper consists of sections A, B and C.
answer all questions in Sections A and B. Plus two
questions in Section C.

SECTION A (30 MARKS)

Answer all questions in this section. Write the letter
representing the most correct answer to each question in
the box provided.

1. In which one of the following associations do both
organisms benefit?
 - (a) Round worm in human gut.
 - (b) Fungi and algae living together.
 - (c) Liver fluke in liver of sheep.

- (d) Plasmodium in human blood.
2. Which stage of mitosis is represented in figure I ?
- (a) Prophase (b) metaphase
(c) Anaphase. (d) Telophase.
3. A soil with poor water retention ability has.
- (a) low capillarity (b) small particles.
(c) poor aeration (d) poor drainage.
4. Which of the following is a method of controlling tapeworms?
- (a) use of insecticide. (b) chlorination of water
(c) draining of stagnant water (d) proper disposal of sewage
5. Which of the following occur during expiration in humans? The diaphragm
- (a) falls and intercostal muscles contract
(b) flattens and intercostal muscles relax.
(c) becomes dome
6. Which one of the following factors favour cross pollination?
- (a) Stamens and carpels maturing at the same time
(b) Flowers remaining closed after maturation
(c) Stamens being situated below the stigma.
(d) Style being shorter than the filament.

7. A vertebra with a short neural spine and long transverse process?

- (a) lumbar vertebra
- (b) thoracic vertebra.
- (c) cervical vertebra.
- (d) sacral vertebra.

shaped and intercostal muscles contract.

(d) becomes dome shaped and intercostals muscles relax.

8. Which of the following hormones are both produced by gonads?

- (a) Testosterone and adrenaline.
- (b) Follicle stimulating hormone and thyroxin
- (c) Progesterone and oestrogen.
- (d) Anti-diuretic hormone and oestrogen

9. Which of the following are products of aerobic and anaerobic respiration?

- (a) Water and carbon dioxide.
- (b) Carbon dioxide and energy.
- (c) Ethanol and water.
- (d) Carbon dioxide and lactic acid.

10. Which one of the following is an adaptation of external parasites?

- (a) Loss of sense organs.
- (b) Possession of rudimentary digestive system.
- (c) Poorly developed reproductive system.
- (d) Presence of claws.

11. Which one of the following is an example of a monoecious plant?
(a) Maize. (b) Pawpaw. (c) Pineapple,
(d) Bean.
12. The importance of phototropism in plants is to enable
(a) plants grow towards mineral salts and water
(b) climbing plants get grip on their support.
(c) plants in shade grow faster and get exposed to light.
(d) plant roots gain anchorage.
13. Figure 2 shows the variation of body temperature of an animal with environmental temperature.

Environmental temperature

Fig. 2

Which one of the following animals would have its temperature varying as shown in the figure?

- (a) Snake. (b) Bird. (c) Toad. (d) Snail.
14. A mother of twins has blood group A. One of the sons has blood group AB while the other has blood group O. Which one of the following is the blood group of the father?

- (a) Group A. (b) Group B. (c) Group O.
(d) Group AB.

15. Which of the following animals has a different type of fertilization from?

- (a) Chicken. (b) Lizard.
(c) Crocodile. (d) Frog.

16. Which one of the following graphs in figure 3 correctly represents the variation of the rate of transpiration with humidity?

Humidity

17. When Benedict's reagent was added to a solution containing a food nutrient and the mixture boiled, a yellow precipitate was formed. This shows that

- (a) non reducing sugar was absent.
(b) reducing sugar was present.
(c) non reducing sugar Was present.
(d) traces of reducing sugar were present.

18. A soil sample was heated at 100°C to a constant weight. Which component, the soil was being investigated?

- (a) Organic matter. (b) Air. (c) Microorganisms. (d) Water.

19. Which one of the following sets consists of only dry indehiscent fruits?

Achne, cypsela, nut.

Caryopsis, legume, capsule.

Achne, follicle, legume.

Schizocarp, capsule, caryopsis.

A seedling was illuminated from one side and after 3 days it bent towards the direction of light because auxins concentrated on the side away from light and caused faster growth on that side. ; light accelerated growth of seedlings causing bending.

1

auxins concentrated on the side towards light and caused less growth on that side.

light generally promotes elongation of plant tips causing them to bend.

Which one of the following happens when the osmotic pressure of blood is higher than normal?

Less ADH is secreted and more water is reabsorbed.

Less ADH is secreted and less water is reabsorbed.

More ADH is secreted and more water is reabsorbed.

More ADH is secreted and less water is reabsorbed.

Which one of the following structures of a bony fish enables it to vary its density while swimming?

Lateral fin.

Dorsal fin. ?

Pectoral fin. L

Swim bladder.

ss-sA'S

Turn O'IT

Following is a result of increased levels of adrenaline in the body?

Increased uptake of glucose by the liver. t—__

Decrease in rate of breathing. i

Reduction in metabolic rate.

Increased rate of heart beat.

Double fertilisation occurs in plants when two egg nuclei are fertilised by a male nucleus.

one male nucleus fuses with the egg nucleus and another fuses with the

polar nuclei. ,

one male nucleus fuses with the egg nucleus and the other with

the antipodal nuclei.

two male nuclei fuse with two egg nuclei.

Hairy leaves with sunken stomata is typical of plants living in soils which

face shortage of water.

have a high concentration of salts. V

are well supplied with water. i

grow in shaded areas. L"

f

26.

'■i

27.

In plants, tallness is dominant to shortness. When two heterozygous parents from F₁ generation were crossed, 2508 offspring were produced. What was the approximate number of tall plants among the offspring?

627. $\frac{1}{2}$

836.

1254.

1881.

Which one of the following is a tactic response?

Bending of plant shoot towards light.

Growth of a root towards water.

Withdrawal of a blowfly larva from light.

Rolling up of leaves on being touched.

28. Which one of the following is a vector for yellow fever'*

Aedes mosquito.

Culex mosquito.

Anopheles mosquito.

Black fly.

.TV:.

SECTION B (40 MARKS)

Answer all questions in ,h* section. Answers must **he wriuen in the spaces** provided.

31. Figure 5 shows the amount of carbon dioxide in the air in a forest over a period of 24 hours measured during a sunny day.

Fig- 5

(a) Explain the changes in carbon dioxide concentration.

Time (hours)

12:00 18:00

24:00

CO between 08:00 hours and 16:00 hours.

{04 marks}

\$

I

(ii) between 16:00 hours and 24:00 hours. (04 marks)

% 1

X

,f.igr

* ■ '

|

I - ...

4 ' f

*

if

(b) (i) At what time was carbon dioxide highest? (1 mark)

gfiPi

ifgr &

MMK (ii) Why? (03 marks)

1

I fe \$5\$;

!<<' ■ ■

*

_3ft

(c) (») At what time was carbon dioxide lowest?

(/, mark)

*^-1SRK4f, .. — ••

(u) why? (03 marks)

» t U> ■ (i) On the same graph in Figure 5, draw a sketch to show the ^

vanauon m the concentration of carbon dioxide over the same

^y doX da^ ^ meaSURcmcm was cmitd ou^ during a ^

9 Turn Over

ii

(ii) Explain the variation in carbon dioxide concentration in your sketch compared to the original graph,

ii

lit

1#

It

In an ecosystem, eagles feed on chickens, lizards, termites, caterpillars and grasshoppers. Caterpillars, termites and grasshoppers feed on green plants.

What is an ecosystem?

(01 mark)

(i) Construct a food chain to show the feeding relationship between

termites, eagle, green plants and chickens.

(01 mark)

(u) Which organisms in the food chain receiver.'

food chain in b(i). Explain your answer. ^{energy in the}

(03 marks)

f

lilt

jig

fg

«H|gg

m

ip

^pannp/1 ramQpantipl®

(. onstruel a diagram to show the feeding relationship between all the organisms in the ecosystem above. (03 marks)

Name the trophic level to which each of the following organisms belong.

(02 marks)

Chickens.

Termites.

Green plants.

Eagles.

33. Figure 6 is a diagram showing part of the mammalian circulatory system.

(a) Name the blood vessels labelled A, B, C and D. A

(02 marks)

the direction of blood (low i., the
Using arrows, show **on** the {01 tiunh
blood vessels labelled A and B.

*ii_{nn}nf blood flowing in A and B.

Slate three differences in composition (03 marks)

Explain the changes in the composition of glucose in A
and B.

(02 marks)

How is blood vessel A structurally adapted to perform
its function?

(02 marks)

SECTION C (30 MARKS)

Answer any two questions from this section. Answers to the

not be marked. Answers to the Additional questions answered will be provided, provided the questions must be written in the answer booklets

genetic cross between a homozygous and heterozygous state in
genetics.

(01 mark)

In a tall pea plant was crossed with a short pea plant, only
tall pea

plants were produced in F₁ generation. When two
plants from the F₁

generation were crossed, the resulting F₂ generation had a
mixture of tall and short pea plants.

(i) Using suitable symbols, show genetic crosses to
produce F₁ and F₂ generations.

(10 marks)

e 2 generation had 81 plants determine how many would be

..Sh0rtandla11- **(02 marks)**

fc) Giving a reason state the phenotype which is recessive in pea plants.

(02 marks)

(a) What is the importance of gaseous exchange in animals?

(02 marks)

fb) Describe the process of exhalation in humans.

(05 marks)

Outline J.fTcrences between exhaled and inhaled air in humans

Explain how lung* are efficient respiratory surfaces.

(flj

<)n a hot sunny day, the leaves of bean seedlings were seen wilted. However at' mghi, they recovered and regained their normal shape and size.

(a) Explain the process which led to the 1*' *illins . . . (07,narks)

(11) recovery and regaining 0! the shape and size.

(05 marks)

■ fb) Explain the ecological advantage of wilting to a plant. **(03 marks)**

% 37. (a) Describe what happens in an animal celj during each of the following stages of mitosis:

(if Prophase. (OSmarks)

(ii) Anaphase. ^ : . [OS marks)

(h) Stale the importance of mitosis. (02 marks)

c) Give three differences between mitosis and meiosis. (03 marks)