

**Biology I**

**001**

**21<sup>st</sup> Nov 2012 8.30am-11.30am**

**ORDINARY LEVEL NATIONAL EXAMINATION 2012**

**SUBJECT : BIOLOGY I**

**TIME : 3 HOURS**

**INSTRUCTIONS:**

- This paper consists of **THREE** Sections A, B and C.
- Answer **ALL** the questions in section A. **(55 marks)**
- Answer **THREE** questions in section B. **(30 marks)**
- Answer only **ONE** question in section C. **(15 marks)**

**SECTION A: Attempt all questions.**

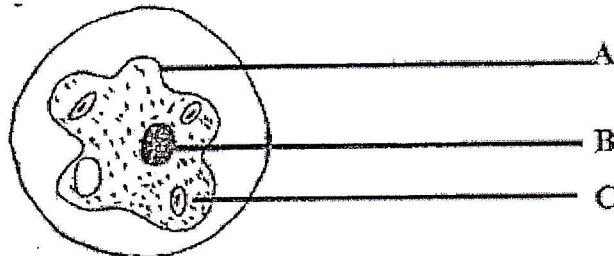
**(55 marks)**

1. Movement is a life process. Name FOUR other life processes that all plants and animals do.

**(4 marks)**

- i) .....
- ii) .....
- iii) .....
- iv) .....

2. Amoeba are single celled animals. The diagram below was drawn by students after observing the amoeba under a microscope.



a) Name the parts labeled A, B and C.

**(3 marks)**

- A.....
- B.....
- C.....

b) Draw lines to link each part of the amoeba cell with its function.

**(3 marks)**

**PART**

**FUNCTION**

A

Where chemical reactions take place

B

Allows substances to move in and out of the cell

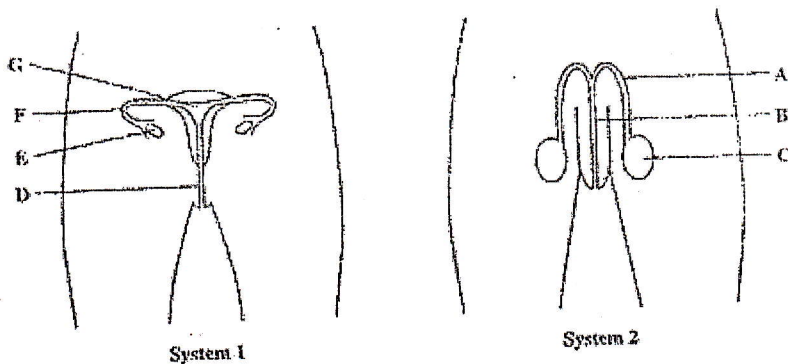
C

controls the characteristics of the cell

c) In which of these parts of amoeba would you find genes?

**(1 mark)**

3. a) The diagrams below show the reproductive systems in humans.



i) Which is the female reproductive system?

**(1 mark)**

ii) Use the information in the diagram to complete the table below.

(3 marks)

	Letter
The place where female gametes are formed.	
The place where the fetus develops	
The place where male gametes are formed.	

b) Give the name of the:

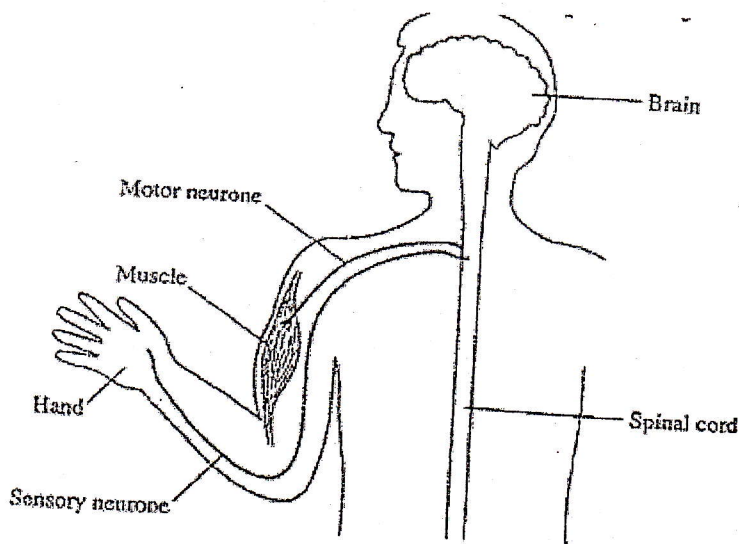
- i) Female gamete
- ii) Male gamete
- iii) Process when the male and female gametes fuse together.

(1 mark)

(1 mark)

(1 mark)

4. The diagram below shows a reflex pathway of a human.



Draw this diagram and answer the following questions.

- a) Label the receptor on the diagram.
  - b) Label the effector on the diagram.
  - c) i) Suggest a stimulus to the hand that could start a reflex response.  
ii) Describe the response this stimulus would cause.
  - d) Put arrows on the diagram to show the direction of the path taken by the nerve impulses.
5. a) Name two things that happen to the glucose produced in plants during photosynthesis.
- b) Plants need mineral salts.
- i) Through which part do mineral salts get into the plant?
  - ii) Explain why water is important in this process.

(1 mark)

(1 mark)

(1 mark)

(1 mark)

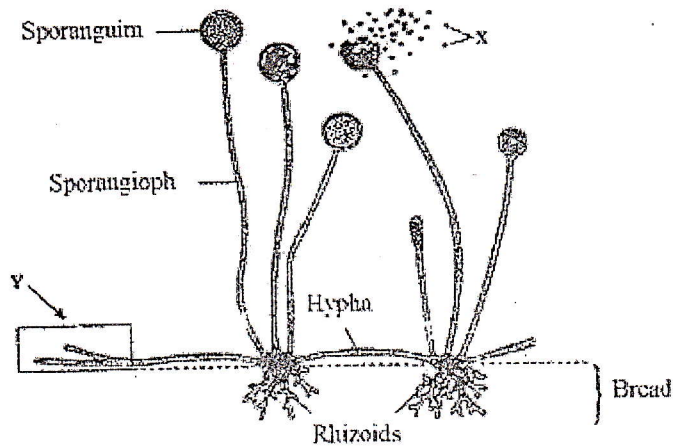
(1 mark)

(2 marks)

(1 mark)

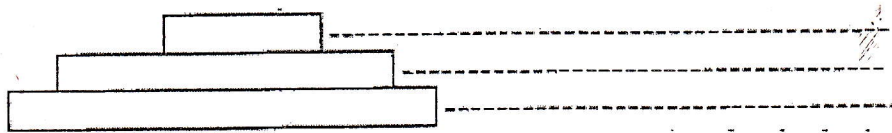
(2 marks)

6. The diagram below shows the structure of a fungi growing on some bread.

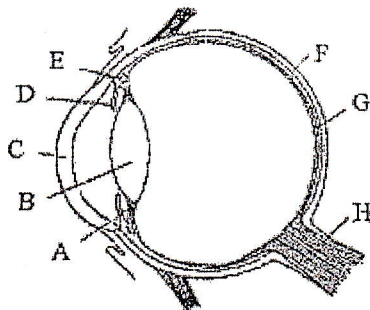


- a) Give the name of the structure labeled X. (1 mark)
- b) When the fungus is feeding, the tip of the hyphae labeled Y release enzymes. Explain why? (2 marks)
- 7. Describe the difference between each of the following pairs of biological terms.
  - i) Ureter and urethra (2 marks)
  - ii) Motor neuron and sensory neuron. (2 marks)
- 8. a) Name at least one disease which is spread by houseflies. (1 mark)  
 b) Explain how house flies can spread diseases (4 marks)  
 c) Give one way by which we can lower the chances of disease being spread by houseflies, apart from killing the flies. (1 mark)
- 9. The diagram below shows a pyramid of energy for the following food chain.

Grass → cow → man



- a) Write the names of the organisms in the food chain on the correct lines next on the diagram. (1 mark)
- b) Where does the grass get its energy from? (1 mark)
- c) Explain why energy decreases from one trophic level to the next. (1 mark)
- 10. The diagram shows a section through the human eye.



a) Label the parts A, B and C.

- A.....
- B.....
- C.....

(3 marks)

b) Give the letter of the part which:

- i) Changes shape to help focus light rays.
- ii) Adjust the amount of light entering the eye.

(1 mark)

(1 mark)

11. Sickle cell anaemia is caused by a change in the gene which controls haemoglobin production. Allele

H: represents the unaffected allele of the haemoglobin gene

h: represents the changed allele of the haemoglobin gene.

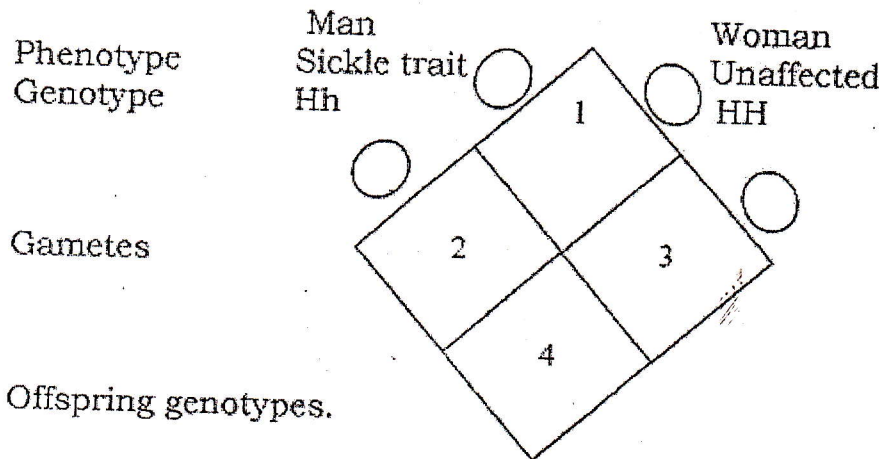
There are three possible genotypes:

HH: the person who is completely unaffected.

Hh: the person is a carrier (sickle trait)

hh: the person who has sickle cell anaemia.

a) Complete the genetic diagram below to the production of children by a man with sickle cell anaemia and a woman is completely unaffected by sickle cell condition.



Off spring phenotypes:

- 1.....
- 2.....
- 3.....
- 4.....

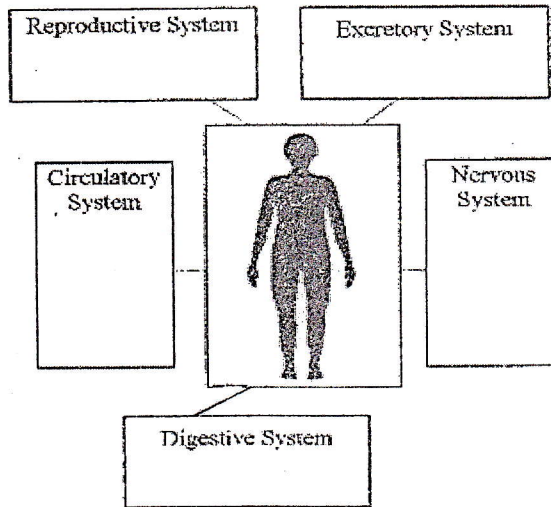
(4 marks)

b) Give a reason why it is impossible for this man and woman to produce any children with sickle cell anaemia.

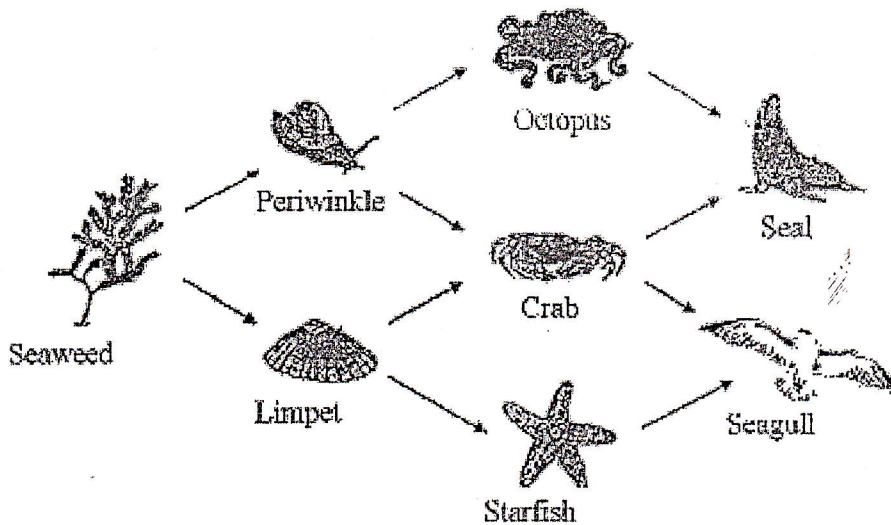
(1 mark)

**SECTION B: Attempt any THREE questions. (30 marks)**

12. Put each part of the body listed below into a box to show which organ system it is in. (10 marks)  
*Bladder, brain, capillary, heart, kidney, large intestines, ovary, spinal cord, stomach, testis.*



13. (a) The diagram below shows part of a food web.



Use the organisms in this web to fill in the table.

(5 marks)

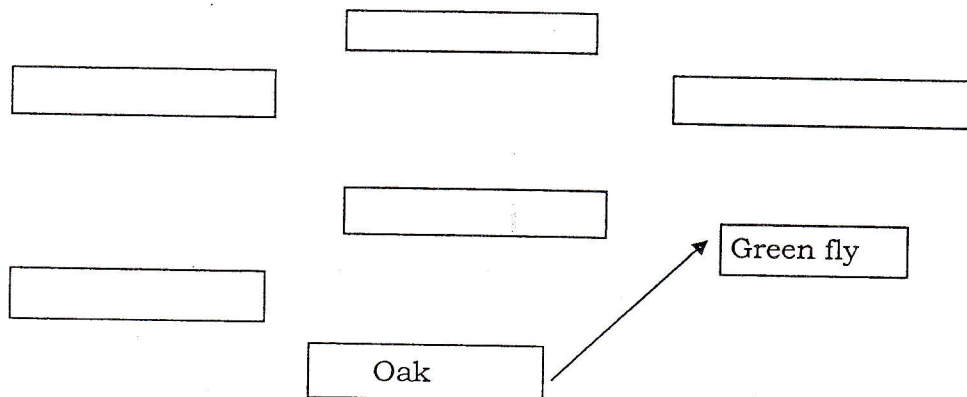
FEEDING HABIT	ONE ORGANISM
Herbivore	
Producer	
Secondary consumer	
Top carnivore	
Primary consumer	

b) Some students made the following notes below about feeding relationships in a wood.

- A green fly got its food form an oak tree leaf
- A lady bird ate the green fly
- A moth larva also ate parts of the oak tree.
- A spider ate a lady bird.
- The wood pecker ate the moth larva and the spider.
- A blue tit ate the moth larva and green fly.

Complete the food web to show these relationships. One relationship is already done for you.

(5 marks)



14. Plants absorb water and dissolved mineral salts from the soil.

a) What do plants make from the following minerals?

i) Magnesium

(1 mark)

ii) Nitrates

(1 mark)

b) Give two reasons why water is important for plants.

(2 marks)

c) Which plant vessels transport water and sugar?

(2 marks)

d) Explain how water rises up the plant.

(4 marks)

15. a) Give differences between asexual and sexual reproduction.

(8 marks)

b) Give one advantage of each type of reproduction above.

(2 marks)

16. Malaria is the most killer disease in Africa.

a) What causes malaria?

(1 mark)

b) How does it infect people?

(1 mark)

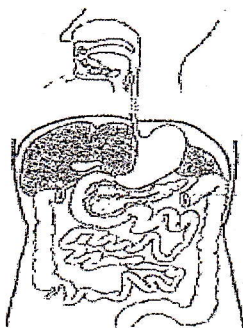
c) Describe all possible means you can recommend to prevent this killer disease.

(8 marks)

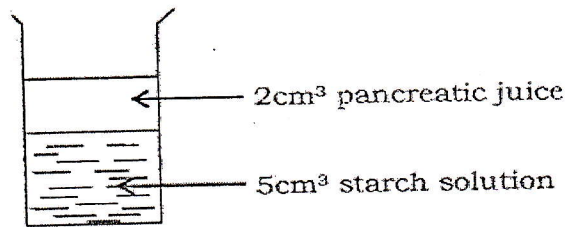
**SECTION C: This question is compulsory.**

(15 marks)

17. The diagram below shows the human alimentary canal.



- Draw part of this diagram and answer the question that follows.
- a) On the diagram, label the salivary glands and the pancreas. (2 marks)
- b) A mixture of starch and pancreatic juice as shown on the diagram below was kept at 37°C.



- Pancreatic juice contains enzymes
- i) Samples were taken from the mixture after one minute and after 10 minutes, these samples were tested for sugar and starch.

The table below shows which test proved positive and which were negative. (3 marks)

	Sample 1 (1 minute)	Sample 2 (10 minutes)
Starch test	Positive	Negative
Sugar test	Negative	Positive.

Explain what caused these changes in the mixture.

- ii) The experiment was repeated using pancreatic juice which had been kept at 100°C for 10 minutes and cooled to room temperature before being added to the starch. Complete the table below to show whether you would expect each test to be positive or negative in the 10 minute samples. (2marks)

	Sample 1 (1 minute)	Sample 2 (10 minutes)
Starch test	Positive	.....
Sugar test	Negative	.....

- iii) How would you test for sugar? What would you observe if sugar was present? (3 marks)

- a) The sugar produced during digestion is absorbed from the alimentary canal through the villi.

- i. Where in the alimentary canal is the villi found? (1 mark)
- ii. State three features of the villi which help it to absorb sugar quickly. (3 marks)
- iii. Name one process by which sugars pass from the inside of the alimentary canal into the blood stream. (1 mark)

END.



**MARKING GUIDE FOR 2012**

**SECTION A**

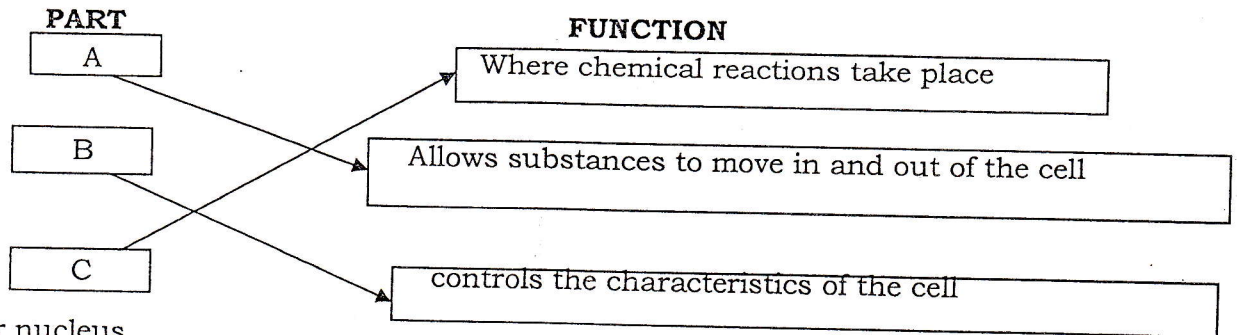
**Answer to Question 1.**

- Reproduce, Respond to stimuli/sense/sensitivity/irritability, Grow/development, Nutrition/feeding, Exchange gases, Excrete, Respire

**Answer to Question 2.**

- a) A – cell membrane/cytoplasmic membrane
- B – nucleus
- C – cytoplasm

b)



- c) B or nucleus.

**Answer to Question 3.**

- a) i) system 1
- ii)

	Letter
The place where female gametes are formed.	E (ovary)
The place where the fetus develops	G(uterus)
The place where male gametes are formed.	C(testis)

- b) i) Egg /ovum/ova
- ii) sperm /spermatozoid
- iii) Fertilization/fertilizer

**Answer to Question 4.**

- a) hand
- b) muscle
- c) i) sharp point/heat/pain/cut
- ii) move the hand away from the stimuli or muscle in the hand contact.
- d) An arrow on the sensory fibre from hand to spine and an arrow on the motor fibre from spine the muscle.

**Answer to Question 5.**

- a) Stored as fructose, stored as sucrose , stored as starch, stored as oil/lipids, transported away in the phloem.
- b) i) Roots or root hair cells.
- ii) - Mineral salts are dissolved in water.
- Water transports salts throughout
- Water enables osmosis or diffusion to take place.

**Answer to Question 6.**

- a) spores
- b) To digest food (bread) /breakup food, to make it soluble /dissolved so that it can be absorbed or so it can pass into hyphae.

**Answer to Question 7.**

- i) Ureter carries urine from the kidney to the bladder while the urethra carries urine from the bladder to the outside of the body.
- ii)

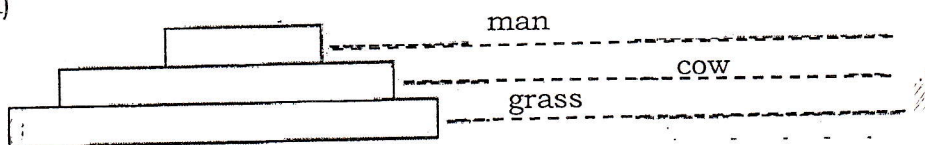
Motor neuron	Sensory neuron
Carries impulses away from CNS or spinal cord or brain towards muscles or to effectors.	Carries impulses towards CNC or spinal cord or brain towards CNS or spinal cord.
Long axon	Short axon
Many dendrons (multipolar)	One Dendron /unipolar
Terminal dendrites connect to the effectors or motor end plates	Terminal dendrites are connected to the intermediate/relay neurons.
Cell body is at the terminal	Cell body branches off the axon.

**Answer to Question 8.**

- a) Diarrhoea, dysentery, cholera, typhoid, trachoma, conjunctivitis, tuberculosis.
- b) transfer/spread of bacteria/germ/microbes, they land on contaminated material, food, kitchen surfaces.
- c) Covering food, hygienic disposal of faeces, covering refuses, clearing kitchen surfaces.

**Answer to Question 9.**

a)



- b) From the sun or light
- c) due to respiration, excretion, unedible parts.

**Answer to Question 10.**

- a) A – suspensory ligament  
B – lens  
C – cornea
- b) i) B  
ii) D

**Answer to Question 11.**

- a) 1 – Unaffected  
2 – Hh sickle trait carrier  
3 – HH unaffected  
4 – sickle cell trait carrier.
- b) Cannot produce hh or they need h from both parents or mother does not have h.

**SECTION B.**

**Answer to Question 12**

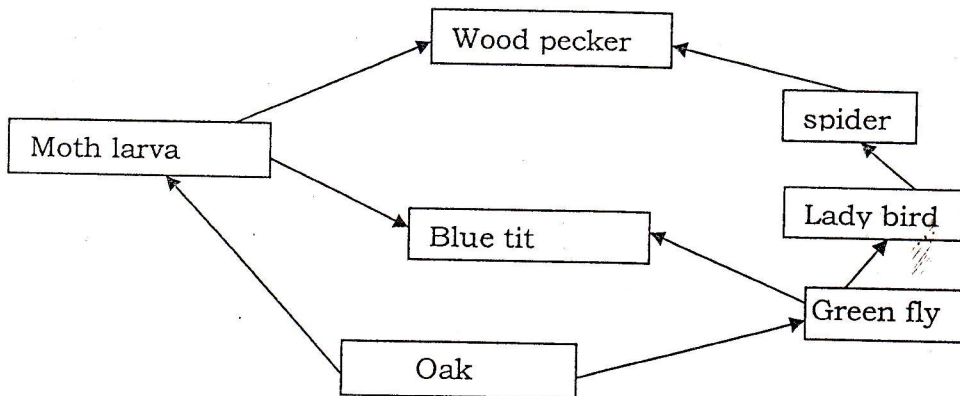
- Reproductive system: ovary, testis.
- Circulatory system: capillary, heart.
- Excretory system: bladder, kidney
- Nervous system: Brain, spinal cord.
- Digestive system: Large intestine, stomach.

**Answer to Question 13**

a)

FEEDING HABIT	ONE ORGANISM
Herbivore	Limpet or Periwinkle
Producer	Sea weed
Secondary consumer	Star fish or crab or octopus
Top carnivore	Seagull
Primary consumer	Limpet or periwinkle

b)



**Answer to Question 14**

- i) Chlorophyll
  - ii) Protein or amino acids.
- b) For photosynthesis, hydrolysis, support/turgidity, a medium for chemical reaction, cooling, germination, transport.
- c) xylem, phloem.
- d) Transpiration, root pressure, evaporation from leaves, cohesion, osmosis, capillary action, air pressure.

**Answer to Question 15**

a)

<b>Asexual</b>	<b>Sexual reproduction</b>
One parent	Two parents
Involves mitosis	Involves meiosis
Off springs are genetically identical to parents.	Not identical, half genes are maternal, half paternal.
Species are liable to be wiped out by disease because of lack of resistance	Excellent individual
Only one individual needed to colonize a new area.	Both sexes needed.
Very rapid to increase population.	Not rapid, both parents may produce one offspring then die.
Very common in plants and simple animals e.g amoeba, hydra.	Almost all plants and animals
There is high chances of successful reproduction taking place	There are low chances.
No gametes needed	Gametes are needed.

- b) Sexual reproduction: resistance to disease, new varieties produced.  
 Asexual reproduction: one parent required, very fast, maintenance of useful characters in population.

**Answer to Question 16**

- a) Plasmodium.  
 b) Female anopheles mosquito containing parasites in its blood stream develop.  
 c) - Clear the mosquito habitat: Bush, stagnant water etc.  
 - Spray mosquitoes with insecticide  
 - use ant malarial drugs  
 - use insect repellent to prevent mosquitoes etc.

**SECTION C:**

**Answer to Question 17**

- a) Teachers' guidance.  
 b) i) - Amylase, starch disappears or broken down by digestion/hydrolysis.  
 - Maltose or glucose is formed.

ii)

	Sample 1 (1 minute)	Sample 2 (10 minutes)
Starch test	Positive	Positive
Sugar test	Negative	Negative

- iii) - Add Benedict's solution, heat.  
 - Observation: if sugar is present, it changes from blue-green-yellow-orange-red/brown.  
 c) i) In the small intestines/duodenum/ileum  
 ii) large surface area, many capillaries/capillary network/good blood supply, thin surface.  
 iii) Diffusion or active transport.

**END**