

SC5043
WASSCE 2019
BIOLOGY 3
Practical
2 hours

3

Name K

Index Number

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination
for School Candidates

SC 2019

BIOLOGY 3

2 hours

PRACTICAL

Write your name and index number in ink in the spaces provided above.

Answer all the questions in Section A, and in addition all the questions in either Section B or C.

No mark will be awarded for answering questions from any part not peculiar to your own country.

Write your answers in your practical answer booklet.

Use both sides of the blank sheets in your answer booklet for writing and drawing.

Work done on any paper other than that provided will receive no mark.

You are advised to use sharp pencils for your drawings. Do not shade or colour. Great importance is attached to the accuracy of all drawings and observations.

2
SECTION A
[50 marks]

FOR ALL CANDIDATES

Answer all the questions in this section.

1. Study specimens **B** and **C** and answer questions 1(a) to 1(g).

- (a) Name the:
(i) Kingdom;
(ii) Phylum;
to which **each** of the specimens **B** and **C** belong. [4 marks]
- (b) State **one** reason **each** for the answer in 1(a)(i) and 1(a)(ii). [4 marks]
- (c) In a tabular form, state **three** observable structural differences between specimens **B** and **C**. [3 marks]
- (d) (i) Name the mode of nutrition exhibited by **each** of specimens **B** and **C**. [2 marks]
(ii) State **one** reason **each** for the answers in 1(d)(i). [2 marks]
- (e) (i) Suggest the habitat of **each** of specimens **B** and **C**. [2 marks]
(ii) State **two** ways in which specimen **B** is adapted to its habitat. [4 marks]
- (f) List **two** substrates on which specimen **C** can grow. [2 marks]
- (g) State **two** ways in which specimen **C** is of economic importance. [2 marks]

2. Study specimens **D** and **F** and answer questions 2(a) to 2(e).

- (a) (i) State the Class to which of **each** of specimens **D** and **F** belong. [2 marks]
(ii) Give **one** reason **each** for the answer in 2(a)(i). [2 marks]
- (b) (i) State **three** structural similarities between specimens **D** and **F**. [3 marks]
(ii) In a tabular form, state **three** structural differences between specimens **D** and **F**. [3 marks]
- (c) (i) Name the type of heterotrophic nutrition **common** to both specimens **D** and **F**. [1 mark]
(ii) Name the respiratory organ of **each** of specimens **D** and **F**. [2 marks]
- (d) State **two** characteristic features of specimen **F**. [2 marks]
- (e) Make a drawing, 8 cm to 10 cm long of the dorsal view of specimen **F** and label fully. [10 marks]

3
SECTION B
[30 marks]

FOR CANDIDATES IN GHANA ONLY

Answer all the questions in this section.

3. Study specimens **G, H, J** and **K** and answer questions 3(a) to 3(e).

- (a) (i) Classify specimens **G, H, J** and **K** into their Divisions. [4 marks]
(ii) Arrange specimens **G, J** and **K** in ascending order of evolutionary trend. [4 marks]
- (b) In a tabular form, state **three** observable differences between:
(i) specimens **G** and **J**; [3 marks]
(ii) specimens **H** and **K**. [3 marks]
- (c) State **three** structural adaptations of specimen **H** to its habitat. [6 marks]
- (d) State **two** observable structural similarities between specimens **G** and **J**. [2 marks]
- (e) Make a drawing, 8 cm to 10 cm long of specimen **G** and label fully. [8 marks]

SECTION C
[30 marks]

FOR CANDIDATES IN SIERRA LEONE

Answer all the questions in this section.

4. Study specimens **L** and **M** and answer questions 4(a) to 4(d).

- (a) (i) In a tabular form, state **six** observable differences between specimens **L** and **M**. [6 marks]
(ii) State **two** similarities between specimens **L** and **M**. [2 marks]
- (b) (i) Classify **each** of specimens **L** and **M** into their Classes. [2 marks]
(ii) Give **two** reasons **each** for the answers in 4(b)(i). [4 marks]
- (c) With the aid of a blade/scalpel, make transverse section of the stem of specimen **L**:
(i) Make a drawing, 8 cm – 10 cm long of a section and label fully. [10 marks]
(ii) Add a drop of iodine solution to the other section of the stem of specimen **L** and state the observation and inference in a tabular form. [3 marks]
- (d) Name the parts that perform **each** of the following functions in the section of the stem of specimen **L**:
(i) support;
(ii) storage;
(iii) transportation of manufactured food. [3 marks]

END OF PAPER

SC5042&1
WASSCE 2019
BIOLOGY 2&1
Essay & Objective
2½ hours

2&1

Name.....

Index Number.....

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination
for School Candidates

SC 2019

BIOLOGY 2&1

2½ hours

*Do **not** open this booklet until you are told to do so. While you are waiting, read the following instructions carefully.*

*Write your **name** and **index number** in **ink** in the spaces provided at the top right-hand corner of this booklet.*

*This booklet consists of **two** papers. Answer Paper 2 which comes first, in your answer booklet and Paper 1 in your Objective Test answer sheet. Paper 2 will last for 1 hour 40 minutes after which the answer booklet will be collected. Do **not** start Paper 1 until you are told to do so. Paper 1 will last for 50 minutes.*

Answer **three** questions in all; **two** questions from Section A and the **only** compulsory question in **either** Section B or Section C.

No marks will be awarded for answering questions **not peculiar** to your own country.

Write your answers in **ink** in your answer booklet.

Large labelled diagrams should be used where they make an answer clearer. The names given for chosen species **must** be English or scientific and **not** vernacular.

Credit will be given for clarity of expression and orderly presentation of answers.

SECTION A

FOR ALL CANDIDATES

Answer **two** questions **only** from this section.

1. (a) (i) Name the **two main** parts of the nervous system. [2 marks]
(ii) List **two** components **each** of the **main** parts of the nervous system named in 1(a)(i). [4 marks]

- (b) Copy and complete the table below with the part of the brain that is responsible for each of the listed actions.

S/No.	Actions	Part of the brain
(i)	Receives impulse from the semi-circular canals of the ears	
(ii)	Control of speech	
(iii)	Regulation of involuntary actions	
(iv)	Sensation of hunger	
(v)	Perceiving smell	
(vi)	Retaining memory	

- (c) What is a *conditioned reflex*? [6 marks]
[2 marks]
- (d) Give:
(i) **two** examples of conditioned reflex in dogs; [2 marks]
(ii) **four** examples of conditioned reflex in humans. [4 marks]

2. (a) (i) What is *translocation* in plants? [3 marks]
(ii) Name the biological process that occurs before translocation takes place. [1 mark]
(iii) Name **one** tissue and **one** plant part **each** where translocation occurs. [2 marks]
(iv) Name **four** substances that are translocated in plants. [4 marks]
- (b) (i) What is *malnutrition*? [2 marks]
(ii) State **three** effects of malnutrition in animals. [3 marks]
(iii) Name the classes of food in a balanced diet. [5 marks]

3. A pond at the back of a school hostel containing living organisms was abandoned for some time.
- (a) Name **two**:
- (i) producers;
 - (ii) consumers;
- that could be found in the pond. [4 marks]
- (b) List **three** abiotic factors that would affect the organisms in the pond. [3 marks]
- (c) (i) Name the instrument that could be used to collect large animals found in the pond. [1 mark]
- (ii) Make a diagram, 6 cm to 8 cm long of the instrument named in 3(c)(i) and label fully. [6 marks]
- (d) State **three**:
- (i) benefits;
 - (ii) disadvantages;
- of the pond to the school and the environment. [6 marks]
4. (a) A man, heterozygous for dark skin colour, D , is married to a homozygous light skinned woman, d and they have **four** children. With the aid of a genetic diagram **each**, determine the number of children that would be:
- (i) light skinned;
 - (ii) dark skinned if a light skinned child was married to a spouse who has the same genes for skin colour as the father. [18 marks]
- (b) Explain **briefly** how vestigial structures are considered as an evidence of evolution. [2 marks]

SECTION B

FOR CANDIDATES IN GHANA ONLY

Answer the questions in this section.

5. (a) State **three** secondary sexual characteristics **each** in:
- (i) males;
 - (ii) females. [6 marks]
- (b) (i) Describe how vegetatively reproducing stems serve their purpose. [2 marks]
- (ii) Give **two** examples of vegetatively reproducing stems. [2 marks]
- (c) State **five** differences between a *DNA* and an *RNA* molecule. [5 marks]
- (d) (i) Outline the process of biogas production. [4 marks]
- (ii) Name **three** crops that could be used to produce biogas. [3 marks]
- (e) (i) State **three** advantages of rendering First Aid treatment to an accident victim. [3 marks]
- (ii) State **five** procedures involved in administering mouth-to-mouth ventilation to an accident victim. [5 marks]

SECTION C

FOR CANDIDATES IN LIBERIA

Answer the questions in this section.

6. (a) State **four** ways by which the placenta is important to the development of a foetus in humans. [4 marks]
- (b) Explain **briefly** the following diseases: [8 marks]
(i) hepatitis;
(ii) kidney stones.
- (c) A student was asked to perform an experiment on the germination of maize seeds. The student then boiled some maize seeds and put them into dry soil in a beaker. The beaker was placed in an air-tight dark cupboard for **five** days. [1 mark]
(i) State the likely outcome of this experiment on the seeds. [3 marks]
(ii) State **three** reasons for the outcome in 6(c)(i).
- (d) (i) State **three** effects of lack of sense receptors in the skin to humans. [3 marks]
(ii) List **three** layers of the epidermis in humans. [3 marks]
- (e) In a tabular form, state **three** differences between the *alimentary tracts* of earthworm and grasshopper. [3 marks]
- (f) Explain **briefly** the importance of: [3 marks]
(i) lightning; [2 marks]
(ii) *Nitrosomonas*, in the Nitrogen Cycle.

END OF ESSAY TEST

**DO NOT TURN OVER THIS PAGE
UNTIL YOU ARE TOLD TO DO SO.**

**YOU WILL BE PENALIZED SEVERELY IF YOU ARE
FOUND LOOKING AT THE NEXT PAGE BEFORE
YOU ARE TOLD TO DO SO.**

PAPER 1
OBJECTIVE TEST
[50 marks]

50 minutes

1. Use 2B pencil throughout.
2. On the pre-printed answer sheet, check that the following details are **correctly** printed:
 - (a) In the space marked *Name*, check your **surname** followed by your **other names**.
 - (b) In the spaces marked *Examination*, *Year*, *Subject* and *Paper*, check 'WASSCE', 'SC 2019', 'BIOLOGY', and '1' in that order.
 - (c) In the box marked *Index Number*, your **index number** has been printed vertically in the spaces on the left-hand side, and each numbered space has been shaded in line with each digit. **Reshade** each of the shaded spaces.
 - (d) In the box marked *Subject Code*, the digits 504113 are printed vertically in the spaces on the left-hand side. **Reshade** the corresponding numbered spaces as you did for your index number.
3. An example is given below. This is for a female candidate whose *name* is Mariam Esi KWAQ. Her *index number* is 7102143958 and she is offering *Biology* 1.

THE WEST AFRICAN EXAMINATIONS COUNCIL
ANSWER SHEET

PRINT IN BLOCK LETTERS		GHA	
Name: KWAQ MARIAM ESI			
Examination: WASSCE		Year: SC 2019	
Subject: BIOLOGY		Paper: 1	

INSTRUCTIONS TO CANDIDATES

1. Use grade 2B pencil throughout.
2. Answer each question by choosing one letter and shading it like this: ☐ A ☐ B ☐ C ☐ D ☐ E
3. Erase completely any answer you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.
5. Do not make any markings across the heavy black marks at the right-hand edge of your answer sheet.

INDEX NUMBER	
7	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
0	0 1 2 3 4 5 6 7 8 9
2	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
4	0 1 2 3 4 5 6 7 8 9
3	0 1 2 3 4 5 6 7 8 9
9	0 1 2 3 4 5 6 7 8 9
5	0 1 2 3 4 5 6 7 8 9
8	0 1 2 3 4 5 6 7 8 9

SUBJECT CODE	
5	0 1 2 3 4 5 6 7 8 9
0	0 1 2 3 4 5 6 7 8 9
4	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
3	0 1 2 3 4 5 6 7 8 9

For Supervisors only
If candidate is absent
shade this space. ☐

Answer all the questions.

Each question is followed by four options lettered A to D. Find the correct option for each question and shade in pencil on your answer sheet, the answer space which bears the same letter as the option you have chosen. Give only one answer to each question. An example is given below.

Which part of the gill of fish is involved in gaseous exchange?

- A. Gill slits
- B. Gill bars
- C. Gill covers
- D. Gill filaments

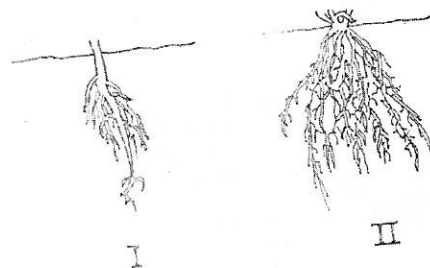
The correct answer is Gill filaments, which is lettered D, and therefore answer space D would be shaded. ☐ A ☐ B ☐ C ☒ D ☐ E

Think carefully before you shade the answer spaces; erase completely any answers you wish to change.

Do all rough work on this question paper.

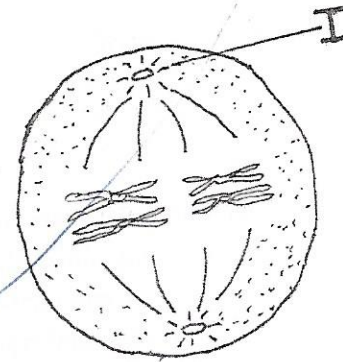
Now answer the following questions.

1. Which of the following structures will not be found in the nucleus of a cell?
 - A. Centriole
 - B. Lysosome
 - C. Nucleolus
 - D. DNA
2. An example of organ level of organization is
 - A. xylem.
 - B. spermatozoon.
 - C. kidney.
 - D. bird.
3. A structural similarity between *Paramecium* and *Amoeba* is the presence of
 - A. one gullet.
 - B. two nuclei.
 - C. two contractile vacuoles.
 - D. one food vacuole.
4. The classes of plants the root systems in diagrams I and II below represent respectively are

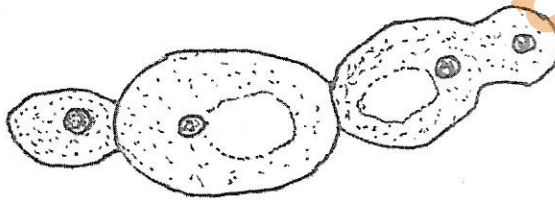


- A. Monocotyledoneae and Monocotyledoneae
- B. Dicotyledoneae and Dicotyledoneae.
- C. Monocotyledoneae and Dicotyledoneae.
- D. Dicotyledoneae and Monocotyledoneae.

The diagram below is an illustration of a stage in a biological process
Study it and answer questions 5 and 6.



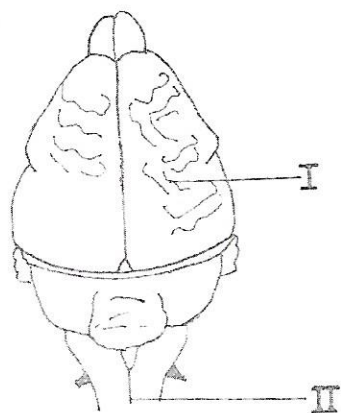
5. What stage of the cell division is illustrated in the diagram?
- Telophase
 - Anaphase
 - Metaphase
 - Prophase
6. The part labelled I is the
- chiasmata.
 - centriole.
 - spindle fibre.
 - centromere.
7. The rate of diffusion of molecules between two media will be higher if
- there is no difference in the concentration of the two media.
 - the difference in concentration of the two media is high.
 - the difference in concentration of the two media is negligible.
 - the difference in concentration of the two media is low.
8. Anaerobic respiration in the organism illustrated in the diagram below produces carbon dioxide and



- glucose.
 - oxygen.
 - water.
 - ethanol.
9. Underground storage stems which grow horizontally in the soil are
- corms.
 - rhizomes.
 - runners.
 - bulbs.
10. Muscle fatigue in the body of an athlete is due to
- accumulation of carbonic acid.
 - accumulation of lactic acid.
 - high oxygen content.
 - low pH.

11. The heart can beat continuously without being fatigued because it is composed of
- renal muscles.
 - cardiac muscles.
 - smooth muscles.
 - skeletal muscles.
12. The product of tissue respiration are
- water, carbon dioxide and energy.
 - glucose, carbon dioxide and energy.
 - oxygen, water and energy.
 - glucose, oxygen and water.
13. Excretory products in plants responsible for the decolouration of flowers are called
- resins.
 - anthocyanins.
 - tannins.
 - alkaloids.
14. The process of maintaining a steady internal environment is known as
- plasmolysis.
 - homeostasis.
 - equilibration.
 - osmoregulation.
15. Which of the following statements is **not** true about hormones?
- They are transported by the blood to the target organs.
 - They are chemical messengers in animals.
 - They may affect more than one target organ.
 - Their responses are voluntary.

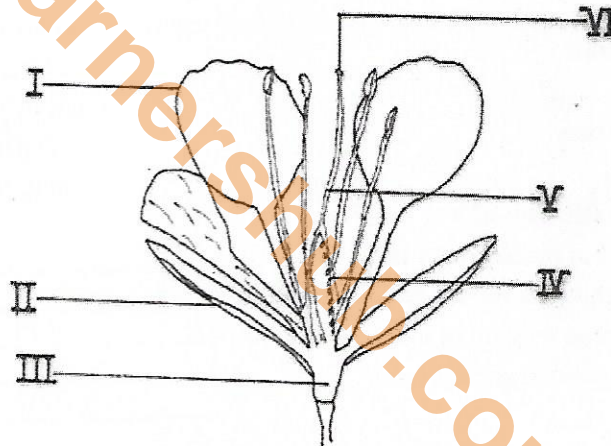
The diagram below is an illustration of a human brain. Study it and answer questions 16 and 17.



16. The part labelled I is the
- medulla oblongata.
 - cerebrum.
 - cerebellum.
 - olfactory lobe.

17. The function of the part labelled **II** is that it controls
- posture and balance of body.
 - all voluntary actions.
 - temperature and appetite.
 - many involuntary actions.
18. To focus on a distant object, the ciliary muscle of the eye
- relaxes and the eye lens gets thicker.
 - contracts and the eye lens gets thinner.
 - relaxes and the eye lens gets thinner.
 - contracts and the eye lens gets thicker.
19. The **main** function of the amniotic fluid is for
- nourishing the foetus.
 - lubricating the birth canal.
 - protection of the foetus from shock.
 - respiration in the foetus.

The diagram below is an illustration of the longitudinal section of a flower. *Study it and answer questions 20 and 21.*



20. Which part of the flower is responsible for the protection of young flower buds?
- IV
 - III
 - II
 - I
21. The essential parts of the flower are labelled
- IV, V and VI.
 - III, V and VI.
 - II, III and IV.
 - I, II and III.
22. Deficiency in insulin could lead to
- nephritis.
 - diabetes.
 - hepatitis.
 - cirrhosis.

23. Which of the following forms of energy is utilized during photosynthesis?
- Chemical
 - Solar
 - Kinetic
 - Potential
24. Light is excluded from a water culture experiment in order to
- prevent the growth of algae.
 - prevent ionization of water molecules.
 - enable the roots to grow straight down.
 - prevent overheating of the roots.
25. The major mineral present in the shell of Molluscs is
- calcium.
 - iron.
 - sodium.
 - copper.
26. The digestion of proteins starts in the
- mouth.
 - large intestine.
 - stomach.
 - small intestine.
27. Tooth decay is usually caused by
- eating a lot of proteinous foods.
 - the bacteria in the mouth that metabolize sugar to acids.
 - eating limited amount of sweetened food.
 - undigested and absorbed food.
28. The conversion of ammonium salts into nitrates is called
- nitrification.
 - fixation.
 - denitrification.
 - putrefaction.
29. The salinity of a brackish habitat
- increases during the dry season.
 - decreases with an increase in the number of organisms.
 - increases at the end of the rainy season.
 - increases immediately after rainfall.
30. If 90 ants are found in a field with a total area of 100 m^2 what is the population density of the ants?
- 90.00
 - 9.00
 - 0.90
 - 0.09

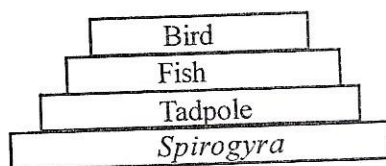
31. The complex relationship between the members of a community and their physical environment is known as
- ecology.
 - saprophytism.
 - symbiosis.
 - commensalism.

32. The specific role of a species within its environment is known as its
- biotic community.
 - trophic level.
 - niche.
 - habitat.

33. Which of the following soil fertility improvement methods will have the **most** negative effect on the ecosystem if **not** controlled?
- Crop rotation
 - Mixed farming
 - Shifting cultivation
 - Application of N-P-K fertilizer

34. Organisms in an ecosystem are usually grouped according to their trophic level into
- producers and consumers.
 - producers and saprophytes.
 - consumers and parasites.
 - carnivores and omnivores.

35.

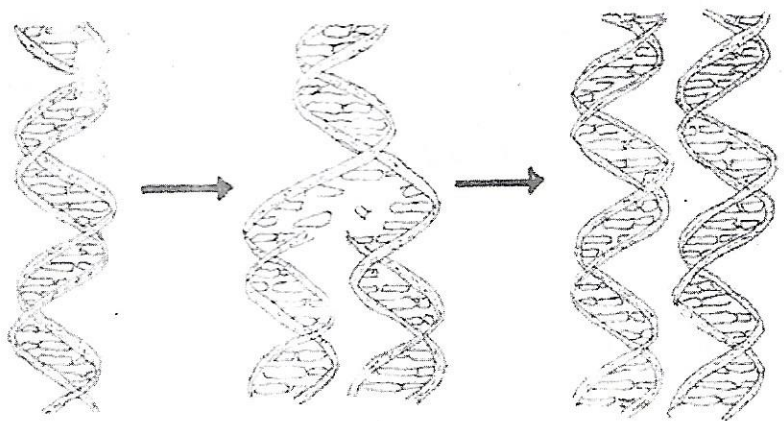


In the pyramid of energy illustrated above, the organism with the **least** amount of transferred energy is

- bird.
 - fish.
 - tadpole.
 - Spirogyra*.
36. Tall trees with unbranched trunks which grow above the upper storey of the forest are **commonly** referred to as
- shrubs.
 - lianes.
 - herbs.
 - emergents.
37. Maize grains are best stored against insect attacks by
- covering with leaves.
 - leaving them on their cobs.
 - storing in the room.
 - keeping in a silo.

38. Cholera is **mostly** spread by
- noise.
 - water.
 - soil.
 - air.
39. Which of the following resources is renewable?
- Tree
 - Iron
 - Coal
 - Petroleum
40. Which of the following roles is **not** performed by a government agency responsible for forest maintenance?
- Regulating mining activities in the forest
 - Tracking the movement of timber, wood and wildlife
 - Creating, protecting and managing the forest reserves
 - Regulating the harvest of timber and poaching
41. Which of the following factors is **not** a source of variation in living organisms?
- Meiosis
 - Mitosis
 - Inheritance
 - Environment
42. Individuals with blood group **AB** can donate blood to individuals with blood group(s)
- O** only.
 - AB** only.
 - A** and **O**.
 - A** and **B**.

The diagram below is an illustration of a process occurring in a living animal cell. *Study it and answer questions 43 and 44.*



43. The process occurs in the
- cytoplasm.
 - Golgi body.
 - mitochondrion.
 - nucleus.

44. The process is called
A. mutation.
B. crossing over.
C. cell maturation.
D. replication.
45. Which of the following nucleotides is **not** found in the DNA molecule?
A. Uracil
B. Guanine
C. Cytosine
D. Adenine
46. In a complete dominance monohybrid cross between pure breeding yellow flowered plant **Y** and a pure breeding white flowered plant **y**, the result of the **first** filial generation is
A. all white flowers.
B. all yellow flowers.
C. 75 % yellow flowers.
D. 50 % yellow flowers.
47. A man whose blood group is heterozygous **B** is married to a woman whose blood group is also heterozygous **B**. Which of the following statements is **correct** about the blood group of their **four** offspring?
A. Two of them belong to blood group **B**.
B. None of them belong to blood group **O**.
C. Three of them belong to blood group **O**.
D. Three of them belong to blood group **B**.
48. The cross between $RrTt$ and $rrtt$ where R is a gene for red colour and T for tallness will result in
A. 75 % tall with red fruits.
B. 50 % tall with red fruits.
C. 25 % tall with red fruits.
D. all the offspring being tall with red fruits.
49. The yellow and black stripes on the body of wasps is an example of
A. warning colouration.
B. camouflage.
C. courtship behaviour.
D. mimicry.
50. The biological importance of the dance by the worker honey bee is that it
A. serves as a means of identifying members of the caste.
B. signals the availability of food.
C. serves as a warning signal.
D. acts as a signal for mating.

END OF PAPER