Please read the following instructions carefully:

1. Answer all the questions in the question paper.
2. Answer question 1 in CAPITAL LETTERS.
3. ALL of the questions in the test book.
5. Read your questions carefully.
6. Good Luck.

QUESTION 1
Choose the alternative that best completes the statement or answers the question. Only write down the correct CAPITAL letter next to the appropriate question number.

1.1 The veins in the pulmonary circuit transport _____.
   a. nutrients           c. lymph
   b. carbon dioxide      d. oxygen

1.2 A boy is bitten by a venomous snake on his left leg. Poison gets to his heart through the _____.
   a. pulmonary vein       c. inferior vena cava
   b. left artery          d. hepatic portal vein

1.3 In the human heart _____.
   a. the main pumping action is by the atria   c. blood from the right ventricle flows to the lungs
   b. oxygenated blood enters the right ventricle   d. blood from the systemic circuit enters the left atrium
1.4 Many individuals of the same species living together in a defined area form a/an
a. population.                      c. genus.
b. community.                      d. ecosystem.

1.5 When two different species overlap in the same biological niche, they are ______
a. unaffected by one another.       c. in co-operation with one another.
b. dependent on one another.        d. in competition with one another.

1.6 Which of the following is characteristic of parasitism?
a. One organism kills and consumes another.    c. Two organisms feed side by side from the same food.
b. Two organisms live together and neither is harmed.  d. One organism lives in or on another and benefits.

1.7 The glomerular filtrate contains _______

a. blood minus cells             c. blood minus proteins
b. blood minus cells and minus proteins  d. plasma minus cells minus proteins

1.8 What will happen if one kidney of a person is removed ______

a. he will survive and remain normal    c. urea will go on accumulating in the blood
b. he will die                              d. urination will stop

1.9 The function of the mammalian kidney is to excrete ____________

a. extra urea, excess water and excess amino acids    c. extra urea, extra salts and extra sugar
b. extra urea, extra carbohydrates and extra water    d. extra salts, urea and excess water

1.10 In which of the following ways does human activity diminish biodiversity?

a. Deforestation removes habitats.          c. Pollution destroys habitats.
b. Urbanization alters habitats and reduces both plant and animal biodiversity.  d. All of the above reduce biodiversity.

1.11 The understanding of the process in the diagram below, helps us to _____

a. predict when and where different groups evolved    c. know the origin and development of an individual organism from embryo to adult
b. Understand how living organisms may be produced from non-living matter          d. understand Lamarck's theory of evolution
1.12 The diagram below shows an example of _____.

(a) Punctuated pattern

Time

a. gradual pattern change
c. punctuated equilibrium
d. Neo-Darwinism

1.13 The main cause of the increase in the amount of CO₂ in the Earth’s atmosphere over the past 150 years _____.

a. has increased worldwide primary production
c. has caused an increase in the amount of infrared radiation absorbed by the atmosphere
d. is the burning of larger amounts of wood and fossil fuels

1.14 Which of the following causes excessively high levels of toxic chemicals in fish-eating birds?

a. Depletion of atmospheric ozone.
c. Biological magnification.
d. Greenhouse effect.

1.15 The plants in the diagram below are used as important medicinal components in many remedies, what are these plants called?

a. Pepperbark plants.
c. Hoodia.
b. Fynbos. 
d. Rooibos.

1.16 Which of these hominin traits seems to have occurred before others?

a. Tool use.
c. Symbiotic thought.
b. Increased brain size.
d. Bipedalism.

1.17 The most primitive hominin discovered to date ______.

a. may have hunted dinosaurs
c. closely resemble a chimpanzee
b. lived 1.2 million years ago
d. walked on two legs

1.18 Which of these species was the first to craft stone tools?

a. H. heidelbergensis.
c. H. ergaster.
b. H. erectus. 
d. H. habilis.
QUESTION 2
Give the correct biological term for each of the following statements. Only write down the correct term next to the appropriate question number on the answer sheet.

2.1 The organs that filter lymph and play an important role in the body’s defence.
2.2 The pacemaker that sets the rate and timing at which cardiac muscle cells contract.
2.3 The heart contracts and relaxes in a rhythmic cycle.
2.4 The property of a system in which variables are regulated so that internal conditions remain stable.
2.5 The hormone that increases the reabsorption of sodium (Na) & water.
2.6 Type of excretory organs present in earthworms.
2.7 Sampling technique to estimate densities and total population sizes.
2.8 When different species compete for a resource in short supply.
2.9 Several species living close to each other, but competition for food is reduced due to their preference for different niches.
2.10 The evolution of similar or analogous features in distantly related groups.
2.11 The process whereby humans select and breed individuals with desired traits.
2.12 A process that refers to evolutionary change above the species level.
2.13 The study of similarity resulting from common ancestry.
2.14 A medicinal plant used as an appetite suppressant and for treating indigestion.
2.15 Species typically introduced to new environments by humans and lack natural predators or disease.
2.16 The study of human origins.
2.17 Australopiths which had sturdy skulls and powerful jaws.
2.18 The species that walked fully upright (bipedal), had humanlike hands and teeth and a brain 1/3 of present humans.

QUESTION 3
Provide a short definition for each of the following:

3.1 Systemic circuit.
3.2 Superior vena cava.
3.3 Obligate mutualism.
3.4 Dispersion.
3.5 Osmoregulation.
3.6 Filtration.
3.7 Eusociality.
3.8 Ecological succession.
3.9 Ozone.
3.10 Greenhouse effect.
3.11 “Gracile”.
3.12 Microevolution.

**QUESTION 4** [17]

4.1 Which are the two (2) main metabolic gases transported by the blood? (2 x ½ = 1)
4.2 What is the stage of the rhythmic cycle during which the ventricles are filled? (1)
4.3 Identify the valve that separates the aorta from the heart? What is the importance of the valve? (3)
4.4 Discuss the flow of blood through the human heart. (20 X ½ = 10)
4.5 Explain the lymphatic system? (2)

**QUESTION 5** [18]

5.1 How does the hormone Aldosterone work? (1)
5.2 How do the kidneys aid in maintaining the acid-base balance in the body? (4)
5.3 Explain how the kidneys act as organs of homeostasis. (4)
5.4.1 What is taking place during tubular secretion? (3)
5.4.2 Provide six (6) examples of the secreted substances referred to in 5.4.1. (6 x ½ = 3)
5.5 Use the table below to distinguish between three (3) different types of waste products. Redraw and complete the table below on your answer sheet. (6 x ½ = 3)

<table>
<thead>
<tr>
<th>EXAMPLE OF WASTE PRODUCT</th>
<th>TOXICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5.1</td>
<td></td>
</tr>
<tr>
<td>5.5.2</td>
<td></td>
</tr>
<tr>
<td>5.5.3</td>
<td></td>
</tr>
</tbody>
</table>

**QUESTION 6** [18]

6.1 The population growth in density-dependent populations is affected by many factors. Name five (5) factors and briefly explain them. (10)
6.2 Suppose you want to know how many box turtles are in a wooded park. On the first day, you hunt through the woods and capture 24 turtles. You place a spot of non-toxic paint on each turtle’s shell and release all turtles back where you found them. A week later you return, and with an extraordinary effort, catch 60 turtles. Of these, 15 are marked and 45 are unmarked. Determine the population size of the turtles. Show all calculations and equations. (5)
6.3 What is symbiosis and provide three (3) examples of this phenomena. (6 x ½ = 3)
QUESTION 7

7.1 What is an anthropogenic impact on the environment and what does this include? (4)
7.2 Distinguish between point source water pollution and non-point source water pollution? (3)
7.3 Fill in the missing words to formulate an accurate scientific statement. (5)

- Life on Earth is protected from damaging effects of 7.3.1 by a protective layer of molecules in the atmosphere.
- Satellite studies suggest that the protective layer of molecules has been gradually 7.3.2 (choose the correct word).
- Destruction of atmospheric protective gasses probably results from 7.3.3 produced by human activity.
- Due to the burning of fossil fuels and other human activities, the concentration of atmospheric 7.3.4 has been steadily increasing.
- 7.3.5 species are typically introduced to a new environment by humans.

7.4 Name three (3) main contributors to water pollution. (3)
7.5 List two (2) sources of air pollution.

QUESTION 8

8.1 Discuss Biogeography and Genetics as two (2) kinds of evidence that exist about the origin of ideas about the origin of life (evolution). (5)
8.2 Discuss four (4) examples of mechanisms that exist that will inhibit reproduction between populations. (4)
8.3 Discuss three (3) methods of how new species come into existence. (3)
8.4 The following questions is based on the background information on Darwin.

8.4.1 What is Darwin's first name? (1)
8.4.2 His interest in the geographic distribution of species was triggered by a stop at a specific place, namely? (1)
8.4.3 What was the name of the ship that Darwin travelled around the world? (1)
8.4.4 How long was the voyage on the ship, during which he conducted his research? (1)

QUESTION 9

9.1 Fit column B with column A. (7)

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1.1 Homo neanderthalensis</td>
<td>A. Lived: 1.8 million years to 100 000 years ago.</td>
</tr>
<tr>
<td>9.1.2 Paranthropus boisei</td>
<td>B. Nickname: Goliath.</td>
</tr>
<tr>
<td>9.1.3 Homo sapien</td>
<td>C. Nickname: Hobbit.</td>
</tr>
<tr>
<td>9.1.5 Homo habilis</td>
<td>E. Lived: 200 000 years ago to present.</td>
</tr>
<tr>
<td>9.1.6 Homo floresiensis</td>
<td>F. Relied heavily on meat, such as bison, deer and musk ox.</td>
</tr>
<tr>
<td>9.1.7 Homo erectus</td>
<td>G. Nickname: Nutcracker man.</td>
</tr>
</tbody>
</table>
9.2 Briefly discuss each of the following to ensure that the reader knows the meaning of the term.

9.2.1 Hominins

9.2.2 Australopiths

9.3 Complete the following table to accurately compare two (2) Hominins.

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>Homo erectus</th>
<th>Homo sapiens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain</td>
<td>900cc – 1100cc</td>
<td>9.3.1</td>
</tr>
<tr>
<td>Skull</td>
<td>9.3.2</td>
<td>9.3.3</td>
</tr>
<tr>
<td>Skeleton</td>
<td>9.3.4</td>
<td>More slender slighter build</td>
</tr>
</tbody>
</table>

9.4 Briefly indicate where Paranthropus boisei lived and what his diet consisted of.

TOTAL 150