EXAMINATIONS COUNCIL OF ZAMBIA

Joint Examination for the School Certificate and General Certificate of Education Ordinary Level

BIOLOGY

PAPER 1 Multiple Choice

Monday 8 NOVEMBER 2010 50 minutes

Additional materials:
- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)

TIME 50 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Look at the left hand side of your answer sheet. Ensure that your name, the school/centre name and subject paper are printed. Also ensure that the subject code, paper number, centre code, your examination number and the year are printed and shaded. Do not change the already printed information.

There are forty questions in this paper. Answer all questions. For each question there are four possible answers: A, B, C and D. Choose the best answer and shade according to instructions on the answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark.

Any rough working should be done in this booklet.

Cell phones are not allowed in the examination room.

This question paper consists of 16 printed pages.

[Turn over
1. The diagram below shows a cell from a leaf of a plant.

Which of the labelled parts stores salts?

2. The diagrams below show four different animal cells as seen through a microscope.

What are these cells called?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Neuron</td>
<td>Red blood cell</td>
<td>White blood cell</td>
<td>Muscle cell</td>
</tr>
<tr>
<td>B</td>
<td>Muscle cell</td>
<td>White blood cell</td>
<td>Red blood cell</td>
<td>Neuron</td>
</tr>
<tr>
<td>C</td>
<td>Muscle cell</td>
<td>Neuron</td>
<td>Red blood cell</td>
<td>White blood cell</td>
</tr>
<tr>
<td>D</td>
<td>White blood cell</td>
<td>Muscle cell</td>
<td>Red blood cell</td>
<td>Neuron</td>
</tr>
</tbody>
</table>

3. The process that can reduce the rate of photosynthesis is ...

A. respiration.
B. pollution.
C. germination.
D. transpiration.

4. What is the total number of teeth in the mouth of a rabbit whose dental formula is $I_1^1$, $C_0^0$, $Pm_0^0$, $M_3^3$?

A. 14
B. 6
C. 8
D. 28
The diagram below shows an experiment to investigate osmosis.

Which of the following statements is correct about sugar solution X and sugar solution Y?

A  Solution Y is more concentrated than Solution X.
B  Solution X is more concentrated than Solution Y.
C  Both solutions X and Y are of equal concentrations.
D  Sugar molecules diffused out of Solution Y into Solution X.

Which of the following graphs shows the effect of light intensity on the rate of photosynthesis in a pond weed (Elodea)?
The following diagrams show an experimental procedure to investigate the mineral salt requirement of rice plants grown in different culture solutions.

What would be the deficiency symptoms observed in plants X, Y and Z after three weeks?

<table>
<thead>
<tr>
<th></th>
<th>Deficiency symptom in Plant X</th>
<th>Deficiency symptom in Plant Y</th>
<th>Deficiency symptom in Plant Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Stunted growth</td>
<td>Poor root development</td>
<td>Yellowing of leaves</td>
</tr>
<tr>
<td>B</td>
<td>Stunted growth</td>
<td>Yellowing of leaves</td>
<td>Poor root development</td>
</tr>
<tr>
<td>C</td>
<td>Poor root development</td>
<td>Stunted growth</td>
<td>Yellowing of leaves</td>
</tr>
<tr>
<td>D</td>
<td>Poor root development</td>
<td>Yellowing of leaves</td>
<td>Stunted growth</td>
</tr>
</tbody>
</table>

The figure below shows changing energy requirements with age and type of occupation.

What is the difference in energy requirement between a boy aged 5 years and a 25 year old adult doing heavy work?

A 8 000KJ  
B 10 000KJ  
C 12 000KJ  
D 14 000KJ
The diagram below shows processes taking place in an organism.

Which numbered part represents the process of respiration?

A 2 only
B 1 and 2
C 1 and 3
D 2 and 3

The diagram below shows chemical digestion of a nutrient in the human body.

Identify enzyme K and products M and L.

<table>
<thead>
<tr>
<th>Enzyme K</th>
<th>Product M</th>
<th>Product L</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Lipase</td>
<td>Fatty acid</td>
<td>Glycerol</td>
</tr>
<tr>
<td>B Lipase</td>
<td>Glycerol</td>
<td>Fatty acids</td>
</tr>
<tr>
<td>C Trypsin</td>
<td>Peptide</td>
<td>Amino acids</td>
</tr>
<tr>
<td>D Maltase</td>
<td>Glucose</td>
<td>Fructose</td>
</tr>
</tbody>
</table>

Which of the following blood vessels will have the highest level of amino acids after a meal rich in proteins?

A Aorta
B Pulmonary vein
C Hepatic portal vein
D Renal vein
12 Which of the following correctly identifies the types of root system?

**Couch grass**
- A Tap root
- B Adventitious
- C Tap root
- D Fibrous

**Dandelion**
- A Fibrous
- B Fibrous
- C Adventitious
- D Tap root

13 The diagram below shows a longitudinal section through the phloem.

Name a substance that is conducted across the sieve plates.
- A Glucose
- B Starch
- C Sucrose
- D Proteins
14 The following events occur during blood clotting.

1. Fibrinogen changed to fibrin.
2. Platelets release thromboplastins.
3. Prothrombin converted to thrombin.
4. Fibrin forms a network of fibres that traps blood cells.

In which order do these events occur?

A 2 → 3 → 1 → 4
B 1 → 2 → 3 → 4
C 3 → 4 → 2 → 1
D 4 → 1 → 2 → 3

15 The diagrams below show a cross section of the three types of blood vessels drawn to scale.

[Diagrams of blood vessels X, Y, Z]

What are these blood vessels called?

X  Y  Z
A  Vein  Artery  Capillary
B  Capillary  Vein  Artery
C  Vein  Capillary  Artery
D  Artery  Capillary  Vein
16 The diagram shows the internal structure of the heart.

Identify Valve X and Vessel Y?

<table>
<thead>
<tr>
<th>Valve X</th>
<th>Vessel Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>pulmonary vein</td>
</tr>
<tr>
<td>B</td>
<td>pulmonary artery</td>
</tr>
<tr>
<td>C</td>
<td>aorta</td>
</tr>
<tr>
<td>D</td>
<td>vena cava</td>
</tr>
</tbody>
</table>

17 The diagram below shows the apparatus that can be used to investigate whether carbon dioxide is given off by a potted plant during respiration.

Which one of the following would you expect to observe in the flasks labelled 1, 2 and 3?

<table>
<thead>
<tr>
<th>FLASK 1</th>
<th>FLASK 2</th>
<th>FLASK 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Clear</td>
<td>Cloudy</td>
</tr>
<tr>
<td>B</td>
<td>Cloudy</td>
<td>Clear</td>
</tr>
<tr>
<td>C</td>
<td>Clear</td>
<td>Cloudy</td>
</tr>
<tr>
<td>D</td>
<td>Clear</td>
<td>Cloudy</td>
</tr>
</tbody>
</table>
18 Which of the following reactions of tissue respiration occurring in a human being would yield the largest amount of energy?

A  Glucose (1g) + Oxygen → Carbon dioxide + water + Energy.
B  Glucose (1g) → Lactic acid + Energy.
C  Glucose (1g) → Ethanol + Carbon dioxide + Energy.
D  Fatty acid (1g) + Oxygen → Carbon dioxide + water + Energy.

19 The graph shows the concentration of lactic acid in the blood of an athlete.

![Graph showing concentration of lactic acid over time](image)

During which time(s) was the athlete exercising?

A  Period X
B  Period Y
C  Period X and Y
D  Period X and Z

20 The diagram below shows a vertical section through a mammalian skin.

![Diagram of mammalian skin](image)

To which of the structures labelled P, Q, R, S or T does blood supply increase when the body is too hot to help return the temperature to normal?

A  P and Q
B  P and R
C  R and T
D  S and T
21 Which of the following is a nitrogenous waste in plants?
   A  Urea
   B  Cocaine
   C  Latex
   D  Oil

22 The figure below shows the longitudinal section of a maize seed.
    Which of the labelled parts grow into roots?

23 The graph below shows the average height of boys and girls up to the age of 18 years.

At what age are girls generally taller than boys?
   A  4 – 6 years
   B  6 – 10 years
   C  11 – 14 years
   D  15 – 18 years
Which of the following graphs shows the correct relationship between a mammal's body temperature and the temperature of its environment?

25 The diagram below shows part of a growing root.

Identify the region of cell differentiation and specialisation.
26 The diagram below shows a section through the human brain.

Which of the labelled structures is the centre for processes such as thought, memory and judgement?

27 Select the diagram that correctly shows the size of the pupil of the human eye when in the dark.

28 The diagram below shows a section of a mammalian eye.

In which of the labelled parts is there the greatest concentration of cone cells?
The diagrams below show anterior view of the two bones from the vertebral column.

From which regions of the vertebral column are the two bones found?

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Thoracic</td>
<td>Cervical</td>
</tr>
<tr>
<td>B</td>
<td>Thoracic</td>
<td>Lumbar</td>
</tr>
<tr>
<td>C</td>
<td>Lumbar</td>
<td>Thoracic</td>
</tr>
<tr>
<td>D</td>
<td>Cervical</td>
<td>Sacral</td>
</tr>
</tbody>
</table>

The diagram below shows an experiment set up to demonstrate the response of maize seedlings to light. They are growing in a box with a hole cut at one end.

Which of the seedlings labelled 1, 2, 3 or 4 would grow towards light?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 and 3</td>
</tr>
<tr>
<td>B</td>
<td>1 and 2</td>
</tr>
<tr>
<td>C</td>
<td>3 and 4</td>
</tr>
<tr>
<td>D</td>
<td>4 and 1</td>
</tr>
</tbody>
</table>

Which of the following pairs of stimuli can affect the distribution of auxins in plant roots and shoots?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Light and water.</td>
</tr>
<tr>
<td>B</td>
<td>Gravity and water.</td>
</tr>
<tr>
<td>C</td>
<td>Gravity and light.</td>
</tr>
<tr>
<td>D</td>
<td>Light and chemical.</td>
</tr>
</tbody>
</table>
32 Which of the following bones form a hinge joint?
A Humerus and ulna.
B Radius and scapula.
C Radius and ulna.
D Scapula and humerus.

33 The diagram below shows a flower of a type of a wind-pollinated grass called *Ileucine indica*.

In the diagram, what feature shows that the flower is wind-pollinated?
A Club-shaped stigma
B Petals
C Nectar gland
D Feathery stigma

34 The diagram below shows a pollen grain soon after it landed on the stigma.

What process has the pollen grain undergone to appear as shown in the diagram?
A Pollination
B Fertilization
C Elongation
D Germination
35 The diagram below shows fruits of Dandelion and Sycamore.

How is each of them dispersed?

<table>
<thead>
<tr>
<th>Dandelion</th>
<th>Sycamore</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Animal</td>
</tr>
<tr>
<td>B</td>
<td>Self</td>
</tr>
<tr>
<td>C</td>
<td>Wind</td>
</tr>
<tr>
<td>D</td>
<td>Wind</td>
</tr>
<tr>
<td></td>
<td>Animal</td>
</tr>
</tbody>
</table>

36 The following diagram shows a developing foetus in the uterus.

Which of the following shows the composition of blood in blood vessel P?

<table>
<thead>
<tr>
<th>Glucose Concentration</th>
<th>Oxygen Concentration</th>
<th>Carbon dioxide concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>B Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>C High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>D High</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>
37 Which of the following is the most important advantage of sexual reproduction over asexual reproduction?

A  It protects the embryo during its early growth.
B  It ensures the survival and growth of the species.
C  It allows variation to arise in the offspring.
D  It produces offspring more quickly.

38 Match the following diseases with their causative agents.

<table>
<thead>
<tr>
<th>Influenza</th>
<th>Tuberculosis</th>
<th>Malaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  Virus</td>
<td>B  Bacterium</td>
<td>C  Protozoan</td>
</tr>
<tr>
<td>B  Protozoan</td>
<td>C  Virus</td>
<td>B  Bacterium</td>
</tr>
<tr>
<td>C  Protozoan</td>
<td>D  Bacterium</td>
<td></td>
</tr>
<tr>
<td>D  Virus</td>
<td></td>
<td>C  Virus</td>
</tr>
</tbody>
</table>

39 The diagram below shows the carbon cycle.

Identify the process represented by letter X.

A  Photosynthesis
B  Decomposition
C  Combustion
D  Respiration

40 Albinism in humans is a condition caused by a recessive gene. If two albinos marry, what is the chance of them having a normal child?

A  0%
B  50%
C  75%
D  100%