EXAMINATIONS COUNCIL OF ZAMBIA

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

BIOLOGY
PAPER 1 Multiple Choice

Wednesday 13 NOVEMBER 2002

TIME: 50 minutes

INSTRUCTIONS TO CANDIDATES

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

Write your name, centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

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 one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

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1. Which structure is not present in root cells?
   A. Cell wall
   B. Cell membrane
   C. Sap vacuole
   D. Chloroplasts

2. The diagrams below shows specialized plant cells.

   ![Diagrams](image)

   From which parts of the plants could the above cells have been obtained?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>S</td>
<td>T</td>
</tr>
<tr>
<td>A</td>
<td>Roots</td>
<td>Stem</td>
</tr>
<tr>
<td>B</td>
<td>Leaves</td>
<td>Stem</td>
</tr>
<tr>
<td>C</td>
<td>Leaves</td>
<td>Roots</td>
</tr>
<tr>
<td>D</td>
<td>Stem</td>
<td>Roots</td>
</tr>
</tbody>
</table>

3. The diagram below shows an apparatus used to demonstrate the movement of substances.

   ![Diagram](image)

   Which of the pairs correctly describes the movement of water molecules and dye particles?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Water molecules</td>
<td>Dye particles</td>
</tr>
<tr>
<td>A</td>
<td>Osmosis</td>
</tr>
<tr>
<td>B</td>
<td>Diffusion</td>
</tr>
<tr>
<td>C</td>
<td>Osmosis</td>
</tr>
<tr>
<td>D</td>
<td>Diffusion</td>
</tr>
</tbody>
</table>
4 The diagram shows part of the alimentary canal.

An enzyme works under the following conditions.

<table>
<thead>
<tr>
<th>Food acted upon</th>
<th>Temperature</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypeptides</td>
<td>37°C</td>
<td>7</td>
</tr>
</tbody>
</table>

In which labelled region of the alimentary canal is this enzyme found?

5 Which graph shows the effect of increasing temperature on the rate of photosynthesis?
The diagram shows the structure of a Villus in the small intestines.

Which characteristics shown in the diagram make the Villus an effective absorbing structure?

A  The large surfaces area and being long
B  Being long and moist
C  The network of capillaries and being thin
D  The network of capillaries and being moist

The following table gives the percentage of carbohydrate, fat and protein in four samples of food.

<table>
<thead>
<tr>
<th>Food sample</th>
<th>Carbohydrate %</th>
<th>Fat %</th>
<th>Protein %</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>59</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>54</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>C</td>
<td>36</td>
<td>26</td>
<td>19</td>
</tr>
<tr>
<td>D</td>
<td>30</td>
<td>22</td>
<td>18</td>
</tr>
</tbody>
</table>

Which food contains the most energy?
8 The pie chart shows the relative amounts of the main substances needed by the Human body.

Which of the letter represents the substances needed for growth and repair of worn out tissues?
A    R
B    P
C    Q
D    S

9 The graph below shows how light intensity affects stomatal opening and the rate of transpiration.

Why does the water loss by transpiration start to drop at point A?
A    The water lost has gone beyond maximum point for water loss.
B    The increase in light intensity destroys leaf structures
C    The excess water loss reduces the leaf structure.
D    Stomata close due to excessive water loss.
10. The diagram shows structures associated with the liver.

What are the relative blood pressures in X, Y and Z?

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>B</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>C</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>D</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

11. Below are some of the components of blood.

A

B

C

D

Which of these would engulf bacteria entering through a cut in the skin?

12. Which of the following directly brings about an increased breathing rate during physical exercise?

A  Increased demand for oxygen
B  Increased production of carbon dioxide
C  Increased use of glucose
D  Increased production of lactic acid.
13 Which of the following correctly describes Anaerobic respiration in Yeast?

<table>
<thead>
<tr>
<th>Amount of Energy</th>
<th>Carbon-Dioxide</th>
<th>Lactic Acid</th>
<th>Ethanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>high</td>
<td>produced</td>
<td>not produced</td>
</tr>
<tr>
<td>B</td>
<td>high</td>
<td>produced</td>
<td>produced</td>
</tr>
<tr>
<td>C</td>
<td>low</td>
<td>produced</td>
<td>produced</td>
</tr>
<tr>
<td>D</td>
<td>low</td>
<td>produced</td>
<td>not produced</td>
</tr>
</tbody>
</table>

14 The apparatus shown below was set up to investigate respiration.

![Diagram of apparatus]

What happens to the coloured drops in the capillary tube over the next few hours?

A They will both move the same distance towards the seeds.
B The droplet in A will move towards the seeds while that in B will not.
C The droplet in A will move a longer distance towards the seeds while that in B will move a shorter distance in the same direction.
D The droplet in B will move a longer distance towards the seeds while that in A will move a shorter distance in the same direction.

15 Which of the following least describes the effects of emphysema?

A Excessive production of mucous.
B Cilia in air passage not beating.
C Reduced absorbing surface of lungs.
D Inflamation of bronchiole lining.
16 The diagram below shows some of the structures that are associated with the thorax.

What are the labelled structures P, Q, and R?

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>Q</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Spinal cord</td>
<td>Ribs</td>
<td>Lungs</td>
</tr>
<tr>
<td>B</td>
<td>Spinal cord</td>
<td>Lungs</td>
<td>Ribs</td>
</tr>
<tr>
<td>C</td>
<td>Ribs</td>
<td>Lungs</td>
<td>Spinal cord</td>
</tr>
<tr>
<td>D</td>
<td>Lungs</td>
<td>Spinal cord</td>
<td>Ribs</td>
</tr>
</tbody>
</table>

17 Which of the following is **not** an excretory organ?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Skin</td>
</tr>
<tr>
<td>B</td>
<td>Lungs</td>
</tr>
<tr>
<td>C</td>
<td>Kidneys</td>
</tr>
<tr>
<td>D</td>
<td>Liver</td>
</tr>
</tbody>
</table>

18 Samples of blood from structures 1 and 2 were analysed.

The analysis revealed that the blood in structure 1 contains

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>less carbon-dioxide and less urea than blood in structure 2.</td>
</tr>
<tr>
<td>B</td>
<td>more carbon- dioxide and less urea than blood in structure 2.</td>
</tr>
<tr>
<td>C</td>
<td>more oxygen and more urea than blood in structure 2.</td>
</tr>
<tr>
<td>D</td>
<td>less oxygen and more urea than blood in structure 2.</td>
</tr>
</tbody>
</table>
19. What structure attaches the humerus to the scapular in the ball and socket joint of the shoulder?
   A. Joint capsule  
   B. Ligament  
   C. Tendon  
   D. Cartilage

20. The diagram shows a Homeostatic flow Chart in the Human body.

   hypothalamus detects temperature  
   message sent to skin

   blood temperature raised above normal

   Blood flowing in various muscle tissues during physical activity

   Skin response

Which of the following best describes the skin response?
   A. Sweating raised
   B. Reduced shivering
   C. Vasodilation of arteries
   D. Hair on skin, raised

21. Which of the following results from increased secretion of adrenaline?
   A. Increased supply of glucose in the blood.
   B. Increased blood supply to the intestines.
   C. Decreased heart rate.
   D. Decreased breathing rate.
22 The diagram shows the appearance of the front view of the eye.

Which labelled part controls the amount of light entering the eye?

23 Which of the following statements describes what happens when a person with damaged motor nerves of the arm accidentally touches a very hot object?

A Able to move the arm and not able to feel pain.
B Fail to move the arm but able to feel the pain.
C Able to move the arm and also feel pain.
D Fail to move the arm and not able to feel the pain.

24 The diagram below shows a seedling responding to stimuli.

Which of the statements below correctly describes the response of the seedling?

<table>
<thead>
<tr>
<th>The Plumule</th>
<th>The Radicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive phototropic</td>
<td>Negative phototropic</td>
</tr>
<tr>
<td>B Negative Phototropic</td>
<td>Negative phototropic</td>
</tr>
<tr>
<td>C Positive phototropic</td>
<td>Positive Phototropic</td>
</tr>
<tr>
<td>D Negative Phototropic</td>
<td>Positive Phototropic</td>
</tr>
</tbody>
</table>
One of the effects of excessive consumption of alcohol is that it causes a person to stagger.
Which of the following is most likely to be affected to bring about the staggering effect?
A Muscle  
B Eye  
C Medulla  
D Cerebellum

26 In an effort to control insects on a bean crop, a non-biodegradable insecticide was used to eliminate the pests. However, all kinds of insects were eliminated.
Which of the statements below best describes the effect that follows?
A Yield from the field would increase  
B Yield from the field would reduce  
C Crops from the field would all be destroyed.  
D Some of the crops from the field would be destroyed.

27 For each 1000kJ of Energy that a goat takes in as food, it uses 70kJ for growth, loses 410kJ as heat and 520kJ in faeces.
What percentage is used by the goat?
A 7%  
B 41%  
C 48%  
D 52%

28 The diagram below represents a food web.

![Food Web Diagram]

If the producer 1, is suddenly completely wiped out by disease, what would be the most likely immediate effect on the other organisms in the web?
A 4, 5 and 6 would be reduced in numbers, but no organism dies.  
B 4, 5, 6 would die out, 8, 9 and 10 would be reduced in number.  
C All the primary consumers would be reduced in numbers.  
D All consumers in the food web would die out.
29 The diagram below shows the water cycle.

At what point is the water cycle mostly disturbed by man?

30 The table below shows the findings of a research carried out at four different schools over a period of one year to find out the number of pupils who had suffered from malaria.

<table>
<thead>
<tr>
<th>School</th>
<th>Number of pupils that had malaria out of 1000</th>
<th>Number of pupils that died from malaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>550</td>
<td>8</td>
</tr>
<tr>
<td>B.</td>
<td>350</td>
<td>7</td>
</tr>
<tr>
<td>C.</td>
<td>200</td>
<td>6</td>
</tr>
<tr>
<td>D.</td>
<td>52</td>
<td>0</td>
</tr>
</tbody>
</table>

Which school had a successful anti-malarial Control programme.

31 How does spraying of oil and insecticide on stagnant water help to reduce the spread of malaria?
   A  It suffocates the larvae and pupae
   B  It kills the mosquito.
   C  It destroys the eggs.
   D  It suffocates the plasmodium.

32 Which of the following statements explains why some living organisms in water die if raw sewage is allowed into the water?
   A  Sewage makes water dirty.
   B  Sewage ensures that it uses up all the oxygen in water
   C  Sewage nourishes water microorganism which deplete the oxygen
   D  Sewage is poisonous to aquatic organisms.
The diagrams below show a section of the carpel part of flower and the fruit formed from the carpel after fertilization and fruit formation.

Which part of the carpel later develops into structure X?

The diagram shows the role played by insects in pollen transfer.

What would be the result of such transfer?
A  Cross pollination.
B  Cross breeding.
C  Germination of pollen.
D  Incompatibility.

The table shows the percentage failure rate of some birth control methods.

<table>
<thead>
<tr>
<th>Birth control method</th>
<th>Percentage failure rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>98%</td>
</tr>
<tr>
<td>B</td>
<td>60%</td>
</tr>
<tr>
<td>C</td>
<td>25%</td>
</tr>
<tr>
<td>D</td>
<td>0%</td>
</tr>
</tbody>
</table>

Which of these birth control methods is likely to be vasectomy?
36 Which substances enter the mother’s circulation from the foetus?

<table>
<thead>
<tr>
<th></th>
<th>Carbon Dioxide</th>
<th>Oxygen</th>
<th>Glucose</th>
<th>Urea</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>B</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>C</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>D</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

Key: ✓ = Enters  ✗ = Does not enter

37 In families A and B the first five children of each family were all boys. If a boy from family A marries a girl from family B, what are the chances of their first born child being a boy?
A 25%
B 50%
C 75%
D 100%

38 The phenotypic results of a genetic cross in plants are shown in the pie chart below.

![Pie chart showing a 90° triangle labeled 'dwarf' and the remaining 90° labeled 'tall'.]

Which of the following genotypic crosses would produce the above results?
A  TT × tt
B  TT × Tt
C  Tt × tt
D  Tt × Tt

39 A black skinned man who had an X-ray taken on his arm had both alleles for skin colour in that area mutated. If later in life he has children, what will be the effect of this X-ray mutation on the skin colour of the offspring’s arm?
A  Carriers of albinism
B  Complete albinos
C  Skin colour between black and albino
D  Complete black skin

40 Which of the following is as a result of natural selection?
A  Disease resistant crop plants.
B  Insecticide resistant mosquitos.
C  Sweet seedless oranges.
D  Fat beefy cattle.
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