**NANDI NORTH AND NANDI CENTRAL JOINT EXAMINATIONS 2016**

Biology p1, p2&p3

**231/1**

**BIOLOGY PAPER 1**

**JULY / AUGUST 2016 TIME: 2 HOURS**

1. Differentiate between movement and locomotion as used in characterizing living things. (1mk)
2. (a) What is the function of condenser in a light microscope? (1mk)

(b) State **two** roles of centrioles in animal cells. (2mks)

1. (a) Explain the term Osmotic potential in plant physiology. (1mk)
   1. A group of students set-up an experiment to investigate a certain physiological process as shown below.
2. Name the physiological process under investigation. (1mk)
3. If the set-up was left for 20 minutes, what observations will be made? (1mk)
4. Account for the observation made in 3 (b) (i) above. (2mks)
5. (a) Name **two** cells that contain chloroplast in a leaf. (2mks)

(b) State **two** factors affecting the rate of photosynthesis in plants. (2mks)

1. Name any **two** factors determining energy requirements in human beings. (2mks)
2. (i) State **two** primary functions of the roots to plants. (2mks)

(ii) Explain the significance of transpiration in plants. (1mk)

1. Name **one** vitamin and **one** mineral ion responsible for blood clotting. (2mks) Vitamin:

Mineral:

1. (a) (i) Name any **two** gaseous exchange surfaces employed by amphibians. (2mks)

(ii) Name **one** factor affecting rate of breathing in humans. (1mk)

(b) What is the role of carbon anhydrase in blood circulation? (1mk)

1. The figure below shows a respiratory surface for gaseous exchange in mammals. Suggest the corrections that should be made to the diagram before gaseous exchange can take place. (2mks)
2. Study the equation below and answer the question that follow.

C6H12O6 → 2C2H5OH+CO2 +Energy

1. (i) What does the above equation represent? (1mk)

(ii) Name the industrial application of the process named in (a) (i) above. (2mks)

1. What is “oxygen debt?” (1mk)
2. Explain the term respiratory quotient as used in biology. (2mks)
3. (a) Differentiate between excretion and secretion. (2mks)
   1. Explain the absence of the following components in urine of a healthy person. (1mk)
4. Glucose: …
5. Plasma proteins:
6. (i) What is the name of the hormone responsible for regulating the level of sodium ions in blood of a mammal?

(1mk)

(ii) State **two** ways in which glucogen hormone regulate blood sugar level. (2mks)

1. (i) State **one** characteristic shared by the class Reptilia and class Aves. (1mk)

(ii) Some students collected a living specimen for use in the laboratory. It had the following characteristics:-

* Elongated body
* Two pairs of legs per segment
* Body has between 9 – 100 segments
* Three body parts.

Which class does the above animal belong? (1mk)

1. A student at Kaloleni High School picked an organism by the shore of the Indian Ocean. After examining it very carefully, she formed an opinion that the organism belongs to class Arachnida. She then classified it as follows:-

Kingdom – Animalia Phylum – Arthropoda Class – Arachnida

1. Identify **one** mistake in her classification. (1mk)
2. List down **two** characteristics that she could have used in placing the organism in class Arachnida. (2mks)
3. (a) Define the term carrying capacity as used in ecology. (2mks)

(b) State **two** characteristics of a population as used in ecology. (2mks)

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1. Study the food web below and answer the questions that follow.

Grasshopper Lizard Heron Mongoose

Aardvark Chicken

Grass Termite

Bulbul bird Kite

Sheep Human

Leopard Vulture

1. Construct any food chain in which human is a tertiary consumer. (1mk)
2. Suggest the possible short term effects in this ecosystem if all kites migrate away. (1mk)
3. (a) The diagram below represents a certain organism belonging to the kingdom fungi. Name the parts labeled Q and R.

(1mk)

(b) State **two** hormones involved in menstrual cycle giving their roles. (2mks)

1. Differentiate between miscarriage and premature birth. (2mks)
2. (a) Name **two** conditions necessary for germination. (2mks)
3. Which enzyme does each of the following roles?
   1. Breakdown carbohydrates into glucose in a seed. (1mk)
   2. Breakdown protein into amino acid in a seed. (1mk)
4. Differentiate between primary growth and secondary growth in plants. (2mks)
5. (a) State **two** examples of discontinuous variations in human. (2mks)

(b) State **two** functions of DNA molecule. (2mks)

1. Name **two** disorders caused by gene mutations. (2mks)
2. Define the term evolution. (1mk)
3. Differentiate between homologous structures and analogous structures as used in evolution.
4. (a) Study the nerve cell provided below and answer the question that follow.
5. Name the type of the nerve cell shown above. (1mk)
6. Name the parts labeled A and B. (2mks)
7. On the diagram, indicate using the arrow the direction of the nerve impulse. (1mk)
8. Which structure in the ear detects: (2mks)
9. Sound waves:
10. Change in position:
11. (a) Name the type of skeleton found in each of the following Phyta in kingdom animalia.
12. Chordata:
13. Arthropoda:

(b) Name **two** types of movable joints in mammals. (2mks)

1. What is the role of unpaired fins in fish? (1mk)

**(THEORY)**

**JULY / AUGUST 2016 TIME: 2 HOURS SECTION A (40 MARKS)**

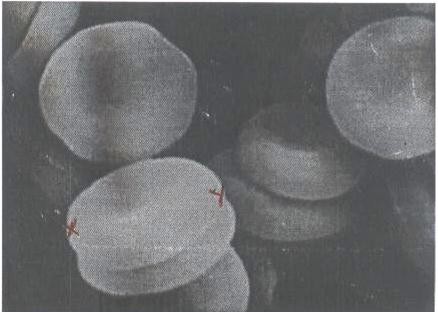
**Answer all questions in this section in the spaces provided.**

1. Study the diagram below and answer the questions that follow.
2. (i) Name the part labeled E and F. (2mks)

(ii) State a function of the parts labeled A and C. (2mks)

1. Name each of the parts that:
   1. Responds to hormone oxytocin. (1mk)
   2. Responds to progesterone hormone. (1mk)
   3. Acts as an endocrine gland. (1mk)
2. Name the structure of the ovary that secretes progesterone hormone in the first four months of pregnancy. (1mk)
3. Pure breed of red flowered and pure breed of white flowered 4 o clock plants were crossed to give F1 off-springs which had pink flowers. The F1 were selfed.
4. Using letter R to represent gene for red colour and W to represent gene for white colour work out the phenotypic ratio of F2.

(4mks)

1. Work out the genotypic ratio of a cross between F1 offspring and the white flowered plant. (3mks
2. Comment on the gene(s) controlling the colour of flowers mentioned above (1mk)
3. Study carefully the photograph shown below.
4. (i) Identify the cells above. (1mk)

(ii) State **two** functions of the cells shown above. (2mks)

1. Explain how the above cells are adapted to their function. (2mks)
2. Name a parasite that may invade and destroy the cells above. (1mk)
3. Suggest **two** bones in an adult man, which produce the cells shown above. ( 2mks)
4. The set of apparatus below was assembled by a group of students to investigate some physiological process.
5. (i) Give **two** aims of the experiment. (2mks)

(ii) Explain observations expected after 24 hours. (2mks)

1. Before the experiment, the glucose was boiled then cooled.
   1. Why was it necessary to boil the solution? (1mk)
   2. What was the importance of oil layer in the experiment? (1mk
2. Describe a control experiment for the set up? (1mk)
3. Suggest **one** industrial application of the process being investigated. (1mk)
4. (a) What is meant by the following terms? (2mks)
   1. Adaptive radiation:
   2. Vestigial structures:
5. Evolution is an ongoing process and is still going on even today. State **two** pieces of evidence which suggests that evolution is still taking place. (2mks)
6. Explain how the following factors influence natural selection. (4mks)
   1. Predators
   2. Diseases

**SECTION B (40 MARKS)**

***Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8.***

1. An experiment was carried out to investigate the effect of temperature on the rate of reaction catalyzed by an enzyme. The results are shown in the table below.

|  |  |
| --- | --- |
| **Temperature (0C)** | **Rate of reaction in mg of products per unit time** |
| 5 | 0.2 |
| 10 | 0.5 |
| 15 | 0.8 |
| 20 | 1.1 |
| 25 | 1.5 |
| 30 | 2.1 |
| 35 | 3.0 |
| 40 | 3.7 |
| 45 | 3.4 |
| 50 | 2.8 |
| 55 | 2.1 |
| 60 | 1.1 |

1. On the grid provided, draw a graph of rate of reaction against temperature. (6mks)
2. When was the rate of reaction 2.6mg of product per unit time? (2mks)
3. Account for the shape of the graph between: (2mks)
   1. 50C and 400C
   2. 450C and 600C
4. Other than temperature, name **two** ways in which the rate of reaction between 50C and 400C could be increased. (1mk)
5. (i) Name **one** digestive enzyme in the human body which works best in acidic condition. (1mk)

(ii) How is the acidic condition for the enzyme named in (e) (i) above attained? (2mks)

1. The acidic condition in (e) (ii) above is later neutralized.
   1. Where does the neutralization take place? (1mk)
   2. Name the substance responsible for neutralization. (1mk)
2. (a) Describe secondary growth in flowering plants? (14mks)

(b) Explain the importance of support and movement in plants. (6mks)

1. Describe economic importance of the following Kingdoms:-
2. Monera (10mks)
3. Fungi (10mks)

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**BIOLOGY PAPER 3**

**CONFIDENTIAL**

Each student to be provided with the following:-

1. Specimen W – Clean fresh large Irish potato.
2. Cork borer – 0.5cm diameter
3. Distilled water
4. 2 beakers – 100ml each
5. Concentrated sucrose solution labeled X 100ml
6. Distilled water labeled Y 100ml
7. Tissue paper
8. 30cm ruler
9. 2 labels
10. Measuring cylinder
11. Scalpel
12. Stop watch

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**BIOLOGY PAPER 3 (PRACTICAL)**

**JULY / AUGUST 2016 TIME: 1¾ HOURS SECTION A (40 MARKS)**

**Answer all questions in this section in the spaces provided.**

1. You are provided with specimen W. push a cork borer through specimen W to remove 4 cylinders of potato tissue. Cut off one end of each cylinder. From the cut end measure 40mm length and cut the cylinder. Repeat this for the other three cylinders. Put 25ml of solution X in a beaker labeled X and 25ml of solution Y in a beaker labeled Y. Place two cylinders in a beaker containing solution Y and the other two in a beaker containing solution X. Leave the experiments for 45 minutes. After 45 minutes remove the cylinders and mop them up with a tissue paper.
2. Measure and record the length of each cylinder in the table below. (8mks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cylinder in solution** | **Initial length** | **Final length** | **Average length** | **% change in length** |
| X 1  2 |  |  |  |  |
|  |  |
| Y 1 |  |  |  |  |
| 2 |  |  |

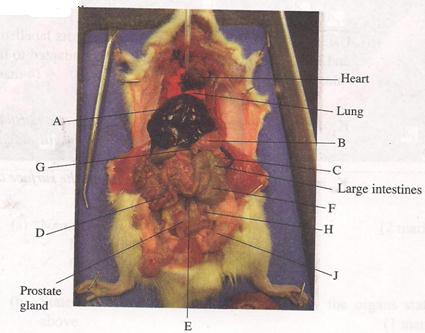
1. Account for observations made in solution:
2. X: (2mks)
3. Y: (2mks)
4. Below are photographs of three sets of seedlings labeled A1, A2 and B. Examine them and use them to answer the questions that follow.
   1. Name the phenomenon exhibited by seedlings in set A2. (1mk)
   2. Give a reason why plants exhibit the phenomenon named in (i) above. (1mk)
   3. Name the response exhibited by the seedlings in set B. (1mk)
   4. State the stimulus that caused the response in (iii) above. (1mk)
   5. Explain how the response named in (iii) above have occurred. (3mks)
   6. State the observable differences between seedlings in set A1 and A2. (3mks)

|  |  |
| --- | --- |
| Set A1 | Set A2 |
|  |  |

* 1. State and explain the type of germination in seedling A1. (2mks)
  2. State the conditions under which the seedlings in set A1 and A2 were grown. (2mks) Set A1

Set A2

1. The following is a photograph of a dissected mammal. Study the photograph and answer the questions that follow.



1. Name the structures labeled A, B and C. (3mks)
2. On the photograph, label and name the site of production of vitamin K. (1mk)
3. Identify and state one function of the following parts:- (6mks)

|  |  |  |
| --- | --- | --- |
| PART | IDENTITY | FUNCTION |
| B |  |  |
| C |  |  |
| A |  |  |

1. (i) State the sex of the dissected mammal. (1mk)

(ii) Give a reason for your answer in (d) (i) above. (1mk)

1. Identify the class to which the specimen belongs. (1mk)
2. State the reason for your answer in (a) (i) above. (1mk)