**GATITU MIXED SCONDARY SCHOOL**

**BIOLOGY FORM 4**

**MIDTERM EXAM TERM 1 2015**

**Section A (40 marks)**

**Answer all the questions in this section**

1. (a) In drosophila melanogaster, the inheritance of eye colour is sex linked. The gene for red eye is dominant. A cross was made between a homozygous red eyed female and a white eyed male. Work out the phenotypic ratio of F1 generation. (Use letter R to represent the gene for red eyes) (5mks)

(b) What is the genotypic ratio of the offsprings (1mk)

(c) What is meant by hybrid vigour. (2mks)

2 . The diagram below represents a food web in a terrestrial ecosystem.

Lions

Hawks

Snakes

Lizards

Toads

Antelopes

Flies grasshoppers

Green plants

(a) From the food web above, construct a food chain with five organisms. (2mks)

(b) State the trophic level occupied by

(i) Lizards \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

(ii) Hawks \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

(iii) Antelopes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

(iv) Green plants \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

(c) What would happen if leopards were introduced in the ecosystem (2mks)

3. (a) In an experiment, a variety of garden peas having a smooth seed coat was crossed with a variety with a wrinkled seed coat. All the seeds obtained in the F1 had a smooth seed coat. The F1 generation was selfed. The total number of F2 generation was 7324.

(a) Using appropriate letter symbols, work out the genotype of the F1 generation. (4mks)

(b) From the information above, work out the following for the F2 generation

(i) Genotype ratio (2mks)

(ii) Phenotype ratio (1mk)

(iii) Wrinkled number (1mk)

4. (a) Describe how insect pollinated flowers are adopted to pollination (5mks)

(b) Describe the role of each of the following hormones in the human menstrual cycle (3mks)

(i) Oestrogen

(ii) Progesterone

(iii) Luteinizing hormone

5. (a) State two types of variations in living organisms. (2mks)

(b) Haemophilia is a sex linked trait in man caused by recessive gene represented by h

(i) Using a genetic cross, work out the genotypes of the offsprings from a marriage between

haemophilic man and a carrier woman. (4mks)

(ii) What is the probability that their son will be haemophilic (1mk)

(iii) Give a reason why males are more haemophilic than females (1mk)

**SECTION B (40 MARKS)**

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

**SECTION B**

6. Rice seeds were soaked overnight. Fresh mass and dry mass of a sample of 20 seeds was obtained and recorded in the table. The rest of the seeds were planted in a tray that had soil and well watered daily. Twenty of the seeds/seedlings were removed from the soil every two days for two weeks. Their fresh and dry mass was taken and recorded in the table as shown below.

|  |  |  |
| --- | --- | --- |
| Time in days | Fresh mass in (g) | Dry mass in (g) |
| 0  2  4  6  8  10  12  14 | 14.0  18.0  24.5  32.0  38.5  41.0  43.0  45.0 | 4.0  3.5  2.5  1.5  2.0  3.0  4.5  6.0 |

(a) Using the same axes, plot graphs of changes in fresh and dry mass against time (7mks)

(b) What would be the fresh and dry mass of the seedling at day 9? (2mks)

(i) Fresh mass

(ii) Dry mass

(c) Account for the change in fresh mass and dry mass between day 0 and day 6

(i) Fresh weight (2mks)

(ii) Dry mass (2mks)

(d) Explain the change in dry mass from day 8 (2mks)

(e) Explain why a sample of 20 seeds was used instead of one seed (2mks)

(f) Describe how dry mass was obtained (3mks)

8. (a) What is meant by digestion? (2mks)

(b) Describe how mammalian small intestine is adapted to its function. (18mks

7. (a) Describe the process of fertilization in flowering plants. (15mks)

(b) State the changes that takes place in a flower after fertilization (5mks)