

4. How would you demonstrate to a class the effects of good tillage on the productiveness of the soil ?

5. If crops of wheat had been grown for three successive seasons in a virgin soil, what culture and cropping would you recommend in order to restore the fertility ?

6. How would you explain to a class the reasons for adopting different methods of planting or sowing for the following crops:—(a) wheat, (b) potatoes, (c) turnips ? Why are different seasons chosen for planting or sowing these crops ?

7. Compare the damage inflicted on the wheat plant by rust and by Hessian fly. State what you know of the development of each of these pests and of the best methods of preventing and mitigating their ravages.

*No. 67.—General Agriculture.—For Class C and for Civil Service Senior.*

*Time allowed : Three hours.*

1. The formation of the fruit may be effected by the development of different parts of the flower in different plants: compare in this respect wheat, the plum, and the gooseberry.

2. Explain why particular conditions of soil, light, temperature, air-supply, and water-supply are all necessary to the healthy growth of green plants.

3. By what methods may a sufficient supply of nitrogen be given to a soil that is deficient in it ? Explain fully the sources of the nitrogen in each case.

4. What methods and what implements should be used in preparing land for a crop of potatoes ?

5. Discuss the qualifications that a breed of stock should possess to fit it for dry hilly land covered with tussock and patches of native scrub.

6. What advantages may be gained by grafting trees ? Explain how a graft becomes united with the stock.

7. Describe a method of performing a mechanical analysis of soils

*No. 68.—Agricultural Chemistry.—For Class C and for Civil Service Senior.*

*Time allowed : Three hours.*

1. What is the usual composition of atmospheric air ? Which of the constituents are directly important as plant-food, and by what organs does the plant assimilate them ?

2. Give a short classification of soils based upon the nature of the rocks from which they are derived. What are the common defects in each of the soils which you mention ?

3. How can a mechanical analysis of a soil be carried out ? Why is it desirable to supplement the mechanical analysis by a chemical analysis ?

4. What are the beneficial constituents of the following manures : Dissolved bones, kainit, guano, basic slag, soot, wood-ashes ?

5. Point out the chemical and physical principles involved in an ordinary four-course crop-rotation

6. Explain clearly what is meant by "germination," illustrating your remarks by special reference to the case of barley.

7. What do you know of the value of hay, oats, potatoes, cotton-cake, brewer's grains, and skim milk as food for agricultural stock ?

8. How would you ascertain whether a sample of milk had been diluted with water ? What constituents of milk would you expect to find in the following preparations : Condensed milk, butter, cheese cream cheese, whey, junket ?

*No. 69.—Agricultural Botany.—For Class C and for Civil Service Senior.*

*Time allowed : Three hours.*

1. Describe the process of germination of a seed of wheat. Explain the special dangers to which a plant is subject during the process of germination.

2. Give a detailed description of the two chief organs of nutrition of a plant. Explain how both are necessary for the formation of the tissue of ordinary plants. Give an instance of a plant in which both are absent, and explain how in this case the growth and vitality of the plant are maintained.

3. Moisture, light, a moderate temperature, and a fertile soil are necessary for the successful growth of vegetation: state the effect that an insufficiency of any one of these will have upon the growth of green plants.

4. Mention and describe three grasses suitable for growing in permanent pasture. State what peculiarities of soil or climate are suitable for each kind.

5. Name and describe three weeds belonging to the *Compositae*. What methods must be employed to prevent each of them from spreading ?

6. How may the germinating-power of a sample of seed be tested ? What would you consider the most important characters in determining the value of a sample of rye-grass seed ?

7. Describe the growth and life-history of the rust fungus. How may its ravages be minimised ?

*No. 70.—Agricultural Zoology.—For Class C and for Civil Service Senior.*

*Time allowed : Three hours.*

1. On what principles is the classification of insects based ? Exemplify the application of those principles.

2. What is an earthworm ? Describe the effects that earthworms have upon the soil.