PAPER 2

ESSAY

[80 marks]

Answer **four** *questions* **only** *from this section.*

Credit will be given for clarity of expression and orderly presentation of material.

All *questions carry* **equal** *marks.*

1. (*a*) (i) What are *chromosomes*? [2 marks]
(ii) State **three** uses of DNA testing in humans. [3 marks]

(*b*) (i) Name **three** noble gases present in the air. [3 marks]
(ii) Explain **briefly** why the noble gases are unreactive under normal conditions. [2 marks]

(*c*) (i) Explain the term *post harvest loss* as used in crop production. [2 marks]
(ii) State **three** precautions farmers take to minimize post harvest losses of cereals in Ghana. [3 marks]

(*d*) (i) What is an *inductor* as used in electronics? [2 marks]
(ii) State **three** applications of solar energy in everyday life. [3 marks]

2. (*a*) Give **two** examples of **each** of the following types of crops cultivated in Ghana:
(i) stem tubers;
(ii) root tubers;
(iii) legumes. [6 marks]

(*b*) (i) Explain the term *saponification.* [2 marks]
(ii) State the observation that could be made when brine is added to the products of saponification. [2 marks]

(*c*) (i) What is a *reflex action*? [2 marks]
(ii) Give **three** examples of reflex actions in the human body. [3 marks]

(*d*) (i) State the law of *conservation of energy.* [2 marks]
(ii) A cement block of mass 25 kg is placed at a height of 10 m above the ground and pushed to fall. Calculate the velocity of the block just before it touches the ground. [$g = 10\ m\ s^{-2}$] [3 marks]

(*a*) (i) State **three** causes of genetic variation in human population. [3 marks]
(ii) Give **two** ways in which genetic variation affects organisms. [2 marks]

(*b*) (i) Explain the following terms associated with air movement:
(α) Trade winds;
(β) Storm. [4 marks]

(ii) A storm moves at a speed of $2.0 \times 10^2\ m\ s^{-1}$. It blows for 30 minutes at this constant speed. How far would the storm reach. [2 marks]

(*c*) (i) What are *radioisotopes*? [2 marks]
(ii) State **three** uses of radioisotopes. [3 marks]

(*d*) State **four** signs that a cow exhibits just before parturition. [4 marks]

4. (*a*) (i) What is an *organic functional group*? [2 marks]

(ii) Name the functional group of **each** of the following organic compounds:

(α) HCOOH;

(β) $CH_3CH(OH)CH_3$;

(γ) CH_2CHCH_2. [3 marks]

(*b*) (i) State **two** methods farmers adopt to control rodents on the farm. [2 marks]

(ii) Give **one** way in which **each** of the following factors is of importance when selecting a site for lettuce cultivation:

(α) type of soil;

(β) accessibility to site;

(γ) topography. [3 marks]

(*c*) (i) What is *personal hygiene*? [2 marks]

(ii) State **three** effects of poor personal hygiene on the individual. [3 marks]

(*d*) (i) What is an *electromagnet*? [2 marks]

(ii) State **three** uses of electromagnets in everyday life. [3 marks]

5. (*a*) (i) Explain the term *brooder house* as used in poultry. [2 marks]

(ii) State **three** causes of cannibalism in poultry. [3 marks]

(*b*) (i) What is a *rainbow*? [2 marks]

(ii) Explain **briefly** how a rainbow is formed. [3 marks]

(*c*) (i) Name **two** types of interactions that exist in an ecosystem. [2 marks]

(ii) State **three** ways by which energy could be lost in food chain. [3 marks]

(*d*) (i) What is a *solvent*? [2 marks]

(ii) A solution was prepared by dissolving 20 g of NaOH in 500 cm^3 of distilled water. Calculate the concentration of the solution in mol/dm^3.

[Na = 23.0, O = 16.0, H = 1.0] [3 marks]

6. (*a*) (i) Explain **briefly** how static electricity is produced. [2 marks]

(ii) Name **two** other sources of electric power generation apart from hydro and thermal. [2 marks]

(*b*) (i) Name **three** glands associated with the alimentary canal of humans. [3 marks]

(ii) List the substance secreted by **each** of the glands named in (*b*)(i). [3 marks]

(*c*) (i) State **one** use of **each** of the following gases:

(α) hydrogen;

(β) ammonia. [2 marks]

(ii) Write a balanced chemical equation for the reaction involving ammonium chloride and calcium hydroxide. [3 marks]

(*d*) Name the **main** nutrient that is responsible for **each** of the following processes in crop plants:

(i) root and tuber development;
(ii) formation of chlorophyll;
(iii) development of strong stem;
(iv) growth;
(v) fruit development.

[5 marks]

END OF PAPER