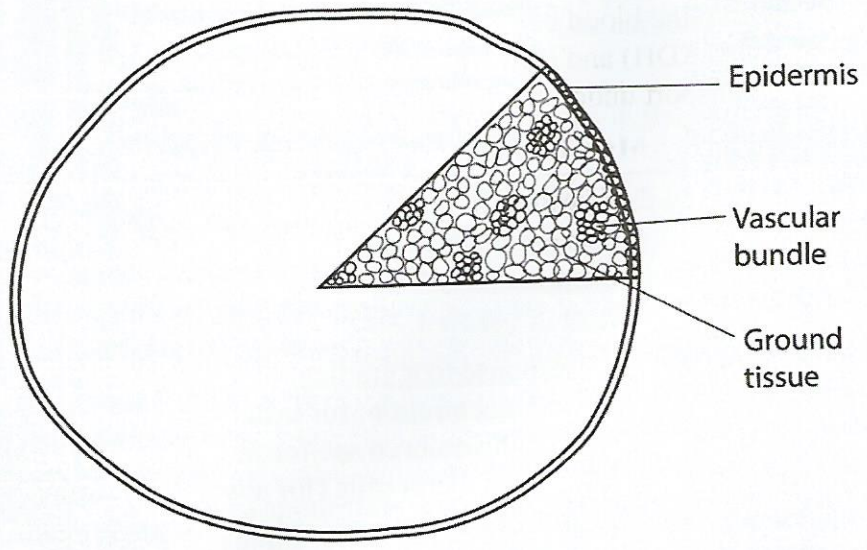
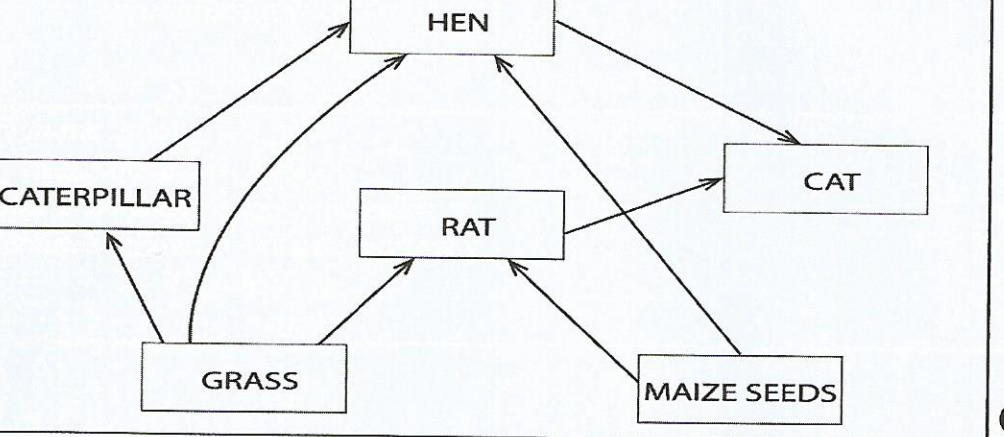


KCSE 2022 PAPER 3

4.5.3 Biology Paper 3 (231/3)

<p>1. (a)(i)</p>	 <p style="text-align: right;">Epidermis Vascular bundle Ground tissue</p> <p style="text-align: right;">Any 2 correct labels</p>	<p>(3 marks)</p>
<p>(ii)</p>	<p>Magnification = Low power objective magnification × eyepiece objective magnification; = $x4 \times x10 = x40$;</p>	<p>(2 marks)</p>
<p>(b)</p>	<p>Monocotyledonae; Scattered vascular bundles;</p>	<p>(2 marks)</p>
<p>(c)</p>	<p>(Monocotyledonous) stem;</p>	<p>(2 marks)</p>
<p>(d)</p>	<ul style="list-style-type: none"> • Firmly hold slide on the stage with clips; • Never use coarse adjustment knob with high/medium power objective; • Use fine adjustment knob with high/medium power objective; • Start with the stage at safest distance from objective lens/lower body tube/objective lenses carefully/slowly to avoid breaking the slide • Start with the stage at the safest distance from the objectives; • Avoid breaking the slide; <p style="text-align: center;">Max 2 marks</p>	<p>(2 marks)</p>
<p>(e)</p>	<p>(i) Mirror – reflects light onto the stage/slide/specimen/into the microscope; (ii) Diaphragm – regulates/controls the amount of light falling/reaching onto the object/stage/slide; (iii) Condenser – concentrates light onto the object/slide/stage/specimen;</p>	<p>(3 marks)</p>

2. (a)(i)	In G – white/cream/ yellow/cream-yellow/white-yellow; H – (a little) brown; (less colour change/black/browning; J – more brown/ more colour change/more black/browning/blackening;	(3 marks)
(ii)	In H – water covered the surface of banana peels/ diluted/dissolved the enzymes/little oxygen in water; hence less enzyme-air/oxygen reaction;	(2 marks)
	In J – The peeled surface was fully exposed to the atmospheric air/ oxygen; hence maximum enzyme-air reaction/oxidation, resulting in the significant colour change;	(2 marks)
(b)(i)	H – turns brown/brown colour increases (to look like the peel placed in beaker J); J –remained brown/continued to be brown/black;	(1 mark) (1 mark)
(ii)	G – No colour change/white/cream/yellow. The acid/low pH/hydrochloric acid denatured/destroyed the enzymes; J – The enzymes on the surface of the peel were (fully) exposed to the atmospheric air/oxygen, hence the surface was fully oxidized, turning brown/black/were exposed to optimum/best/suitable/favourable pH;	(1 mark) (1 mark)
(c)	Neutral/pH 7.0;	(1 mark)
(d)(i)	No colour change/ white/cream/yellow/cream yellow;	(1 mark)
(ii)	Boiling denatures/destroys/kills enzymes;	(1 mark)
14 marks		
3. (a)(i)	 <pre> graph TD GRASS --> CATERPILLAR GRASS --> RAT MAIZE_SEEDS[MAIZE SEEDS] --> RAT CATERPILLAR --> HEN RAT --> HEN RAT --> CAT HEN --> CAT </pre>	(8 marks)

(ii)	<p>Grass/K → Caterpillar/P → Bird/hen/Q → Cat//R Grass/K → Caterpillar/P → Rat/N → Cat//R Maize/L → Caterpillar/P → Rat/N → Cat//R</p> <p>Correct identification of the longest food chain/organisms in the food chain; Direction of arrows;</p>	(2 marks)
(b)(i)	Grass/Specimen K /maize/Specimen L ;	(1 mark)
(ii)	It is a producer/manufactures own food (directly from the sun);	(1 mark)
(c)	<ul style="list-style-type: none"> • Specimen K purifies the air by releasing oxygen/using up the carbon (IV) oxide exhaled by specimen R; • Specimen K offers habitat for most for most organisms that specimen R feeds on; • Specimen K provides an enabling environment for R to take cover in the event of danger/search for preys/mates; 	(1 mark)
		(13 marks)