Question	Answer	Marks
3(a)(i)	*any two of:* pipe; sprinkler / sprays; rotates; movable;	**2**
3(a)(ii)	*any one of:* some evaporates; some is falling on bare soil;	**1**
3(b)(i)	trickle drip irrigation;	**1**
3(b)(ii)	it goes to the root / less evaporation;	**1**
3(c)(i)	*any two of:* it helps keep a protective cover of plants on the soil; wet soil particles are heavier and less likely to blow away; water binds soil particles together;	**2**
3(c)(ii)	*any three of:* overgrazing / overstocking / animals exceed the carrying capacity; without rotating the pasture; leaves soil bare; no roots to hold the soil; wind blows / water washes, particles away; movement trails / hoof damage;	**3**

Question	Answer	Marks
6(a)(i)	rice farming OR shifting cultivation;	1
6(a)(ii)	dairy farming OR cattle ranching;	1
6(a)(iii)	commercial farming is growing crops or rearing / grazing animals for profit / sale; subsistence farming is growing crops or rearing / grazing animals to feed the farmer and their family;	2
6(a)(iv)	intensive / extensive;	1
6(b)(i)	*any two from:* north (east) India / south (west) of Nepal / between India and Nepal; flows through Bangladesh; east / south east of New Delhi; starts / source, in the Himalayas; flows into the Bay of Bengal;	2
6(b)(ii)	seeds – requirements OR products; harvesting – farming activities;	2
6(b)(iii)	growing crops – main crop is rice / plants seeds / ploughing / transplanting / weeding / fertile soil; subsistence – small profit / fed to family;	2
6(c)(i)	*irrigation:* irrigation allows crops to be watered during drier season; so rice can be grown all year round / extends the growing season / area; *pesticides:* pesticides used to control weeds / pests; so more room for crops / less of crops are destroyed; *high-yielding varieties (HYVs) of seeds:* HYVs are introduced which are more resistant to drought / disease; so more of the crop survives; varieties have a shorter growing season; allowing an extra crop to be grown / larger yields;	4

Question	Answer	Marks
6(c)(ii)	*any three from:* fertilisers washed into rivers; causes eutrophication; nitrogen levels increase; growth of algae increases; oxygen levels decrease; death of aquatic life; toxicity to humans / blue baby syndrome; too many chemicals in soil causes, plant toxicity / problems with soil fertility;	3
6(d)(i)	*any three from:* main feeder pipe brings water, controlled by valve; explanation of the need for a valve; (smaller) pipes carry water to plants; water drips from holes close to plants; plastic sheet surrounds plants to reduce water loss (through evaporation);	3
6(d)(ii)	*any two from:* (water directed at roots) so less lost to evaporation; water not wasted on bare ground between crops; fewer weeds grow in this area; more water efficient method / water can be regulated; all plants have adequate supplies of water; reduces leaching of nutrients;	2
6(e)(i)	it increased; from 0.35 to 2.80 million tonnes / by 2.45 million tonnes;	2
6(e)(ii)	1960–1965;	1
6(e)(iii)	correct plotting; line drawn;	2
6(e)(iv)	31 million tonnes;	1

Question	Answer	Marks
6(e)(v)	*any three from:* more fertilisers and pesticides needed for HYVs; impact on the environment / extra irrigation caused salinisation; some farmers could not afford, new seeds / equipment (became relatively poorer); famers had to borrow money / debt increased; rural unemployment / increased rural to urban migration; HYVs not as palatable to eat;	**3**
6(f)(i)	an energy source that will not run out / can be used over and over again / will always exist;	**1**
6(f)(ii)	10(%);	**1**

Question	Answer	Marks
6(f)(iii)	*Level of response marked question:* Level 3 [5–6 marks] Developed ideas used to describe both viewpoints. Ideas will be developed and expressed in a logical order. It is expected that ideas are linked to specific example(s). Level 2 [3–4 marks] Simple ideas presented to support both viewpoints, or a one-sided response that contains more developed concepts. The response may lack structure or some detail. Level 1 [1–2 marks] Simple ideas used to describe one viewpoint or form a simple list. Ideas lack detail or development and typically present only one viewpoint. Response may contain irrelevant material or repetition. No response or no creditable response [0]. *Level of response marking indicative content:* Candidates may start by describing what biomass is or providing examples of biomass. For people in favour, candidates may cover the fact that biomass is renewable (if replanted), it can be stored, and that it uses farm surpluses. Some candidates may say it produces less carbon emissions than fossil fuels and extends the life of fossil fuels. For people not in favour, candidates may cover concerns over intensive methods to produce crops, the cost compared to fossil fuels, the need for capital investment to establish plants, loss of land to grow food crops and deforestation to grow energy crops. They may also say it produces more carbon dioxide than other renewable energy sources.	**6**

Question	Answer	Marks
3(a)(i)	plot of days at 140 and correct use of key; plot of yield at 4.5 and correct use of key;	2
3(a)(ii)	to develop a quick(er) growing variety / variety with a high(er) yield;	1
3(b)	*any three from:* the poor(est) did not gain; could not afford to buy what would help increase productivity; one example, e.g. fertiliser / irrigation / hybrid-seed / machinery; to compete had to borrow; borrowing left the farmers in debt;	3
3(c)(i)	*any two from:* use of, natural pest control / biological pest control / predators / competitors; use of pest-resistant crop varieties; use, nets / screens to protect crops; use chemicals only when essential; change the environmental conditions that favour pests;	2
3(c)(ii)	*any two from:* it minimises the use of pesticides; it reduces, risks to human health / poisoning; to reduce risk to the, environment / ecosystem; long-term solution / future generations will not need to cope with pesticide resistance;	2

Question	Answer	Marks
2(a)(i)	two lines in correct positions (e.g. at 61 and 71 or at 61 and 90); segments correct to key;	2
2(a)(ii)	90(%);	1
2(a)(iii)	*any four from:* increased demand (from growing population); increased size of fishing vessels / vessels go further from shore; development of factory ships; more effective fishing methods / new technology used; e.g. sonar to find fish shoals / satellite technology; increased size of nets / drift nets (as large as one km wide); fishers get a good price for the fish so catch as many as possible; illegal nets / fishing illegally / overfishing / ignoring quotas; no enforcement of rules / no rules / fishing during breeding season; lack of education over the consequences of overfishing;	4
2(b)(i)	*any two from:* a limit is set for the number of a type of fish that can be caught (within a time period); fishing then has to stop; leaves enough fish for stocks to increase / prevents overfishing;	2
2(b)(ii)	*any one from:* some fish caught that are not allowed / bycatch, often die before they are returned to the sea; quotas may be, incorrectly set / too high;	1

Question	Answer	Marks
3(a)(i)	*any three from:* gentle slopes / fairly flat / no steep slopes; no, field boundaries / gateways; large, fields / area; no rivers; no (other) obstructions; appropriate named machinery e.g. tractor / combine harvester;	**3**
3(a)(ii)	*any one from:* little fertiliser used; wheat takes, a lot of / same nutrients out of the soil / robber crop / impoverishes the soil / soil loses fertility; many weeds compete with the crop; pest / disease, build up;	**1**
3(a)(iii)	wind break / shelter from the wind / for timber / firewood / animal habitat / shade for house;	**1**
3(a)(iv)	*all three circled for **one** mark:* commercial, cropland, extensive (circled);	**1**
3(a)(v)	*any one from:* market demand; capital input; can afford large land area / the land is cheap; market value / profit (from crop); transport to market;	**1**

Question	Answer	Marks
3(b)	*any three from:* maintain soil fertility; crop rotation / in each field one crop is followed by a different crop the next year; intercropping / plant crops in between rows of other crops; strip farming / plant crops in strips / leave grass strip between crop strips; different crops have different nutrient requirements; some crops / alfalfa / legumes, have nitrogen fixing bacteria in root nodules; some crops / cereals, have high nutrient demands so are followed by plants that return a lot of nutrients to the soil / a grass ley; reduction of soil erosion; by improved soil structure; by, covering / protecting / trapping the soil; less chance of all crops being destroyed by pests and diseases;	**3**

Question	Answer	Marks
1(a)	Africa and Middle East;	1
1(b)	1820;	1
1(c)	*any two from:* wealth / some regions cannot afford insecticides; lack of availability of insecticides in some regions; other biological controls used in some regions; greater use, on more valuable crops / where intensive production / value of agriculture to economy / more use if more crops; some regions naturally less affected by pests, due to climate / other environmental condition; lack of legislation;	2
1(d)	*any two from:* biological controls; growing pest resistant (GM) crops; greenhouses / use of barriers to pests; hydroponics; timing of crops; intercropping; crop rotation; manual methods, e.g. remove by hand;	2

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Question	Answer	Marks
2(a)	*any two from:* *foreground:* dry / dead / sparse grass / bare; *background:* (small) trees / bushes / thorny vegetation / with no leaves; (scrub) vegetation on hills; denser vegetation;	2
2(b)	*any two from:* four year drought has caused vegetation to die; not enough, vegetation / food, to keep cattle / little vegetation to eat; not enough water to keep cattle; as vegetation needs water / vegetation reduced due to drought;	2

Question	Answer	Marks
3(a)	cracks / channels / gullies, have developed;	1
3(b)	*any two from:* on a slope; water will flow over the slope / surface run-off dislodges soil; wind will sweep across field / no wind breaks dislodges soil; little vegetation to hold soil together / over cultivation / overgrazing / deforestation;	2
3(c)	*any two from:* terracing; contour ploughing; bunds; wind breaks; maintaining vegetation cover (all year); addition of organic matter to improve soil structure; planting trees / mixed cropping / intercropping / crop rotation;	2

Question	Answer	Marks
8(a)	pie chart completed (five segments plotted correctly in correct order) ;;; key shaded and labelled;	4
8(b)	*any two from:* increase in world (human) population; (so) increase in demand for food; change in diet towards more grain; increase in consumption of meat (which needs grain for livestock); agriculture more intensive / due to over cultivation;	2
8(c)(i)	26.1;	1
8(c)(ii)	*any one from:* conversion ratio lower (for chicken) / 7:1 for beef compared to 2:1 for chicken; more food needed for a cow (to produce 1 kg of beef) / chickens require less food or less water (to produce 1 kg);	1
8(c)(iii)	5 780 625 / 5.8 million / 5.78 million;	1

Question	Answer	Marks
8(c)(iv)	*any two from:* unsuitable land (for crops); unsuitable climate (for crops); profitability; lack of demand for crops / (more) demand for meat; lack of knowledge (about, growing crops / arable farming); lack of money to change farming type; animals also provide other products; tradition;	2

Question	Answer	Marks
1(a)	*any two from:* land cut into, flat surfaces / steps / reduces slope / gradient; speed of (surface) run-off is reduced; soil held back (by terraces); water held by bunds;	2
1(b)	*any two from:* contour ploughing; windbreaks; maintain vegetation cover; afforestation / mixed cropping / intercropping / crop rotation; increasing drainage; adding organic matter; bunds;	2

Question	Answer	Marks
6(a)(i)	3039 (million USD);	1
6(a)(ii)	*bar graph with:* appropriate use of scale; labelled axes with units; all plots correct;;	4
6(b)(i)	*any two from:* reduction in insect pollinators; impact on food web; water pollution;	2
6(b)(ii)	*any five from:* local people can use clean water; then grey water used on big farms; big farms could invest in, water storage systems / reservoirs; water conservation techniques could be used, e.g. rain water harvesting; investment in accessing aquifers / use of boreholes; charging big farms to extract water / water meters; agreements on levels of water use / quotas; choice of crops which do not use so much water; use of efficient irrigation techniques, e.g. trickle drip, clay pot; better education in, water use / conservation of water;	5

Question	Answer	Marks
8(a)(i)	491;	1
8(a)(ii)	axis labels and units; sensible linear scale so graph uses at least half plotting space; points correctly plotted; line joining points;	4
8(a)(iii)	yield will stay the same / no increase;	1
8(a)(iv)	*(list rule applied)* *any two from:* temperature; amount of rainfall; amount of (sun)light; pests / invasive species; disease;	2
8(b)	*any two from:* due to, rain / irrigation; fertilisers dissolve in water; (surface) run-off; infiltration / via ground water;	2
8(c)	*any two from:* larger yield per plant, e.g. bigger / heavier / more productive, plants; faster growth / multiple harvests per year; resistant to environmental conditions; drought-resistant; temperature-resistant, e.g. frost-resistant; resistant to, disease / pests; AVP;	2

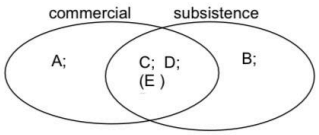
Question	Answer	Marks
2(a)	pastoral / livestock; commercial / large scale;	2
2(b)	*any three from:* large concentration of animals; risk of overgrazing: no plants / tree roots, to hold soil; less interception when it rains; cattle compact soil so less infiltration; slope increases run off; no wind breaks;	3

Question	Answer	Marks
2(a)	commercial arable;	1
2(b)	*any two from:* crop rotation; fertilisers; insect control; (insecticide); weed control (herbicide); fungi control (fungicide); genetically modified organisms / better varieties / higher yielding varieties; mechanisation;	2
2(c)	*any two from:* waterlogging; dries out / compaction / capping; soil erosion; salinisation; leaching;	2

Question	Answer	Marks
7(a)(i)	arable, pastoral, mixed;	1
7(a)(ii)	subsistence farms are for own use whereas commercial farms are for profit;	1
7(b)	*any two from*: salinisation; waterlogging / flooding; death of plants from under-watering / reduction in yield; soil erosion; leaching of nutrients / run-off causing eutrophication;	2
7(c)	*crop rotation – any two from:* planting different crops each year; reduces, pests / disease; so one crop is beneficial to the next; maintains soil fertility / soil structure; *selective breeding – any two from:* breeding plants for desired traits; pest/ disease-resistance; speed of growth; size; drought-resistance / climate tolerance;	4
7(d)(i)	*any two from:* no natural predators; no natural diseases; favourable environmental conditions, e.g. temperature; resistant to other methods of control; out-competed other plants;	2

Question	Answer	Marks
7(d)(ii)	*any two from:* destruction of farmland; reduction in crop yield; lack of grazing land for animals; reduction in profit; cost of trying to control;	2
7(d)(i)	biological (control);	1

Question	Answer	Marks
4(a)(i)	bar plotted at 3200;	1
4(a)(ii)	(nuts) sheep / goat meat eggs milk fruit vegetables sugar 3 correct; 6 correct;	2
4(b)	*any three from:* agriculture is a major use of water; finite water supplies; if more used for agriculture, less available for people; use of pesticides might pollute water; fertiliser (run-off) will pollute water; animal waste may contaminate water sources;	3
4(c)	*any four from:* grow varieties of crops / produce which require less water / genetically modified crops / selective breeding; rainwater harvesting / example of; use of trickle drip irrigation / clay pot; mulching; recycling of water / example of; use of reservoirs to collect run-off;	4

Question	Answer	Marks
3(a)		4
3(b)	*any three from:* kills, beneficial / other, insects; (which) affects the food, chain / web; idea that insects are eaten by organisms in higher trophic levels; bioaccumulation; insecticide resistance in organisms; explanation of pest-resurgence; leaching/run off into water sources kills aquatic life	3
3(c)	use of: pest-resistant varieties (of plants) / biological control / picking off by hand / use of nets / barriers / genetically modified organisms (GMOs) / traps / crop rotation;	1

Question	Answer	Marks
3(a)	land clearance / harvest of wood / slash and burn / trees cut down ;	1
3(b)	*any two from*: no vegetation to protect soil / less interception; so more rain hits soil surface; increased run off; fewer roots to bind the soil; increased wind erosion / fewer wind breaks;	2
3(c)	*any two from*: as a carbon, sink / store; maintain biodiversity; plants may be source of medicinal drugs / eq ; for sustainability of supply of forest products / food;	2