Selective Breeding and Genetic Engineering 2

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	genes chromosomes		1 1
b)i)	higher yield less use of pesticides		1 1
b)ii)	any two from: • uncertain about effects on health • fewer bees • might breed with wild plant • seeds only from one manufacturer		2
Total marks			6

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any three from: ⸜ remove gene ⸜ use of enzymes ⸜ from plant with high sugar production ⸜ insert gene into rye grass	ignore references to other methods eg tissue culture and embryo transplantation allow from bacteria	3
b)	any two from eg ⸜ concern about effect on (health) of cow ⸜ concern about effects on human (health) ⸜ concern about food chain effects or effects on ecosystem ⸜ effect on gene pool	ignore not natural or cost ignore ethical / religious arguments if no other marks awarded 'we don't know the long term effects' = 1 mark	2
Total marks			5

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	insects don't eat / damage crop	allow idea of insects carrying plant disease	1
b)i)	60		1
b)ii)	lower (yield)	accept 'higher' if answer clearly refers to wheat with transferred gene	1
	by 8 (arbitrary units)	allow yield is only 52 or goes down to 52 accept ecf from (b)(i) for 2 marks	1
b)iii)	grow / use wheat without insect poison (gene) higher yield (in fields)	accept bigger crop / more wheat ignore grows better	1 1
c)	concerned about) effect on populations of (wild) flowers / insects effect of eating GM crops on human health	ignore unnatural / unethical / against religion unqualified accept specific examples given ignore harms the environment allow harmful to humans if eaten	1 1
Total marks			8

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	(jellyfish) gene(s) cut out ref to enzymes (at any stage) (gene) transferred to zebra fish at early stage of development / embryo / egg	ignore removal of zebra fish genes	1 1 1
b)	any two from: could transfer gene to other (fish) species effects on food chains effects on zebra fish themselves, eg may out compete non GM zebra fish	ignore unethical / religious / unnatural accept effects on other species / humans who eat them	2
Total marks			5

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any three from: • (gene) cut out • (gene / cut out) from (bacterial) chromosome / DNA • ref to enzymes (at any point) • (gene spliced) into maize chromosome / DNA • (gene added) at an early stage of development	accept (gene / cut out) from (bacterial) plasmid	3
b)	any four from: • justification based on comparison of the relative merits of at least one advantage and one disadvantage Advantages: • less effort for farmer or less likely to harm farmer • (pesticide) always there or doesn't wash away • less insects to eat crop / maize or carry disease • so greater crop production / yield Disadvantages: • (toxin) kills other insects • so (some) crops don't get pollinated / (sexually) reproduce • possible harm when eaten by humans / animals • damage to food chains • gene may spread to other species	max 3 marks if only advantages or disadvantages given ignore ref to cost allow examples eg no need to spray allow pesticide doesn't contaminate water courses ignore ref to cost allow maize not pollinated allow may have unpleasant taste allow reduced biodiversity	4
Total marks			7