Question	Answer	Marks	Guidance
1 a	Dr Grace: idea that doctors have to decide who gets one (1) Dr Henshaw: idea that (may have to take the organs when) relatives do not agree / relatives may think the donor forgot to opt out (1)	2	 **ignore** ref to deciding if to continue treatment **ignore** references to the wishes of the donor **allow** idea that have to decide whether to abide by the relatives wishes
b i	**any two from:** (in the opt out system) people do not need to do anything to donate / ORA (1) idea that organs may be donated even though donors did not wish this (1) they may forget to opt out / did not know they had to opt out / did not have time to opt out (1)	2	 **ignore** don't need a card to donate
ii	**any two from:** (supports it because) the 2 (much) higher numbers are in opt-out countries / Spain and Portugal have higher numbers (1) (however) one country with opt out/Poland the numbers are lower (1) (can not tell) as only data from six countries given (1)	2	 **allow** mean/ average/total in the three countries with opt out is higher (may quote figures: 24 vs 14 for means / 72.1 vs 42.1 for totals) **allow** Spain and Portugal support the prediction **allow** Poland does not support the prediction
	Total	**6**	

Question	Answer	Marks	Guidance
2 a	too many bacteria / the colonies join together (1)	1	
b	(no because) her soil has 300 000 bacteria (1) has less than the normal / less than 3 000 000 (1)	2	**allow** one mark for dish 6 being diluted 100 000 times and dish 7 being diluted 1 000 000 times **allow** 1 mark ecf for yes, her soil has 3 000 000 bacteria which is the same as normal
	Total	**3**	

Question	Answer	Marks	Guidance
3 a i	mosquitoes suck **infected** blood/blood from someone with malaria (1) pass plasmodium into (new) individual/human/host (1)	2	**Ignore** bacteria or virus **ignore** reference to merely biting but **allow** feeding/drinking **infected** blood **ignore** references to vector unless qualified **allow** pathogen / protozoan / parasite for plasmodium **ignore** malaria is transferred **allow** mosquitos suck blood with plasmodium and pass on to another human (2)
ii	mosquitoes breed in water / (female) mosquito lays eggs in water (1) ora and spraying insecticide kills mosquito/larvae/eggs/ offspring (1)	2	**ignore** insecticide kills plasmodium/pathogen **ignore** it stops the eggs being laid in the water **ignore** insects unqualified
b	heat stroke (1) dehydration (1)	2	**ignore** just 'stroke' **allow** hyperthermia **allow** insufficient water to remove toxins **allow** higher level answers e.g. damage to enzymes / stops enzymes working / denatures enzymes (1) **allow** preventing chemical reactions happening (1) **ignore** kills enzymes **ignore** burn or body becomes too hot or overheats **ignore** damage to any body part e.g. organ failure
	Total	**6**	

Question	Answer	Marks	Guidance
4 a	kill (other) microorganisms / stops microorganisms entering (1) prevent production of other products / spoilage (1)	2	**ignore** stop microbes reproducing **allow** prevent contamination **allow** kill bacteria/fungi **allow** so there are no microorganisms/bacteria/fungi **ignore** simply stop microorganisms/bacteria/fungi **ignore** kill germs/bugs/viruses **allow** might change the products / reduce alcohol production **allow** idea that microorganisms might be harmful **allow** (other microorganisms) compete for resources
b	**[Level 3]** Two comparisons and two explanations Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Two comparisons and one explanation Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** One comparison OR one explanation Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at D to A*** **Indicative scientific points may include** comparisons: • alcohol production is/starts/finishes quicker/earlier with added sugar • both produce 14% alcohol / the same final percentage/level of alcohol explanations: • added sugar means fermentation / anaerobic respiration happens more quickly OR sugar is a limiting factor • 14% alcohol / high percentage/level of alcohol kills yeast **Note:** One comparison and two explanations = L3,5 marks One comparison and one explanation = L2,3 marks **ignore** just 'alcohol made from sugar' **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
	Total	**8**	

Question			Answer	Marks	Guidance
5	(a)		total protein eaten = 51(g) (1) EAR = 36(g) (1) correct deduction ie no, she is eating more than enough protein / too much protein (1)	3	**allow ecf** i.e two marks if there is a correct deduction but an error in either the calculation of EAR **or** protein eaten **allow** one mark if there is a correct deduction but an error in both the calculation of EAR **and** protein eaten no mark for deduction without figures for both protein and EAR to back it up **allow** yes, she is getting more than enough no mark for just 'no' but allow if a comparison is implied, e.g no, she needs 36 but is getting 51 = 3 marks
	(b)		Sue is pregnant / breast feeding / has a more physical mode of life / more exercise / recovering from injury (1) (needs more protein) as she is providing nutrition/milk (for her offspring) / needs to increase/repair her muscle / repair tissues / protein for growth of baby (1)	2	**ignore** Sue has had a baby **ignore** references to disease **ignore** supports the baby

Question			Answer	Marks	Guidance
	(c)		recognition that needs an alternative supply of **protein** / needs protein supplements (1) an example of such a source e.g dairy products / milk / cheese / eggs / tofu / beans / pulses / nuts / lentils / Quorn™ / avocado / broccoli / spinach / peas / asparagus / greens / (1)	2	**allow** recognition that meat is a good supply of protein **allow** fish **ignore** vegetables / fruit / plants / just 'meat substitute'/ 'vegetarian meat' **allow** protein shakes / protein drinks / myco-protein (2) **allow** need alternative source of iron / vitamin B6 / vitamin B12 (1) and example of such a source (1) **ignore** reference to other vitamins and minerals
			Total	**7**	

Question			Answer	Marks	Guidance
6	(a)		6.0 – 2.1 (1) BUT 3.9 (litres) (2)	2	**allow** 6.0 -2.2 (1) or 3.8 (2) **ignore** 4 (litres)
	(b)		**any two from:** **lining** of airways becomes inflamed (1) fluid builds up (in lungs) (1) **muscles** around bronchioles contract (1) airways/bronchioles constricted/narrowed (1)	2	**ignore** symptoms of asthma e.g. wheezing / tight chest / difficulty breathing / less air in lungs **allow** lining of airways becomes swollen **ignore** lungs become inflamed **allow** mucus builds up **allow** muscles in bronchioles go into spasm **ignore** just 'airways shrink' but **allow** airways shrink and restrict air flow **ignore** airways close **allow** lung capacity reduced **ignore** references to bronchi / trachea / alveoli
			Total	**4**	

Question			Answer	Marks	Guidance
7			**[Level 3]** More than one possible criticism given **and** an explanation that a build up of cholesterol reduces the supply of oxygen / glucose to the heart (muscle). Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** One possible criticism given **and** a recognition that cholesterol reduces blood flow to the heart (muscle) / in coronary arteries. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** One possible criticism given **or** a recognition that there is a link between (saturated) fat in the diet and cholesterol/plaque/reduced blood flow to heart **or** recognition that cholesterol reduces blood flow to heart **or** recognition that cholesterol build-up means the heart has to work harder. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to A*** **Indicative scientific points:** criticisms: • only six / seven countries studied • all developed countries • only measured total fat in diet / did not measure saturated fat in diet / can not deduce effect of saturated fat • Keys has assumed all other factors other than fat in diet were the same / other factors (influencing heart disease) have not been controlled for eg levels of salt in diet **ignore** not enough evidence **ignore** simply other factors can cause / are linked to heart disease explanations: • there is a link between the amount of saturated fat eaten and the build up of cholesterol plaques. • narrowed coronary arteries reduce blood flow to heart muscle **max 3 marks** if do not use term cholesterol **ignore** saturated fat causes heart disease (in question) **ignore** simply 'cholesterol restricts blood flow' **ignore** references to just high blood pressure
			Total	**6**	

Question			Answer	Marks	Guidance
8	(a)	(i)	some drugs are more harmful / dangerous than others / it depends how harmful / dangerous they are (1) different penalties (for possession / use) / it affects the penalty / AW (1)	2	**ignore** some drugs are stronger / addictive **ignore** incorrect class, eg class C drugs are more harmful = 1 **allow** AW for penalty eg punishment / fine / prosecution
		(ii)	LSD (1)	1	**allow** any correct answer eg 'magic mushrooms' / PCP / ketamine / 'angel dust' **ignore** cannabis (and any alternative wordings eg weed) as in question. **ignore** cocaine / heroin / alcohol / ecstasy
		(iii)	the widening of blood vessels (1)	1	**allow** widening of arteries / capillaries **ignore** veins widen **allow** blood vessels dilate **allow** blood vessels open up / expand / get bigger **ignore** blood vessels get fatter / swell up / relax **ignore** more blood flows **not** vessels move closer to surface
	(b)		**any two from:** idea that no / less neurotransmitter / chemical to bind with next neurone / AW (1) prevents nerve impulses passing from neurone to neurone (1) at / across a synapse (1)	2	 **allow** prevents nerve impulses being sent along / to next neurone **ignore** slows down impulses / reduces impulses / blocks impulses / impulses can not get through **ignore** references to messages / signals / information

Question			Answer	Marks	Guidance
	(c)	(i)	5000 (2) **but** 75000 in lethal dose box (1)	2	**allow** ecf for max 1 if therapeutic ratio = value for lethal dose ÷15 eg lethal dose = 750, TR = 50
		(ii)	**any two from:** heroin (no mark) because: smallest lethal dose (1) smallest therapeutic ratio (1) most likely to have an overdose as smallest dose needed to have an effect is closest to lethal dose (1)	2	no mark for heroin on its own, but need heroin to get mark(s) **allow** comparative answers, eg smaller lethal dose **ignore** non-comparative answers eg 'lethal dose is only 48mg' **but allow** eg 'lethal dose is only 48mg but lethal doses of others are 300,000 and 75,000' **ignore** most dangerous (in question) / most likely to kill you **ignore** smallest dose needed to have an effect
			Total	**10**	