

- 1 (a) (*mycoprotein has* *accept converse answers for beef*
less protein / figures compared ;
less fat / figures compared ;
 fibre / figures compared ; **A** roughage
 carbohydrate / figures compared ; [max 2]
- (ii) *assume answers are about mycoprotein*
less fat / 9.2 g compared to 48.6 g / 39.4 g less fat / 5× less fat ;
 so less risk of + heart disease / heart attack / blockage of arteries / obesity ;
A 'clogged' / 'furred' / hardening *ignore* diabetes
 fibre / 19.5 g compared to 0 g ;
 so less risk of, constipation / bowel cancer ;
A faster transit time / helps peristalsis / easier defecation explained [4]
- (b) (*award two marks if correct answer (1.7) is given*
if no answer or incorrect answer award one mark for correct addition to get
 98.3
 $49 + 9.2 + 19.5 + 20.6 = 98.3$
 $100 - 98.3 = 1.7$ (g) ;; [2]
- (ii) *accept first answer on the line*
 mineral(s) / named mineral / ions / salt(s) / vitamin(s) / named vitamin ;
 calcium / potassium / sodium / magnesium / iron / phosphate / iodine / zinc
R nitrate / sulphate / micronutrients [1]
- (c) (glucose / sucrose / lactose / maltose / sugar(s) / molasses / corn steep
 liquor ; **A** carbon source
 minerals / mineral salts / vitamin(s) ;
 ammonia / ammonium / amino acids ; **A** nitrogen source [max 2]
- (ii) filter / separate liquid from solid / retain solids / AW ; [1]
- (iii) carbon dioxide ; **A** CO₂ [1]
- (d) (24 °C ; **A** a temperature within range 20 to 30 °C [
- (ii) *ignore refs to the paddle*
 heat released / exothermic ;
 (during) respiration / metabolism / fermentation ; [2]
- (iii) constant, production / growth ;
A optimum temperature / produce antibiotic as fast as possible
 low temperature will slow down, enzyme action / fungal growth ;
 high temperature will, denature enzymes ; **R** if 'and too low'
 high temperature will kill fungus ; **R** if 'and too low'
 high temperature may breakdown, product / antibiotic / penicillin ; [max 2]
- (iv) use a water jacket ; [1]

[Total: 19]

- 2 (a) (i) deforestation / slash and burn ; 1
- (timber use) (ii) ref. (to timber) for housing / furniture / wood / paper / fence posts AW ;
 (land use)(spaces) ref. to (timber for) fuel AW ; **A** burn to keep warm max. 2
 ref. to roads / industry / housing / airports / other use of land ;
- (iii)
- i. ref. to soil erosion / mudslides / silting of rivers / desertification / dust bowl ;
 - ii. due to lack of (tree) roots to stabilise soil ; (linked to i.)
 - iii. ref. to increased risk of flooding ;
 - iv. due to lack of trees to slow down water ; (linked to ii.) **A** leaf litter absorbs water
 - v. ref. to leaching of soil / minerals washed out / soil becomes infertile ;
 - vi. can lead to eutrophication of rivers / lakes AW ;
 - vii. less photosynthesis / burning or rotting wood ;
 - viii. less CO₂ absorbed from atmosphere / more CO₂ produced / in atmosphere ;
 - ix. ref. to global warming / greenhouse effect ; (linked to vii. or viii.)
 - x. ref. to drop in oxygen in atmosphere AW ;
 - xi. less rain (change in weather) ;
 - xii. due to less transpiration AW ; (linked to xi.)
 - xiii. ref. to reduction of habitats AW / habitats split up AW ;
 - xiv. ref. to disruption of food chains / loss of food ;
 - xv. so animals / plants + can become extinct or numbers depleted / loss of biodiversity ;
 - xvi. ref. to loss of genes / sources of chemicals for medicines AW ;
 - xvii. ref. to more pollution + due to smoke / road traffic / factories AW ;
 - xviii. ref. loss of income + tourism max. 6
- (b) MAX. 3 IF ONLY ONE NUTRIENT IS USED
 IGNORE ENERGY REFS PROTEIN
- (fat) i. soya contains less fat ; **A** both sets of figures
 ii. ref. to less cholesterol ;
 iii. less risk of atherosclerosis / blockage of arteries / atheroma / stroke ;
 iv. less risk of a heart attack / heart disease AW ;
 v. ref. to less risk of obesity ; (O.R.A.)
- (fibre) vi. soya contains (more) fibre ; **A** both sets of figures
 vii. so there is less risk of constipation (prevents) ;
 vii. less risk of colon cancer ;
 viii. fibre absorbs or removes toxins ; (O.R.A.) max. 4
- (ii) FOOD CHAINS MUST USE NAMED ORGANISMS **R** plant etc.
- i. (soya food chain) soya → human ; **A** description
 - ii. (corned beef food chain) grass → cow → human ; **A** description
 - iii. beef food chain has an extra level AW / has extra link / beef food chain longer ;
 - iv. energy lost through food chain / 90% energy lost at each level;
 - v. more energy is lost in beef chain ;
 - vi. example of energy loss e.g. body heat / movement of animal / not all food digested / energy lost in faeces / urinating / excretion / respiration / egestion ;
 - vii. in food chain there is more biomass in soya than in cows ; **R** more producers than consumers unequal. **R** less energy in beef than soya max. 4
- total max. 17**