

**Mark scheme 5090 /2 – Theory November 2001**

1(a)(i)	Plant <b>B</b> ;	1
(ii)	37 or 38 – 35 ; = 2 or 3 g ;	2
(b)(i)	transpiration / evaporation ; (increases) humidity / water vapour in air / no air movement ; slower rate of diffusion / less evaporation / less transpiration / less water loss ; 2	1
(c)	continues at (+ / - ) same rate ; very little / no loss of water vapour from upper surface ; few / no stomata on upper surface / stomata are on lower surface ; [max 2]	2
2(a)(i)	nitrogen / N / N <sub>2</sub> ; carbon / C ;	2
(ii)	<b>U</b> – decomposition / decay / putrefaction / rotting ; bacteria (or correct named) / fungi / decomposes / saprotrophs etc ; <b>V</b> – nitrification ; bacteria / <u>Nitrosomonas</u> / <u>Nitrobacter</u> ; ( <b>not</b> 'microorganisms')	4
(b)	<b>Y</b> – urea / uric acid / nitrogenous waste / urine;; <b>Z</b> – proteins / amino acids / peptides / nucleic acids or named ;	2
(c)	cannot manufacture protein / amino acids ; needs supply of <u>nitrogen</u> / <u>N</u> <sub>(2)</sub> ; uses insect protein / (absorbs) amino acids; [max 2]	2
3(a)(i)	<b>W</b> – ovary (wall) ; <b>X</b> – style / stigma ;	2
(ii)	testa / (seed) coat / covering;	1
(b)	wind or description ; any 2 from : 0.003g / light, large surface area / winged / flat / thin / wide, small ;;	3
(c)(i)	leaves / named cells / chloroplasts ;	1
(ii)	in solution / in phloem / mass flow ;	1
(iii)	(sweet) to attract animals ; (ripe) eaten and dispersal ;	2
4(a)(i)	line from label to space between ribs ; diaphragm domed (totally within body outline, not starting above bottom 3 ribs, extending across more than half the body) ;	1 1

- (b)(i) decreased pressure ;  
air enters / forced into balloons / balloons inflate / become larger ; 2
- (ii) no rib movement / rigid bell jar ;  
no musculature ;  
different diaphragm movement e.g. sheet never domed / has to be pulled ;  
3
- 5(a) **M** – right atrium / right auricle ;  
**N** – aorta ; 2
- (b) **1 and 2** more oxygen and less carbon dioxide ; 1
- (c) alveoli / air sacs ; 1
- (d)(i) maximum surface / more diffusion / gas movement faster ;
- (ii) to prevent blood (named component) or cells passing through / to allow only  
gas to pass ; 2
- (e)(i) white / WBC / leucocyte / any named leucocyte ; 1
- (ii) infection / reference to bacteria / introduced antigens / stress / trauma /  
damaged cells ;  
(explanation) they make antibodies / antitoxins / engulf or ingest pathogens ;  
2
- 6(a)(i) (digestion) (pancreatic) juice / enzymes (or any two named) (from pancreas) ;  
NAMED enzyme and reaction x 2 ;; (any two from protease / trypsin  
(ogen), amylase, lipase)  
(assimilation) reference to insulin and effect ; [max 3] 3
- (ii) (digestion) produces bile / reference to pH ;  
for emulsification of fat ;  
(assimilation) storage ;  
any two substances stored ( any one vitamin, glycogen, fat, iron) ;  
amino acid or protein synthesis ; [max 3] 3
- (b)(i) little food at a time / no storage / food passes through quickly ;  
need to eat often ;  
any reference to effect on protein digestion ;  
bacteria not killed by acid / bacteria are (normally) killed by acid in stomach ;  
no churning / special diet / prepared or pre-processed food ; [max 4] 4
- (ii) less water absorption ;  
soft faeces / tendency to diarrhoea / stoma / colostomy or ileostomy / bag /  
hygiene / smell / disposal / inconvenience / increased frequency / drink more  
water / take in more salts; 2
- 7(a)(i) decreased oxygen ;

- and (ii) increased respiration ;  
anaerobic ;  
(raised levels of) lactic acid ;  
fatigue / cramp ;  
heat generated ;  
more sugar carried to / needed in muscles ;  
more oxygen carried to / needed in muscles ;  
more carbon dioxide carried in blood / produced in muscles ;  
blood moves faster / more blood to muscles / pulse rate rises ;  
heart beats faster / more blood to muscles / pulse rate rises ;
- (iii) more carbon dioxide ;  
less oxygen ; [max 10] 10
- (b) Any **two**, stating increase in component or function, from :  
fat or carbohydrate (or named carbohydrate) for energy,  
water to prevent cramp or to replace sweat or for temperature regulation,  
protein for muscle / repair / growth,  
ions (or ONE named) to replace those lost in sweat or prevent cramp / or  
any named function,  
vitamins (or ONE named) and suitable function ;; [max 2] 2
- 8(a) in either (i) or (ii): combining / joining / uniting / fusion ;  
gametes / nuclei / sex cells ;  
zygote ;
- (i) sperm and ovum / egg ;  
sperm swims ;  
in oviduct / Fallopian tube ;
- (ii) male inside pollen (grain) ;  
female inside ovule / embryo sac ;  
reference to pollen tube ;  
fertilisation inside ovary / ovule / embryo sac; [max 8] 8
- (b) (self-pollination) (some) variety ;  
when genes / alleles combine ;  
(asexual) no / less variety / identical / clone ;  
(cross-pollination) greater range of allele / gene combination / larger gene  
pool ;  
greatest variety ; [max 4] 4
- 9(a) in (i) or (ii): auxins /  
IAA / IEA / (growth) hormones ;  
fewer / less / more on one side (i.e. unequal distribution) ;
- (i) on dark side ;  
more / faster rate of growth / cell division / cell production / cell elongation  
;  
positively phototropic ;

- (ii) on lower surface ;  
 slower rate of growth / cell division or production / cell elongation ;  
 root grows downwards / towards earth or soil and geotropic; [max 7] 7
- (b) named animal ;  
 description of apparatus (or on diagram) ;  
 named stimulus – a differential must be indicated ;  
 appropriate response described ;  
taxis ;  
 repetition / 3 or more organisms ;  
 control / suitable time referred to for experiment or recovery ; [max 5] 5
- 10(a) a solvent ;  
 carrying / transport medium ;  
 any named solute (in body or in drink) ;  
 maintains cell shape / major constituent of cell / cytoplasm / protoplasm /  
 cytosol ;  
 medium for or used in chemical reactions / a correct e.g. of a chemical  
 reaction ;  
 use in temperature regulation;  
 any **two** body fluids (e.g. blood, sweat, urine, amniotic fluid, synovial fluid  
 etc.) ;; [max 6] 6
- (b) diffusion ;  
 through capillary walls / out of capillaries ;  
 differential concentration ;  
 tissue fluid ;  
 surrounds / bathes the cells;  
 through cell membranes ;  
 any **two** examples of substances transferred (in correct direction) ;; [max 6]  
 6