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Mark Scheme (RESULTS)
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GCE

GCE Biology (6104/03)

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Question Number	Answer	Mark
1 (a)	B = medulla (oblongata) ; C = cerebellum ;	**2**

Question Number	Answer	Mark
1 (b)	1. to receive sensory input / eq ; 2. idea of {interpretation/coordination} (of information) ; 3. {initiates / transmits} impulses to effector ; 4. idea of control of voluntary action / eq ; 5. reference to {thought / learning / intelligence / memory } ; 6. reference to speech ; 7. reference to {personality / emotion} ;	**max 2**

Question Number	Answer	Mark
2 (a)	1. idea of a deviation from the {norm / normal level / eq } triggers mechanism to eliminate the deviation ; 2. increase in level of cortisol inhibits {CRH secretion /hypothalamus} ; 3. (which) reduces secretion {of ACTH / from (anterior) pituitary} ; 4. this causes drop in level of cortisol ;	**max 3**

Question Number	Answer	Mark
2 (b)	{follicle stimulating hormone / FSH / luteinising hormone / LH / thyroid stimulating hormone / TSH / growth hormone / prolactin } ;	**1**

Question Number	Answer	Mark
2 (c)	1. effect is longer lasting / eq ; 2. effect is slower / eq ; 3. effect is (often) not reversible / eq ; 4. reference to involvement of transport in blood system ; 5. reference to {several target organs/diffuse effect / eq} ; 6. hormonal involves chemical control, nervous involves electrical (and chemical) control ;	**max 3**

Question Number	Answer	Mark
3 (a)	1. reference to influx of calcium ions(into pre-synaptic knob) / eq ; 2. vesicles move to pre-synaptic membrane / eq ; 3. fuse with pre-synaptic membrane / eq ; 4. (acetylcholine released) by exocytosis ;	**max 3**

Question Number	Answer	Mark
3 (b)(i)	value between 0.85 and 1.95 (ms) ;	**1**

Question Number	Answer	Mark
3 (b)(ii)	3.0 ± 0.05 (ms) ;	**1**

Question Number	Answer	Mark
3 (b)(iii)	1. correct reading from graph of duration of one action potential ; 2. 1000 / reading from graph ;	**2**

Question Number	Answer	Mark
3 (c)	1. idea that the inside of the (post-synaptic) membrane is becoming {more negative / hyperpolarised} ; 2. therefore {more Na^+ channels must open / more Na^+ must enter} ; 3. to reach threshold level / eq ;	**max 2**

Question Number	Answer	Mark
4 (a)(i)	carbon dioxide / CO_2 ;	**1**

Question Number	Answer	Mark
4 (a)(ii)	1. to regenerate the {hydrogen carriers / NAD^+ } / oxidise reduced NAD ; 2. NAD^+ does not become limiting / eq ; 3. so that glycolysis can continue ; 4. to allow ATP to be formed (during glycolysis) ;	**max 2**

Question Number	Answer	Mark
4 (b)(i)	1. rate is {constant / steady / eq} for the first 6 minutes ; 2. rate {slows / decreases} from {6 to 14 minutes / for next 8 minutes} ; 3. no respiration from 14 – 20 minutes / eq ; 4. manipulation of figures e.g. calculation of rate for first 6 minutes ;	**max 3**

Question Number	Answer	Mark
4 (b)(ii)	rate is constant (throughout the 20 minutes) / rate is slower in sucrose than in glucose (in first 6 to 8 minutes) / respiration does not stop ;	**1**

Question Number	Answer	Mark
4 (b)(iii)	1. to prevent oxygen entering (solution) / keep conditions anaerobic ; 2. to prevent TTC being {oxidised / decolourised} / no TTC would be reduced ;	**2**

Question Number	Answer	Mark
4 (b)(iv)	1. maintain constant temperature / eq ; 2. respiration produces heat (energy) ; 3. change of temperature will affect rate of enzyme activity ; 4. idea that the experiment can be performed in 20 minutes ;	**max 2**

Question Number	Answer	Mark
5 (a)	1. (ultrafiltration) occurs in {glomerulus / Bowman's capsule / renal capsule} ; 2. reference to high pressure {of blood / in glomerulus} ; 3. because afferent arteriole is wider than efferent arteriole ; 4. {small molecules / eq} forced out (through capillary wall) / {large molecules / proteins} remain in blood ; 5. reference to {fenestrations / pores} in capillary walls ; 6. reference to basement membrane (acting as a filter) ; 7. reference to podocytes in (Bowman's capsule) ;	**max 4**

Question Number	Answer	Mark
5 (b)	1. all {glucose / amino acids} are reabsorbed ; 2. by (sodium) co-transport mechanism ; 3. {some / eq} urea is reabsorbed ; 4. by diffusion ; 5. sodium ions are {actively reabsorbed / co-transported} ; 6. {chloride ions / negatively charged ions} (follow) down electrochemical gradient ; 7. reference to microvilli (on epithelial cells) to increase surface area ; 8. reference to {many mitochondria for active transport / mitochondria produce ATP (for active transport) ;	**max 5**

Question Number	Answer	Mark
6		**6**

White blood cells	**Type of immune response**	**One role in the immune response**
B-lymphocytes	humoral / antibody mediated / specific ;	reference to antibody production by plasma cells / reference to plasma cells / reference to of memory cells ;
T-lymphocytes	cell-mediated / specific ;	act as memory cells / killer T cells {destroy infected cells / destroy cancer cells / attract macrophages / activate phagocytosis } / / T helper cells activate {B-cells / antibody production} / T suppressor cells suppress {killer T cells /B-cells} ;
Macrophages	non-specific / phagocytosis ;	phagocytosis / engulf bacteria / antigen presentation ;

Question Number	Answer	Mark
7 (a)	1. both have a {heavier /eq} left ventricle ; 2. both have a {thicker / eq} wall ; 3. both have a larger volume (left ventricle) ; 4. manipulation of figures to quantify one of the comparisons ;	**max 3**

Question Number	Answer	Mark
7 (b)	1. reference to {epicardium / pericardium}, myocardium and endocardium ; 2. outer {epicardium / pericardium}, inner endocardium and myocardium in between / eq ; 3. reference to cardiac muscle ; 4. reference to {epithelial cells / connective tissue} ;	**max 2**

Question Number	Answer	Mark
8 (a)	1. age; 2. gender; 3. level of fitness / eq ; 4. resting pulse rate ; 5. diet / weight ; 6. heart conditions / eq ; 7. high blood pressure ; 8. drugs ; 9. height / eq ;	**max 2**

Question Number	Answer	Mark
8 (b)	1. 152 x 85, 142 x 96 ; 2. / 1000 ; 3. subtraction = 0.71 ;	**3**

Question Number	Answer	Mark
8 (c)	1. description of systolic and diastolic ; 2. systolic increases ; 3. (after training programe) stroke volume increases / greater volume of blood entering arteries / heart contracts with greater force ; 4. (due to) greater stretching of ventricles during filling / increased filling / increased end diastolic volume ; 5. diastolic decreases ; 6. due to greater emptying ; 7. reference to Starling's law ;	**max 4**

Question Number	Answer	Mark
9 (a)	**A** alveolus **B** blood vessel **C** bronchiole ;; **NB** All correct for 2 marks, 2 correct for 1 mark	**2**

Question Number	Answer	Mark
9 (b)(i)	1. number of deaths greater in men than women (in all years) ; 2. between 1930 and 1960 increase in death rate in men but {stayed constant in women / only increased slightly} ; 3. between 1960 and 1980/1990 death rate increased in men and women ; 4. linear increase in women but not linear in men ; 5. after 1990 number of deaths fell in men but still rose in women ; 6. manipulated comparative quantitative comment ;	**max 3**

Question Number	Answer	Mark
9 (b)(ii)	1. lung cancer caused by smoking ; 2. increase in lung cancer due to increase in smoking ; 3. men smoke more than women ; 4. women started to smoke about 1930 ; 5. reference to polluted work environment causing lung cancer ; 6. idea of women {smoking being more socially acceptable / having money / going out to work} ;	**max 3**

Question Number	Answer	Mark
9 (c)	1. removal of tumour / lung ; 2. radiotherapy ; 3. chemotherapy ;	**max 2**

PAPER TOTAL: 70 MARKS