

01. 0610_s20_MS_43 Q: 5

(a)	<i>any two from:</i> nucleus / nuclear membrane / nuclear envelope ; (linear) chromosomes ; mitochondrion ; endoplasmic reticulum ; vacuoles / vesicles ; AVP ;	2
(b)	<i>any six from:</i> resistance arises by mutation ; in small number of bacteria ; ref. to a random event (not related to presence of antibiotic) ; antibiotic kills bacteria that do not have the mutation / AW ; resistant bacteria have no competition ; resistant bacteria reproduce ; pass on, gene / allele, for resistance ; <u>natural selection</u> ; method of transmission from one person to another described ; gene transferred to other bacteria (of different type) in a plasmid ; AVP ;	6
(c)	<i>any three from:</i> prescribe / use, antibiotics less often ; do not use for, viral / fungal, infections ; make sure people complete the course of antibiotics / AW ; develop new antibiotics ; do not use the same antibiotics for too long / rotate antibiotics / AW ; use combinations of antibiotics ; AVP ;; e.g. isolation of patients with antibiotic-resistant infections / good hygiene to prevent spread of infection / reduce use of antibiotics in farming	3

02. 0610_w19_MS_41 Q: 4

	Answer	Mark	Partial Marks
(a)	(named) mechanical (barriers) ; (named) chemical barriers ; ref. to active immunity ; white blood cells / lymphocytes / phagocytes ; (phagocytes) engulf (named) microorganisms / phagocytosis ; lymphocytes produce antibodies ; ref. to specific, antigens / pathogens ; ref. to long term immunity / memory cells ; AVP ;	5	
(b)	antibiotics ;	1	

03. 0610_m17_MS_42 Q: 2

	Answer	Mark	Partial Marks
(a)	no nucleus ; cell wall ; loop of DNA ; AVP ;;	2	
(b)(i)	overall increase in number of cases of MRSA ; largest increase, between 2004–2005 / exponential ; data quote including the number of cases and the year / data manipulation ;	2	
(b)(ii)	1 correct ref to mutation of bacteria ; 2 <u>variation</u> in ability of bacteria to survive antibiotic treatment ; 3 bacteria with no / little resistance, die ; 4 bacteria with resistance, survive and breed ; 5 passing on resistant allele ; 6 ref to natural selection ; 7 AVP ; e.g. ref to strengthening of cell wall	4	
(c)	more responsible use of antibiotics ; improved, detection / screening to avoid spread ; ref to improved cleanliness ; isolating infected patients ; development of new antibiotics / treatment ;	2	

04. 0610_s17_MS_42 Q: 6

	Answer	Mark	Partial Marks																											
(a)(i)	cell membrane ; DNA ; ribosomes ; cytoplasm ;	2	A genes / genetic material / chromosome(s)																											
(a)(ii)	<table border="1"> <thead> <tr> <th></th> <th><i>white blood cell (S)</i></th> <th><i>prokaryote (R)</i></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>no cell wall</td> <td>cell wall ;</td> </tr> <tr> <td>2</td> <td>(named) organelles</td> <td>no (membrane-bound) organelles ;</td> </tr> <tr> <td>3</td> <td>nucleus</td> <td>nucleoid / no nucleus ;</td> </tr> <tr> <td>4</td> <td>linear, chromosomes / DNA</td> <td>loop of DNA / circular / naked, chromosome ;</td> </tr> <tr> <td>5</td> <td>large ribosomes</td> <td>small ribosomes ;</td> </tr> <tr> <td>6</td> <td>no plasmids (in cytoplasm)</td> <td>plasmids (in cytoplasm) ;</td> </tr> <tr> <td>7</td> <td>large</td> <td>small ;</td> </tr> <tr> <td>8</td> <td>antibodies</td> <td>no antibodies ;</td> </tr> </tbody> </table>		<i>white blood cell (S)</i>	<i>prokaryote (R)</i>	1	no cell wall	cell wall ;	2	(named) organelles	no (membrane-bound) organelles ;	3	nucleus	nucleoid / no nucleus ;	4	linear, chromosomes / DNA	loop of DNA / circular / naked, chromosome ;	5	large ribosomes	small ribosomes ;	6	no plasmids (in cytoplasm)	plasmids (in cytoplasm) ;	7	large	small ;	8	antibodies	no antibodies ;	3	
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(b)(i)	T = antigen ; U = mitosis ; I cell division V = antibodies ;	3																												
(c)(i)	phagocytosis ;	1	A endocytosis																											
(c)(ii)	(phagocyte) engulfs pathogen ; phagosome / vacuole, forms ; (enzymes) digest / breakdown / destroy, pathogen ; AVP ;	1	e.g. antigens presented on cell surface																											
(d)(i)	incisors ;	1																												
(d)(ii)	bacteria use sugar / AW (on teeth as a food source) ; bacteria respire ; acid is produced ; AVP ;	2	e.g. plaque / tartar, forms – ref to CO ₂ is acidic – ref to lactic acid																											
(e)	regular, brushing / mouthwash / flossing / wash / clean, teeth ; avoid sugary foods / diet described ; dental check-ups ; fluoride, toothpaste / in water ;	2																												

05. 0610_m20_MS_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	A – bronchus ; B – trachea ; C – diaphragm ;	3	
(a)(ii)	1 diaphragm, contracts / flattens ; 2 external intercostal muscles contract ; 3 ribs move, upwards / outwards ; 4 volume, increases ; 5 pressure, decreases ; 6 air enters (the, mouth / trachea / lungs,) to equalise the pressure ;	4	
(b)(i)	$86 / 44184 \times 100 = 0.194$; 0.19 (%) ;	2	
(b)(ii)	idea that non-smokers / passive smokers / AW, can die from / can develop lung cancer ; the greater the exposure to tobacco smoke the greater the risk (of dying from lung cancer) ; comparative data quote ;	3	
(b)(iii)	COPD ; CHD ; AVP ;;	2	apply list rule

06. 0610_m19_MS_42 Q: 3

	Answer	Mark	Partial Marks
(a)	(A) D C F B G (E) ;	1	
(b)	correct ref. to neurotransmitter ; released from vesicles (into synapse / synaptic gap) ; ref. to movement (of neurotransmitter) by diffusion ; (neurotransmitter) binds with receptor (molecules on neurone on the other side of synapse) ; causing impulse to continue / AW ;	4	
(c)(i)	depressant ; increases reaction times / slows down impulses / slows down the nervous system ; ref. to effect on synapse / AW ; loss of self-control / mental function is affected / inability to walk or talk ; AVP ;;;	3	
(c)(ii)	sleeplessness / insomnia / restlessness ; fatigue / yawning ; diarrhoea ; hallucinations ; anxiety / depression / mood swings / aggression / irritation / confusion ; muscle cramps / aches / pain ; nausea / vomiting ; headaches / dizziness ; shivering / chills / fever ; itching ; runny nose / sweating / clammy skin / crying ; dehydration / (extreme) thirst ; rapid heart rate / hypotension ; AVP ; cravings / double vision	2	
(c)(iii)	(addicts) turn to crime to finance their addiction / AW ;	1	

07. 0610_s19_MS_41 Q: 3

	Answer	Mark	Partial Marks
(a)	accommodation ; antagonistic ; peripheral ; optic ; brain ;	5	
(b)	involves, proteins / carriers / pumps (in neurone membrane) ; (named) ion(s) bind to, proteins / carriers / pumps, to move ions / AW ; move ions, against concentration gradient / from low to high concentration ; using energy ; AVP ; e.g. change in shape of carrier (protein)	3	
(c)	<i>general marking point</i> neurotransmitters move across, synapse / gap / junction / AW ; <i>atropine</i> neurotransmitter cannot, bind to / enter / reach, receptors ; therefore no impulses (along, next / postsynaptic, neurone) / no impulses reach the CNS ; no sensitivity to stimuli / feels no pain / painkiller ; no, contraction of muscle / response ; depressant ; <i>eserine</i> neurotransmitter stays in, synapse / synaptic gap ; neurotransmitter can bind to receptor (rather than stay in synapse) ; continuously stimulates the, next / postsynaptic, neurone ; (more) impulses are sent (in, next / postsynaptic, neurone) ; repeated, contraction of muscle / response ; stimulant ;	6	A reaction time is longer / no reflex
(d)	anabolic steroids increase, muscle mass / AW ; gives athletes unfair advantage / ref. to cheating / unethical / immoral ; (named), side effect / effect on health ; can be banned from taking part in sport if found using them ; ref. to illegality ; AVP ; e.g. can lose sponsorship / loss of reputation / AW	3	

08. 0610_w19_MS_42 Q: 4

	Answer	Mark	Partial Marks
(a)	ref. to, mechanical / chemical, barriers ; nasal hairs, trap / filter / AW, pathogens ; mucus traps pathogens / pathogens stick to mucus ; mucus, produced / secreted, by goblet cells ; cilia move mucus (upwards / towards mouth / away from alveoli) ; coughing / sneezing / swallowing ; phagocytes / phagocytosis / described ;	4	
(b)	introduces harmless form of pathogen / AW ; ref. to antigen(s) ; stimulates an <u>immune response</u> ; ref to <u>active immunity</u> ; <u>lymphocytes</u> produce antibodies ; (lymphocytes develop into) memory cells ; memory cells, remain in the body / give long-term immunity / can produce antibodies (at a later time) ; respond quickly when an infection (of the same pathogen) occurs / before symptoms occur ; AVP ;	4	
(c)	<i>idea that viruses have no antibiotic targets ;</i> viruses, are not alive / are not living / cannot be killed / not cells ; no cell membrane ; no cell wall ; no protein synthesis / no ribosomes ; no metabolism / do not respire ; AVP ; e.g. viruses are inside (host) cells	2	
(d)(i)	percentage of males smoking increases faster than females ; ora more men smoked than women / higher percentage of men smoked (over all the time) ; ora peak for percentage of men smoking occurred earlier ; ora decrease in percentage of men smoking is greater than in females ; ora difference between percentages smoking decreases after peaks ; any comparative use of percentages ;	3	
(d)(ii)	for from A percentage of men and women that smoke increases and decreases ; numbers of deaths from lung cancer in both groups increases and decreases ; both show lag between peak smoking and peak deaths from lung cancer ; country A shows, same time gap / 40-year gap, between peaks for smoking and deaths from smoking ; for from B percentage of men and women who smoke has decreased (overall) ; numbers of deaths from lung cancer in both groups increase ; against from B percentage female smokers, fluctuates / AW, but no fluctuation in men ; numbers of deaths in men increase (continually), whereas deaths in females does not ; country B may show the same but no data to be sure / no data from before 1950 ; any data quote - percentage / number and approximate year and units ;	6	

09. 0610_m18_MS_42 Q: 2

	Answer	Mark	Partial Marks
(a)	<p><i>describe and compare</i></p> <p>1 COPD higher in villages than cities ; ora 2 COPD increasing in both areas ; 3 increasing more rapidly in villages ; 4 fluctuation / COPD decreases, in cities in 2001 ; 5 data quote comparing villages and cities including year and million ;</p> <p><i>suggest</i></p> <p>6 lack of healthcare in villages ; 7 more people smoke in villages / passive smoking ; 8 lack of awareness / education, in villages ; 9 pollution in villages ; 10 poor quality housing in villages ; 11 differences in diet ; 12 AVP ; e.g. lack of physical activity ;</p>	6	
(b)(i)	<p>1 nasal hairs, trap particles / AW ; 2 goblet cells secrete mucus ; 3 particles trapped in the mucus ; 4 cilia moving the mucus ; 5 mucus (containing particles) moved, away from the gas exchange surface / towards the throat / AW ; 6 mucus, swallowed / AW ; 7 AVP ; phagocytes / sneezing</p>	4	
(b)(ii)	<p>more oxygen ; less carbon dioxide ; less water vapour ;</p>	2	
(c)(i)	intercostal ;	1	
(c)(ii)	(pressure) decreases and (volume) increases ;	1	

10. 0610_w18_MS_41 Q: 5

	Answer	Mark	Partial Marks
(a)(i)	<p>chemical substance produced by a (endocrine) gland ; carried by the blood ; alters the activity of specific target organs / AW ;</p>	3	
(a)(ii)	<p>(insulin) stimulates enzymes (production) ; conversion of glucose to <u>glycogen</u> ; <u>glycogen</u> is stored / insoluble ; increased, uptake / absorption / respiration, of glucose by liver (cells) ;</p>	2	
(b)(i)	<p><u>deamination</u> / removal of nitrogen containing part (of amino acids) ; to form urea ; (part of) amino acid converted to ammonia ; ammonia converted to urea ;</p>	2	
(b)(ii)	(protein) synthesis ;	1	
(c)(i)	<p>aerobic / using oxygen ; respiration / (to produce) carbon dioxide and water; <i>ref. to enzymes ;</i> AVP ; converted back to, glucose</p>	2	
(c)(ii)	<p>as alcohol consumption increases risk of dying of liver disease increases ; similar trend in males and females ; comparative data quote with units for g per day ; men exponential / women are not exponential / AW ; at low consumption females have higher risk ; ora same risk at 112 g per day ;</p>	4	

11. 0610_m16_MS_42 Q: 2

	Answer	Mark	Partial Marks
(a)	ADCFBGE	[1]	
(b)	<ol style="list-style-type: none"> 1 <i>ref to</i> chemical neurotransmitter ; 2 from/in, vesicles/ sacs ; 3 neurotransmitter <u>diffuses</u> ; 4 across synaptic <u>clef</u>t/<u>gap</u> ; 5 neurotransmitter binds with receptors ; 	[max 3]	A named neurotransmitter mpt 3/5 R impulse
(c) (i)	<p>sleeplessness ; hallucinations ; muscle cramps /restless legs ; nausea ; vomiting ; headaches ; sweating ; aggression/ agitation / restlessness/ anxiety/ mood swings/panic attacks ; AVP ; e.g. shivering / diarrhoea</p>	[max 2]	I symptoms of use
(ii)	(addicts) turn to crime to finance their addiction /AW ; more opportunity to become drug dealers/ mule/ AW ;	[max 1]	
(d) (i)	<ol style="list-style-type: none"> 1 harmless / dead/ weakened/ attenuated, (named) pathogen/ microorganisms ; 2 injected / ingested ; 3 <i>ref to</i> antigens ; 4 antigen/ vaccine, triggers antibody production ; 5 by lymphocytes ; 6 memory cells are produced ; 7 long-term immunity/ rapid immune response ; 	[max 4]	mpt 7 R resistance I permanent
(ii)	<ol style="list-style-type: none"> 1 short-term defence against pathogens ; 2 no immune response/ immediate protection/ no memory cells produced/ no antibodies produced by the body ; 3 from <u>antibodies</u>, acquired from elsewhere/ AW ; 4 e.g. across placenta/ breast-feeding/ breast milk/ colostrum/ antitoxin/ antivenom/ tetanus injection/ immunoglobulins ; 	[max 2]	
		[Total: 13]	

	Answer	Mark	Partial Marks
(a)	cortex; medulla; ureter;	3	
(b)(i)	<u>renal artery</u> ;	1	
(b)(ii)	<u>renal vein</u> ;	1	
(c)	1 filters, blood / plasma; 2 (filtration occurs) in the glomerulus; 3 reabsorption of (named) useful substances; <i>removes / excretes / loses</i> 4 (named) nitrogenous waste; e.g. urea 5 excess, (named) salt(s) / mineral(s) / ion(s); 6 (named) hormones; 7 excess water;	4	
(d)(i)	chemical / substance, secreted / produced / released, by a (endocrine) gland; into the blood / carried in the blood; controls / regulates / affects, (activity of) target organ(s);	3	R impulse(s)
(d)(ii)	testis / testes;	1	
(d)(iii)	<u>anabolic</u> (steroid); promotes protein synthesis; promotes, growth / strength, of muscle (tissue); makes people more, aggressive / competitive / AW; AVP; e.g. ref to bone density / bone mass / changes body composition	2	
(e)	12.5 (ng cm ⁻³);;	2	<i>working</i> <i>either</i> after 7 days it has fallen from 50 to 25 ng cm ⁻³ , after another 7 days it has fallen to 12.5 ng cm ⁻³ <i>or</i> decreases by $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$, $\frac{1}{4} \times 50 = 12.5$ (ng cm ⁻³) <i>or</i> $\frac{50}{2 \times 2} = 12.5$ (ng cm ⁻³)
		Total: 17	

13. 0610_w16_MS_43 Q: 4

	Answer	Mark	Partial Marks
(a)	(nicotine is) a (chemical) substance taken into the body; that modifies / affects / influences, (chemical reactions in) the body; addictive / can cause withdrawal symptoms (when stopped) / AW;	2	
(b)	<i>carbon monoxide</i> : binds to haemoglobin (permanently); Accept carboxyhaemoglobin reduced oxygen (transport); <i>tar (max 3)</i> : carcinogenic / causes lung cancer; sticks to / blocks / damages, alveoli / cilia; produce more mucus; making prone to (named) respiratory infections; reduced, diffusion / gas exchange;	4	A irritates, gas exchange surface / airways / emphysema
(c)(i)	1 more men smoked (between 1950–1998 than women); ORA 2 both decrease overall / between 1950 and 1998; 3 (overall) drop in men is more (than in women); ORA Ignore data 4 (1950)–1970: men decreasing and women increasing; 5 1970 onwards: both genders decreasing; 6 larger difference in numbers / %, before 1970s / earlier OR smaller difference in numbers / %, after 1970s / later; AW 7 maximum (implied) for women was 50% and 82% for men; 8 comparative data quote between men and women with units stated once;	4	
(c)(ii)	number of deaths by (lung) cancer shows similar trend as percentage smokers; (correlation) in both men and women / AW; lag in the death rate trend (compared with smokers) / AW; relevant data quote from both graphs; trend more obvious in men / death rate in women is increasing overall; impossible to show conclusive link; (because) cannot control experimental conditions / other lifestyle factors; AVP;	4	e.g. lag in / drop of 7–8 years in men
(d)	toxins / AW, in smoke can cross the placenta; increased risk, of miscarriage / still birth / premature birth / low birth weight / deformities; reduces oxygen available to the foetus / foetal brain damage; increased risk, of reduced lung, function / infection, in foetus / infants; babies more likely to become addicted / have withdrawal symptoms; AVP;	3	
		Total: 17	