PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



MARK SCHEME

TOPIC 5: HEALTH, DISEASE AND THE DEVELOPMENT OF MEDICINES (PACK 2)

SCORE	PERCENTAGE
/60	%

STEMUP

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Mark Scheme

Q1.

Question number	Indicative content	Additional guidance	Mark
(i)	Substitution (1) 21.00 x 11.18 Evaluation (1) 234.78 3 significant figures 235	award full marks for correct numerical answer without working award 2 marks for correct evaluation ecf for the incorrect calculation correctly rounded to 3 s.f.	**(3)** **AO3 1a 1b**

Question number	Indicative content	Additional guidance	Mark
(ii)	One from: • each country has a different size population (1) • allows comparisons to be made between countries (1)	 ignore it is easier to read/easier to analyse	**(1)** AO3 1a

Question number	Indicative content	Additional Guidance	Mark
(iii)	One from: • vaccination (1) • {reporting/diagnosis} systems (1) • {access to/quality of} healthcare (1) • environmental factors (1)	 accept examples of relevant environmental factors e.g. population density, proximity of country to others. (1) accept herd immunity (1)	**(1)** AO2 1

Q2.

Question Number	Answer	Additional Guidance	Mark
(i)	(8 x 4) = 32 (grams of alcohol) (1) 1.2 / 1.20 (x risk)	award full marks for the correct answer with no workings	**(2)** **AO3**

Question Number	Answer	Additional Guidance	Mark
(ii)	An answer including two from: • mutations in DNA (1) • cell division is uncontrolled (1) • leading to the formation of a tumour / growth / mass of cells (1)	 accept change in the gene/cell mutates accept {rapid / continuous} cell division	**(2)** **AO2 1**

Q3.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	**D** ☒ 25.0 %		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	An explanation linking the following to lower cholesterol levels/the man's cholesterol level exceeds government recommended levels (1) (mycoprotein) lower in {fat / saturated fat} / mycoprotein contains {no/less} cholesterol (1) which reduces chances of heart attack / stroke / named health condition (1)	 accept the man's cholesterol level is 6 (mmol per dm^3) accept atherosclerosis/stroke/angina ignore heart disease/heart problems	**(2)**

Question Number	A description	Acceptable answers	Mark
(b)	A description including three of the following use of fermenter (1) *Fusarium* (fungus) (1) supplied with {sugar source/ammonia/oxygen} (1) maintain optimal conditions / aseptic conditions/without stirring (1) (after growth) processed to produce mycoprotein (1)	 ignore air ignore nutrients accept named conditions e.g. pH, temperature ignore references to paddles stirring	**(3)**

Q4.

Question Number	Answer	Additional guidance	Mark
(i)	An answer including **two** from: • (communicable) is passed from **person to person** (1) • (communicable) caused by {pathogens / example of pathogen} (1) • (communicable diseases) cannot be inherited (1)	accept reverse arguments for non-communicable diseases	**(2)** **AO1 1**

Question Number	Answer	Additional Guidance	Mark
(ii)	An explanation including: • {cough / sneeze} into a tissue / avoid close contact with infected people / avoid cramped living conditions (1) • because spread of TB is airborne droplets / TB is spread through the air (1) **OR** • vaccination / immunisation (1) • to provide immunity / reduces the chance of a person getting infected (1) **OR** • treat infected people with **antibiotics** (1) • reduces the number of infected people (1)	accept regular hand washing / wear a mask / isolate an infected person accept spread by coughing / breathing it {in / out} accept reduces the chances of contact with an infected person	**(2)** **AO2 1**

Question Number	Answer	Additional guidance	Mark
(iii)	• suitable heading for each column, with country in the left column (1) • all data entered accurately (1)	accept country / region / number of people / people with TB countries can be entered in any order	**(2)** **AO2 1**

Q5.

Question number	Answer		Mark
(i)	An answer including three from: • (cells are triggered to divide) by mitosis (1) • this division is uncontrolled (1) • creates a mass/large number of cells /tumour (1)	accept cells won't stop dividing/faster cell division/increased cell division	(3) AO2 1

Question number	Answer	Mark
(ii)	C interphase **The only correct answer is C** **A** *is not correct because the DNA is not replicated in anaphase* ***B*** *is not correct because the DNA is not replicated in prophase* ***D*** *is not correct because the DNA is not replicated in telophase*	(1) AO1 1

Question number	Answer	Additional guidance	Mark
(iii)	An answer combining: • 1 in 20 is a rate of 5% (1) • obesity increases the risk of bowel cancer more (than other types of cancer) (1)	accept 13% is 1 in 8/1 in 7.7 accept other correct manipulation of figures accept obesity is less of a contributing factor to other types of cancer	(2) AO3 2a+ 2b

Q6.

Question number	Answer		Mark
(i)	An answer including three from: • (cells are triggered to divide) by mitosis (1) • this division is uncontrolled (1) • creates a mass/large number of cells /tumour (1)	accept cells won't stop dividing/faster cell division/increased cell division	(3) AO2 1

Question number	Answer	Mark
(ii)	C interphase **The only correct answer is C** ***A** is not correct because the DNA is not replicated in anaphase* ***B** is not correct because the DNA is not replicated in prophase* ***D** is not correct because the DNA is not replicated in telophase*	(1) AO1 1

Question number	Answer	Additional guidance	Mark
(iii)	An answer combining: • 1 in 20 is a rate of 5% (1) • obesity increases the risk of bowel cancer more (than other types of cancer) (1)	accept 13% is 1 in 8/1 in 7.7 accept other correct manipulation of figures accept obesity is less of a contributing factor to other types of cancer	(2) AO3 2a+ 2b

Q7.

Question number	Answer	Additional guidance	Mark
(b)	A description linking the following: • virus inserts its genetic material into the host cell (1) • uses the host cell {machinery / organelles / resources} • virus {components /protein/genetic material} are made (1) • virus components are assembled inside the cell (1) • cell lyses to release the virus / viruses released from cell (1)	ignore the virus enters a cell accept it takes over the host cell accept appropriate named organelles accept new viruses produced/replicated inside the cell ignore the virus reproduces / divides / grows accept host cell bursts ignore the host lyses	**(4)** **AO1 1**

Q8.

Question number	Answer	Additional guidance	Mark
	An answer linking three from: • (pathogens have) antigens (1) • (that trigger) antibodies to be produced (1) • by lymphocytes (1) • (leads to the) destruction of the pathogen (1) • memory {cells/ lymphocytes} produced (1) • cause a secondary response (in the event of infection by the same pathogen) (1)	accept bacteria/virus for pathogen ignore WBC accept engulf pathogen accept description of a secondary response e.g. before symptoms/before the person gets ill/can react quickly	**(3)** **AO1 1**

Q9.

Question number	Answer	Additional guidance	Mark
	An answer linking three from: • (pathogens have) antigens (1) • (that trigger) antibodies to be produced (1) • by lymphocytes (1) • (leads to the) destruction of the pathogen (1) • memory {cells/ lymphocytes} produced (1) • cause a secondary response (in the event of infection by the same pathogen) (1)	 accept bacteria/virus for pathogen ignore WBC accept engulf pathogen accept description of a secondary response e.g. before symptoms/before the person gets ill/can react quickly	**(3)** **AO1 1**

Q10.

Question number	Indicative content	Mark
*	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO2 (6 marks)** • isolate an antigen from the pathogen which causes the STI • inject the antigen into a mouse/rodent • collect lymphocytes producing an antibody to the STI antigen • fuse the B-lymphocyte with a myeloma cell • production of a hybridoma • hybridoma produces a monoclonal antibody against the antigen of the STI • attach the monoclonal antibody to coloured bead/indicator • incorporate into a test strip.	**(6)**

Level	Mark	Descriptor
	0	No awardable content
Level 1	1-2	• The explanation attempts to link and apply knowledge and understanding of scientific enquiry, techniques and procedures, flawed or simplistic connections made between elements in the context of the question. (AO2) • Lines of reasoning are unsupported or unclear. (AO2)
Level 2	3-4	• The explanation is mostly supported through linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, some logical connections made between elements in the context of the question. (AO2) • Lines of reasoning mostly supported through the application of relevant evidence. (AO2)
Level 3	5-6	• The explanation is supported throughout by linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, logical connections made between elements in the context of the question. (AO2) • Lines of reasoning are supported by sustained application of relevant evidence. (AO2)

Q11.

Question number	Answer	Additional guidance	Mark
	An answer including: • surgery to treat narrow or blocked arteries (1) • lifestyle changes including {healthy diet/more exercise} (1) • (life-long) medication to {prevent blood clots/reduce blood pressure/thin the blood} (1)	 accept by-pass surgery / stents / heart surgery / other relevant surgeries such as gastric bands accept examples of lifestyle changes e.g. stop smoking accept named medications used for cardiovascular disease	**(3)** **AO1 1**

Q12.

Question number	Answer	Additional guidance	Mark
	An answer including: • surgery to treat narrow or blocked arteries (1) • lifestyle changes including {healthy diet/more exercise} (1) • (life-long) medication to {prevent blood clots/reduce blood pressure/thin the blood} (1)	 accept by-pass surgery / stents / heart surgery / other relevant surgeries such as gastric bands accept examples of lifestyle changes e.g. stop smoking accept named medications used for cardiovascular disease	**(3)** **AO1 1**

Q13.

Question number	Answer	Additional Guidance	Mark
(i)	An answer including: • (statins) reduce the level of LDL cholesterol (1) • by 1.4 mmol per dm^3 / from 3.8 mmol per dm^3 to 2.4 mmol per dm^3	accept LDL cholesterol decreases accept idea that it decreases from 3.8 mmol per dm^3 to a lowest value of 2.3 mmol per dm^3 accept 1.5 mmol per dm^3	**(2)** AO3 (1a+1b)

Question number	Answer	Mark
(ii)	An explanation linking the following: • level of LDL increases after the medication is stopped (1) • increases risk of {heart disease/heart attack/stroke/cardiovascular diseases/high blood pressure} (1)	**(2)** AO3 2a+2b

Q14.

Question number	Answer	Additional Guidance	Mark
(i)	An answer including: • (statins) reduce the level of LDL cholesterol (1) • by 1.4 mmol per dm^3 / from 3.8 mmol per dm^3 to 2.4 mmol per dm^3	accept LDL cholesterol decreases accept idea that it decreases from 3.8 mmol per dm^3 to a lowest value of 2.3 mmol per dm^3 accept 1.5 mmol per dm^3	**(2)** AO3 (1a+1b)

Question number	Answer	Mark
(ii)	An explanation linking the following: • level of LDL increases after the medication is stopped (1) • Increases risk of {heart disease/heart attack/stroke/cardiovascular diseases/high blood pressure} (1)	**(2)** AO3 2a+2b

Q15.

Question number	Answer	Additional Guidance	Mark
	An answer including: • the viruses use host cell machinery (1) • {viral genetic material / viral proteins} are made by the cell (1) • new virus particles assemble (1) • lyse host **cells** (to release viral particles) (1)	accept the virus takes over the cell accept DNA/RNA for genetic material accept new viruses are produced (inside the cell) accept bursts cell/destroys cell/disrupt cell membrane if linked to the idea of release	**(3)** **AO1**