PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



MARK SCHEME

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

SCORE	PERCENTAGE
/56	%

STEMUP

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Mark Scheme

Q1.

Question Number	Answer	Mark
	World Health Organization / WHO	**(1)** **AO1 1**

Q2.

Question number	Answer	Additional guidance	Mark
(i)	A comparison including **three** of the following: • the number of transplants needed increased rapidly but the number of donors {only increased slightly /remained low} (1) • from {2014 / 2015} the numbers of transplants required decreased (1) • the number of donors available was always lower than the number of transplants needed (1) • comparison of figures from the graph of the number of people needing an organ and donating an organ (1)	accept peaked in {2014 / 2015} accept there are not enough donors for the transplants needed accept a comparative mathematical manipulation of the data	**(3)** **AO3 2ab**

Question number	Answer	Mark
(ii)	not enough donors are available / to increase the number of organs for donation / to meet the demand for organ transplants	**(1)** **AO3 2b**

Q3.

Question number	Answer	Mark
(i)	B	(1)

Question number	Answer	Mark
(ii)	Any two of the following points: • similar BMI (1) • same gender profile (1) • similar amount (and type) of exercise (1)	(2)

Question number	Answer	Mark
(iii)	An answer that combines the following points to provide a plan: • weigh the 40 obese people (1) • half follow the new diet and half keep their normal diet (1) • after a fixed time period re-weigh the 40 people (1)	(3)

Q4.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	8-10 (hours)	accept any value between 8 and 10	(1)

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	(85/100) x 500 (1) Or (500/100) x 85 (1) 425 (plants)	award two marks for correct bald answer	(2)

Question Number	Answer	Acceptable answers	Mark
(a)(iii)	plant can flower all year round/flowering not limited to one period of the year/plant can flower for longer/flower at any time.	ignore references to growing accept pollination for flowering	(1)

Question Number	Answer	Acceptable answers	Mark
(a)(iv)	C photoperiodism		(1)

Question Number	Answer	Acceptable answers	Mark
(b)(i)	less likely to be eaten (by animals / herbivores)	accept kills pests/reduces damage done by pests reject predators	(1)

Question Number	Answer	Acceptable answers	Mark
(b)(ii)	An explanation linking **two** of the following: the bamboo **mutated** to produce cyanide (1) or bamboo plants that produced cyanide survived to reproduce/ increase in numbers/increase in size (1) **and** **mutation** in greater bamboo lemur allowed them to tolerate cyanide (1) or greater bamboo lemurs get more food so survive to breed/reproduce (more) (1)	accept some bamboo plants have the {**gene/allele**} to produce cyanide ignore bamboo plants not eaten accept lemurs have {**gene/allele**} to tolerate cyanide ignore {adapted to tolerate/resistant to} cyanide accept lemurs have less **competition** for food	**(2)**

Question Number	Answer	Acceptable answers	Mark
(c)(i)	**A** aggression		**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)(ii)	An explanation linking two of the following: sounds can be heard over a long distance /heard in the dark (1) do not need to have visual contact/allows communication with more animals (1) or more different types of sound (1) more {emotions/ behaviour/ information} can be conveyed (1)	accept quicker communication method accept doesn't require good vision	**(2)**

Q5.

	Answer	Acceptable answers	Mark
(i)	A description linking three of the following • inject mammal / named mammal with antigen (1) • (select) B lymphocytes / lymphocyte that produces the (specific) antibody / spleen cells(1) • fuse with tumour / myeloma cells (1) • (to produce a) <u>hybridoma</u> (which divide)(1) • antibodies are isolated / screened(1)	Accept animal for mammal Accept B cells Accept cancer cells Ignore antibodies produced	**(3)**
(ii)	An explanation linking **two** of the following: • antibody (only) attach to cancer cell (1) • drug / radioactive source / toxin bound to antibody / alerts immune system to target cancer cells (1) • no / fewer adverse effect to non cancerous cells (1)	Accept named effect	**(2)**

Q6.

Question number	Answer	Mark
(i)	gonorrhoea	**(1)** **AO3 1a**

Question number	Answer	Additional guidance	Mark
(ii)	(66 000 000 ÷ 1000) = 66 000 (1) (66 000) x 3.7 =244 200 (people) or (3.7 ÷ 1000) = 0.0037 (1) (0.0037) x 66 000 000 = 244 200 (people) or (66 000 000 x 3.7) = 244 200 000 (1) (244 200 000 ÷ 1000) = 244200	award full marks for correct answer no working accept answers in standard form accept 244200 to any incorrect magnitude for one mark	**(2)** **AO2 1**

Question number	Answer	Additional guidance	Mark
(iii)	Any one from: • it is {**passed/spread**} from **person to person** (1) • caused by bacteria (1)	 accept **spread** by {sexual contact / body fluids} accept pathogen ignore caused by a virus	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
(iv)	Any one from: • avoid sexual contact (1) • use a {condom/femidom} (1) • screen people for an infection (1) • treat the infection/give antibiotics (1)	 accept use a barrier form of contraception ignore protection / contraception	**(1)** **AO2 1**

Question number	Answer	Additional guidance	Mark
(v)	An explanation including the following: • it is {killed/inhibited} by antibiotics (1) • because chlamydia is caused by bacteria (1)	accept disrupt cell processes (in bacteria) /prevent (bacteria) reproducing accept antibiotics are used to kill bacteria for 2 marks	**(2)** **AO2 1**

Q7.

	Answer	Acceptable answers	Mark
(i)	An explanation linking **two**of the following: • tobacco contains tar (1) • tobacco/tar contains carcinogens / causes mutations /is cancer forming (1) • nicotine in tobacco is addictive which makes it difficult to give up /causes people to smoke for longer (1)		**(2)**
(ii)	**A** ☒ carbon monoxide		**(1)**

Q8.

	Answer	Acceptable answers	Mark
(i)	An explanation linking **two**of the following: • tobacco contains tar (1)		**(2)**

	• tobacco/tar contains carcinogens / causes mutations /is cancer forming (1) • nicotine in tobacco is addictive which makes it difficult to give up /causes people to smoke for longer (1)		
(ii)	**A** ☒ carbon monoxide		**(1)**

Q9.

Question number	Answer	Additional Guidance	Mark
(i)	An answer including two of the following: • concerns over side effects of immunisation / concerns over the risk of allergic reactions (1) • medical reason for not being immunised (1) • too young for the vaccination programme (1) • no access to healthcare (1)	accept **named** religious objections accept not in the country for the vaccination as a child they have already had measles (1) scared of needles (1) ignore didn't get a vaccine	**(2)** AO2(1)

Question number	Answer	Additional Guidance	Mark
(ii)	An answering including: • most people are immunised / high level of immunity in the population (1) • so non-immunised people are protected from measles infection as they are {less likely to come into contact with the pathogen/someone with measles/measles is less likely to spread through the population} (1)	reject it means non-vaccinated people are immune accept disease/pathogen/infection for measles	**(2)** AO1(1)

Q10.

Question number	Answer	Mark
(i)	lysogenic (pathway) accept phonetically correct misspellings	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
(ii)	all the {genetic material/DNA} of an organism	accept all the genes of an organism	**(1)** **AO1 1**

Q11.

	Answer	Acceptable answers	Mark
	An explanation including **three** of the following**:** • (stimulants) act at the synapse (1) • **more** neurotransmitters (1)	Accept increases neurotransmitters Accept decreases reaction time/speeds up reactions/ speeds up brain activity	**(3)**

	• so speeds up neurotransmission(1)		

Q12.

	Answer	Acceptable answers	Mark
	An explanation including **three** of the following**:** • (stimulants) act at the synapse (1) • **more** neurotransmitters (1) • so speeds up neurotransmission(1)	Accept increases neurotransmitters Accept decreases reaction time/speeds up reactions/ speeds up brain activity	**(3)**

Q13.

	Answer	Acceptable answers	Mark
(i)	**C** ☒ parasite		**(1)**
(ii)	A suggestion linking **two of the following:** • suckers on the head /adaptation of the head (1) • attaches to the intestine (1) OR • a very long thin shape / large surface area (1) • for absorption (1) OR • surface / skin (1) • resistant to enzymes (1)	Accept hooks, teeth for suckers Reject large intestine Accept long flexible shape Ignore references to resistance to stomach acid Ignore references to larvae, eggs and reproduction	**(2)**
(iii)	A suggestion including two of the		

	following: • cooking meat thoroughly (1) • do not eat meat /become a vegetarian / vegan(1) • destroy/don't eat the cysts in the meat(1) • prevent animals from eating tapeworm eggs (1) • worm the animal (1)	Accept food/pork for meat	**(2)**

Q14.

	Answer	**Acceptable answers**	**Mark**
(i)	**C** ☒ parasite		**(1)**
(ii)	A suggestion linking **two of the following:** • suckers on the head /adaptation of the head (1) • attaches to the intestine (1) OR • a very long thin shape / large surface area (1) • for absorption (1) OR • surface / skin (1) • resistant to enzymes (1)	Accept hooks, teeth for suckers Reject large intestine Accept long flexible shape Ignore references to resistance to stomach acid Ignore references to larvae, eggs and reproduction	**(2)**
(iii)	A suggestion including two of the following: • cooking meat thoroughly (1) • do not eat meat /become a vegetarian / vegan(1) • destroy/don't eat the cysts in the meat(1) • prevent animals from eating	Accept food/pork for meat	**(2)**

	tapeworm eggs (1) • worm the animal (1)		

Q15.

Question number	Answer	Mark
(i)	A description that combines the following points to form a plan: • use a sterilised inoculating loop (1) • dip into the bacteria culture and spread evenly over the agar jelly (1) • cover the Petri dish to prevent cross contamination (1)	(3)

Question number	Answer	Mark
(ii)	A description that combines identification of knowledge (1 mark) and reasoning/justification – understanding (1 mark): • both tetracycline and penicillin killed bacteria(1) • penicillin was more effective than tetracycline (1)	(2)

Question number	Answer	Additional guidance	Mark
(iii)	Calculate the radius =9mm Substitution $3.142 \times 9^2 = (1)$ Evaluation 254.5 (mm^2)	**Accept** other acceptable numbers for π	(2)

Q16.

Question number	Indicative content	Mark
*	Answers will be credited according to the 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 that is indicated as relevant. Additional content included in the response must be scientific and relevant • attachment of viral particle to host cell receptor • nucleic acid of virus moves across the cell membrane • into the host cell • replication and synthesis of new viral components • using host DNA • assembly of new viral components into new viruses • lysis of infected host cell • release of fully assembled virus particles	**(6)**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3–4	• Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5–6	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical (AO1)

Q17.

	Answer	Acceptable answers	Mark
	A ☒ antigens		**(1)**

Q18.

	Answer	Acceptable answers	Mark
	A ☒antigens		**(1)**

Q19.

	Answer	Acceptable answers	Mark
(i)	the later that a person gives up smoking/the longer you smoke for the higher risk of lung cancer	ORA	**(1)**
(ii)	9 (%)		**(1)**
(iii)	$\frac{500\,000 \times 9}{100}$ (1) = 45 000 (1)	2 marks for the correct bald answer if value other than 9 (2 – 14) inserted into correct equation ecf applies if calculation is correct	**(2)**

Q20.

	Answer	Acceptable answers	Mark
(i)	the later that a person gives up smoking/the longer you smoke for the higher risk of lung cancer	ORA	**(1)**
(ii)	9 (%)		**(1)**
(iii)	$\frac{500\,000 \times 9}{100}$ (1) = 45 000 (1)	2 marks for the correct bald answer if value other than 9 (2 – 14) inserted into correct equation ecf applies if calculation is correct	**(2)**

Q21.

Question number	Answer	Mark
(i)	An answer that combines points of interpretation and evaluation to provide a logical description: • proteinase K breaks down protein molecules (1) • in cell and nuclear membranes to release the DNA (1)	(2)

Question number	Answer	Mark
(ii)	An answer that combines points of interpretation and evaluation to provide a logical description: • Aseptic techniques should be used to minimise transfer of genetic material / pathogens (1) • By sterilising equipment / autoclaving equipment (1) • Using protective clothing including gloves / facemask / goggles to prevent contamination (1)	(3)

Question number	Answer	Mark
(iii)	An explanation that combines application of knowledge (1 mark) and reasoning/justification – application of understanding: (1 mark): • activity decreases during storage at 37 ^{0}C (1) • because the active site of the enzyme has been affected / because the substrate can no longer bind to the enzyme (1)	(2)

Q22.

Question number	Answer	Mark
	cannot be transferred from one person to another	(1)

Q23.

	Answer	Acceptable answers	Mark
(a)(i)	**C** ☒ parasite		**(1)**
(a)(ii)	A suggestion linking **two of the following:** • suckers on the head /adaptation of the head (1) • attaches to the intestine (1) OR • a very long thin shape / large surface area (1) • for absorption (1) OR • surface / skin (1) • resistant to enzymes (1)	Accept hooks, teeth for suckers Reject large intestine Accept long flexible shape Ignore references to resistance to stomach acid Ignore references to larvae, eggs and reproduction	**(2)**
(a)(iii)	A suggestion including two of the following: • cooking meat thoroughly (1) • do not eat meat /become a vegetarian / vegan(1) • destroy/don't eat the cysts in the meat(1) • prevent animals from eating tapeworm eggs (1) • worm the animal (1)	Accept food/pork for meat	**(2)**
(b)	An explanation including **three**of the following: • (chemosynthetic) bacteria live in (the gut of) the tube worms (1) • the bacteria convert sulphurous / hydrogen sulphide compounds (1) • into food for the tube worms (1) • the tube worms provide place for the bacteria to live / provides oxygen for bacteria	**Accept sulphur** Accept bacteria make food for worms **Accept protection** Accept mutualism / mutual benefit / mutual relationship	**(3)**

	(1) • this is a mutualistic relationship (1)		

Q24.

	Answer	Acceptable answers	Mark
(a)(i)	**C** ☒ parasite		**(1)**
(a)(ii)	A suggestion linking **two of the following:** • suckers on the head /adaptation of the head (1) • attaches to the intestine (1) OR • a very long thin shape / large surface area (1) • for absorption (1) OR • surface / skin (1) • resistant to enzymes (1)	Accept hooks, teeth for suckers Reject large intestine Accept long flexible shape Ignore references to resistance to stomach acid Ignore references to larvae, eggs and reproduction	**(2)**
(a)(iii)	A suggestion including two of the following: • cooking meat thoroughly (1) • do not eat meat /become a vegetarian / vegan(1) • destroy/don't eat the cysts in the meat(1) • prevent animals from eating tapeworm eggs (1) • worm the animal (1)	Accept food/pork for meat	**(2)**
(b)	An explanation including **three**of the following: • (chemosynthetic) bacteria live in (the gut of) the tube worms	**Accept sulphur** Accept bacteria make food for worms	**(3)**

	(1) • the bacteria convert sulphurous / hydrogen sulphide compounds (1) • into food for the tube worms (1) • the tube worms provide place for the bacteria to live / provides oxygen for bacteria (1) • this is a mutualistic relationship (1)	**Accept protection** Accept mutualism / mutual benefit / mutual relationship	