Question	Answers	Extra information	Mark	AO / Specification reference
01.1	any **two** from: sexual intercourse blood using contaminated needles		2	AO1 3.1.1 3.1.2
01.2	viral particles have a protein coat bacterial cells have a cell wall viral particles are much smaller than bacteria cells bacteria are 0.5 – 5 μm in size / 5 – 50× larger		1 1 1 1	AO2 3.1.2
01.3	any **four** from: • virus infects a suitable host cell (through blood / body opening) • virus replicates itself many times • it copies its genetic material and protein coat • this causes the host cell to burst, releasing the many copies of the virus • other cells can then be infected		4	AO1 3.1.1
01.4	15 μm = $15×10^{-6}$ m; 120 nm = $120×10^{-9}$ m difference in size = $\dfrac{15×10^{-6}}{120×10^{-9}}$ = 125 difference = 2 orders of magnitude / 102× / 100×	1 mark for either conversion correct	1 1 1 1	AO2 3.1.1 1.1.1 MS2h

Question	Answers	Extra information	Mark	AO / Specification reference
01.5	any **four** from: • new drugs developed • which prevent HIV infection • education programmes launched / become more effective • encouraging use of condoms / barrier protection during intercourse • fewer people infected in previous years • means fewer people will be infectious so risk of catching infection decreases	to gain 4 marks, answers should include **two** suggestions and **two** linked explanations accept other reasonable suggestion and linked explanation	4	AO3 4.3.1.2
02.1	measles – virus salmonella – bacteria rose black spot – fungus malaria – protist	all correct – 3 marks two or three correct – 2 marks one correct – 1 mark deduct 1 mark for each additional line drawn above four lines	3	AO1 3.1.2 3.1.3 3.1.4 3.1.5
02.2	fever / red skin		1	AO1 3.1.2
02.3	droplet infection		1	AO1 3.1.2

Question	Answers	Extra information	Mark	AO / Specification reference
02.4	14.4 × 16 000 000 = 950.4	accept 950	1	AO2 3.1.2 MS1c
02.5	1204 − 14.4 = 1189.6 cases		1	AO2 x 2 AO3 x 1 3.1.2 MS1c
03.1	protist		1	AO1 3.1.5
03.2	mosquito		1	AO1 3.1.5

Question	Answers	Extra information	Mark	AO / Specification reference
03.3	any **six** from: **avoidance / awareness:** • avoid areas likely to host mosquitos (damp / swamp) • be aware of malaria risk in region to be visited • be aware of symptoms of malaria **prevention:** • sleep under mosquito nets • use pesticide- / insecticide-impregnated mosquito nets • use mosquito repellent • cover up where possible **controlling infection:** • take antimalarial drugs which kill pathogen in blood • have blood test on return for possible malaria infection • early treatment of malaria is more effective	answers from all three sections: 5–6 marks answers from two sections: 3–4 marks answer from one section: 1–2 marks	6	AO1 3.1.2
04.1	tobacco mosaic virus (TMV) – discolouration of leaves gonorrhoea – yellow or green discharge from sexual organs rose black spot – purple or black spots on leaves salmonella – fever, vomiting, diarrhoea	award 3 marks for all correct award 2 marks for two or three correct award 1 mark for one correct deduct one mark for each additional line drawn above four lines	3	AO1 3.1.2 3.1.3 3.1.4 3.1.5

Question	Answers	Extra information	Mark	AO / Specification reference
04.2	HIV gonorrhoea condoms / female condoms barrier	accept other correctly named STD for either / both of the first 2 marks	1 1 1 1	AO1 3.1.2 3.1.3
04.3	send infected children home prevent visitors from coming into the school wash surfaces down with disinfectant	deduct 1 mark for any additional incorrect answers ticked **in addition to** the three correct answers	3	AO3 4.3.1.1
05.1	washing hands before preparing food – avoids transferring a pathogen to food covering face when coughing or sneezing – prevents droplet infection wiping down surfaces with disinfectant – kills pathogens on surfaces isolation of infected people – prevents risk of transferring pathogen to other people		1 1 1 1	AO2 3.1.1.1

Question	Answers	Extra information	Mark	AO / Specification reference
05.2	any **four** from: • store at low temperatures / freeze • to reduce / prevent growth of pathogens; • cook meat products thoroughly • to kill any pathogens present; • maintain good hygiene, e.g. washing hands after handling meat • to prevent contaminating other food products	answer should contain **two** suggestions and **two** linked explanations	4	
05.3	any **three** from: • bacteria reproduce rapidly inside body • bacteria release toxins • toxins damage cells • bacteria can damage cells directly		3	
05.4	any **one** suggestion and explanation pair from: • vaccination of birds • prevents chickens catching disease; • slaughter of infected birds • avoids supplying infected meat to the market; • prevent imports of infected meat • avoids supplying infected meat to the market	answer should include suggestion and explanation for 2 marks	2	

Question	Answers	Extra information	Mark	AO / Specification reference
06.1	fungus		1	AO1 3.1.4
06.2	any **two** from: • purple / black spots on leaves • leaves yellow • leaves drop early		2	AO1 3.1.4
06.3	less chlorophyll present reduces photosynthesis (in chloroplasts) less glucose for respiration		2	AO1 3.1.4
06.4	any **two** from: • use fungicides • use disinfectant on tools / area around plant / on footwear • remove infected leaves / plants		2	AO1 3.1.4
07.1	(recurrent) fever / muscle pain / vomiting / diarrhoea		1	AO1 3.1.5
07.2	mosquitoes are the vector for the disease malaria is caused by a protist / *Plasmodium* (carried by mosquitos)		1 1	AO2 3.1.5

Question	Answers	Extra information	Mark	AO / Specification reference
07.3	(steady) decrease in number of deaths over time any **two** reasons from: • better sanitation • better healthcare / drugs • better education / awareness of prevention • more effective control of mosquito populations • draining land (for agriculture / housing), removing habitat for mosquitos		1 2	AO2 x 1 AO3 x 2 3.1.5
07.4	300 000	accept answer in range 290–300 000 award 1 mark for answer in range 280–290 000 or 310–320 000	2	AO3 3.1.5
07.5	the greater the GDP, the fewer deaths (per 100 000 population) due to malaria	award 1 mark for negative correlation	2	AO2 3.1.5

Question	Answers	Extra information	Mark	AO / Specification reference
07.6	any **four** from: • more wealthy countries have better education systems • so population more aware of causes of malaria / ways to avoid catching malaria; • more wealthy countries spend more on mosquito control • so fewer cases of malaria result; • more wealthy populations can afford mosquito control measures, e.g. mosquito nets / screens • to prevent mosquitos reaching / biting people	answer must include **two** suggested treatments and **two** linked explanations for 4 marks	4	AO3 3.1.5
08.1	caused by a microorganism/ pathogen spread between organisms / plants		1 1	AO1 3.1.1
08.2	any **four** from: • the leaves turn yellow / white discoloured • less chlorophyll present • this reduces photosynthesis (in chloroplasts) • less glucose for respiration / to be transferred into energy • so plants do not grow as well		4	AO1 3.1.2
08.3	chloroplast		1	AO2 3.1.2

Question	Answers	Extra information	Mark	AO / Specification reference
08.4	any **four** from: • use chemicals / disinfectant • to destroy virus on workers' tools / clothing; • use pesticides / insecticides • to kill insects which transfer the virus; • burning of crop • to kill virus in soil; • removal of soil around infected plants • to remove virus from soil	answer must include **two** suggested treatments and **two** linked explanations for 4 marks	4	AO2 3.1.2
09.1	HIV attacks immune system patient becomes infected with disease / cancer patient dies due to infection / condition		1 1 1	AO1 3.1.2
09.2	antiretroviral	do not accept antiviral	1	AO1 3.1.2
09.3	between 1990 and 2005 shows (steady) increase and between 2005 and 2015 shows (steady) decline maximum number of deaths in 2005		1 1	AO3 3.1.2

Question	Answers	Extra information	Mark	AO / Specification reference
09.4	any **one** suggestion AND explanation from: • better education / wider awareness • so people are aware of means of transmission / use condoms / don't share needles; • better sanitary conditions • so body fluids are less likely to be shared; • more effective treatments • so infection with HIV is less likely to lead to death.	answer must include suggestion and reason for 2 marks	2	AO3 3.1.2
09.5	18 per 100 000 people		1	AO2 3.1.2
09.6	deaths: 1998 – 12 cases per 100 000; 2005 – 19 cases per 100 000 change = 7 per 100 000 percentage increase = $\frac{7}{12} \times 100 = 58.3\%$		1 1 1	AO2 3.1.2
10.1	fungus		1	AO1 4.3.1.4
10.2	fungicide		1	AO1 4.3.3.1