Higher Specialist Diploma

Virology

September 2025

Short-Answer Questions

60 minutes

Attempt all Four Questions

Instructions to Candidates

1. Record your candidate number and HSD discipline on the front sheet of the answer booklet.

2. Record your candidate number, the question number and the page number in the spaces provided on the answer sheets.

3. Begin each new answer on a new page.

4. Each question is worth 25 marks.

1. A trainee biomedical scientist comes to you with a serology result of from a renal transplant patient:

- EBV IgM positive
- EBV VCA IgG equivocal
- EBVNA IgG negative

and asks you to tell them what these results indicate and how to proceed. What would you advise?

2. Describe what you would include in a tutorial for trainee biomedical scientists about Shewhart or Levey-Jennings plots and Westgard Rules in Quality Assurance.

3. Your laboratory wants to introduce a syndromic multiplex PCR for gastrointestinal infection- discuss the advantages, disadvantages and possible limits to the introduction of this kind of testing.

4. You arrive in the laboratory after a bank holiday and find that there has been a flood. It has knocked out the power to the main laboratory. How do you respond to ensure continuity of service?

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Essay Paper

120 minutes

Attempt 2 out of 5 Questions

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3. Begin each new question on a new page.

4. Each question is worth 100 marks.

1. Critically analyse the role of UK Standards for Microbiology Investigations (UK SMI) in the laboratory diagnosis and management of viral infections. Discuss how these standards contribute to the accuracy, reliability, and consistency of virology testing in clinical settings.

2. Discuss the significance of International Units (IU) in standardising viral quantification methods. How do IU facilitate comparisons between different laboratories and studies?

3. Critically evaluate the steps involved in establishing a Point of Care Testing (POCT) service for respiratory viral infections in A&E. Discuss the potential benefits and challenges, including considerations for quality control, staff training, and integration with existing laboratory services.

4. Discuss the epidemiology, pathogenesis and laboratory diagnosis of infection caused by Human Cytomegalovirus

5. Critically evaluate the application of metagenomics for characterisation of viral pathogens within clinical virology. Discuss the advantages and limitations of metagenomic techniques in clinical diagnostics with examples.

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Case Studies

120 minutes

Attempt all case studies

Instructions to candidates

1. Record your candidate number and HSD discipline on the front sheet of the answer booklet

2. Record your candidate number, the question number and the page number in the spaces provided on the answer sheets

3. Begin each new case study on a new page

4. Each question is worth 100 marks

5. For these case study questions you are strongly advised to answer the questions as they arise during the case study to avoid later information impacting adversely on your answers to the earlier questions by presuming an "outcome"

SEEN CASE STUDY

1.
Mr C a 24 year old male, presented in A&E in early December 2023 with severe occipital headache, fever, rash and night sweats. He reported multiple episodes of unprotected sexual intercourse and a previous episode of genital HSV infection.

a. List the viral infections which would be suspected in this case and state which samples should be collected for laboratory investigations. Justify your answers. (20 marks)

Initial results show:
HIV IgG + (with low avidity)
HIV VL >1,000,000 copies/ml
CD4 count 350 cells/mm^3
CSF: HSV DNA, VZV DNA and enterovirus RNA negative

Mr C was discharged from hospital and appeared to recover. However, he decided not to start on anti-retroviral therapy. He re-engaged with the HIV service in mid-April 2024 complaining of similar symptoms (fever, occipital headache, night sweats). His HIV virology showed the following:

HIV VL >1,000,000 copies/ml
CD4 count 270 cells/mm^3

Genotypic analysis of his HIV gave the following results:
December 2023- HIV-1 subtype B
April 2024- HIV- 1 subtype G

Baseline resistance testing **Dec 2023** gave the following results:

Mutation scoring: PR

No drug resistance mutations were found for PI.

Drug resistance interpretation: RT

NRTI Mutations:	None
NNRTI Mutations:	None
RT Other Mutations:	V35M • T39A • V118I • I135T • D177E • I178V • G196E • T200V • Q207N • F214L • V245M • K277R • I293V • E297K • Q334M

Nucleoside Reverse Transcriptase Inhibitors		Non-nucleoside Reverse Transcriptase Inhibitors	
abacavir (ABC)	Susceptible	**doravirine (DOR)**	Susceptible
zidovudine (AZT)	Susceptible	**efavirenz (EFV)**	Susceptible
emtricitabine (FTC)	Susceptible	**etravirine (ETR)**	Susceptible
lamivudine (3TC)	Susceptible	**nevirapine (NVP)**	Susceptible
tenofovir (TDF)	Susceptible	**rilpivirine (RPV)**	Susceptible

Drug resistance interpretation: PR

PI Major Mutations:	None
PI Accessory Mutations:	None
PR Other Mutations:	L10LI • I62V • L63P • V77VI • I93L

Protease Inhibitors	
atazanavir/r (ATV/r)	Susceptible
darunavir/r (DRV/r)	Susceptible
lopinavir/r (LPV/r)	Susceptible

Resistance testing from **April 2024** gave the following results:

Drug resistance interpretation: PR

PI Major Mutations:	None
PI Accessory Mutations:	None
PR Other Mutations:	I13V • I15V • K20I • E35D • M36I • R41K • L63S • I64M • H69K • K70R • L89M

Protease Inhibitors	
atazanavir/r (ATV/r)	Susceptible
darunavir/r (DRV/r)	Susceptible
lopinavir/r (LPV/r)	Susceptible

Drug resistance interpretation: RT — HIVDB 9.6 (2024-03

NRTI Mutations: S68G • T69D
NNRTI Mutations: K103N
RT Other Mutations: K20R • V35T • E40ED • V60I • D123DE • I135IT • T165I • D177E • I178L • T200A • Q207E • R211K • P243AS • I244V • V245K • E248D • K249M • D250E • A272P • T286A • E291D • V292I • I293V • E297I • Q330QH • Q332QR • G335GD

Nucleoside Reverse Transcriptase Inhibitors		Non-nucleoside Reverse Transcriptase Inhibitors	
abacavir (ABC)	Susceptible	doravirine (DOR)	Susceptible
zidovudine (AZT)	Susceptible	efavirenz (EFV)	High-Level Resistance
emtricitabine (FTC)	Susceptible	etravirine (ETR)	Susceptible
lamivudine (3TC)	Susceptible	nevirapine (NVP)	High-Level Resistance
tenofovir (TDF)	Susceptible	rilpivirine (RPV)	Susceptible

a. Discuss the laboratory methods for HIV resistance testing. (20 marks)

b. What can you conclude from these results? (25 marks)

c. Discuss the role of genotypic testing in the diagnosis and management of this case. (20 marks)

d. How do the results impact the patient's treatment options? (15 marks)

UNSEEN CASE STUDIES

2.
Mrs S is a 28 year old woman who is 24 weeks pregnant. She has contacted her GP to say her son has chickenpox. She has no history of chickenpox and has not received the VZV vaccine. She attended the Antenatal Clinical at her local hospital for a routine appointment with her son two days ago.

a. Give a brief description of what sample you would request and what diagnostic investigation might be used in this scenario? (15 marks)

b. Discuss the implication of a positive or negative result, treatment options and the advice that should be given to the patient. (50 marks)

c. How should potential contacts at the ANC be followed up? (35 marks)

3**.**

Mr J a 45 sewage worker presents at the A&E department experiencing the following symptoms - fatigue, nausea, abdominal pain, and jaundice. A blood sample is taken. The following virology results are obtained:

HAV IgM - positive
HBSAg - negative
HCV IgG - negative
EBV IgM - negative
EBV VCA IgG - positive
EBVNA IgG - positive
CMV IgM - negative
CMV IgG – positive

a. Provide an interpretation of the laboratory results given. (25 marks)

b. Using the results from part a, state the likely causative agent. What are the possible routes of transmission of the virus; why might Mr J be more at risk? (25 marks)

c. Given this diagnosis, what procedure is the laboratory required to follow? (30 marks)

d. Given the diagnosis, state the prognosis, treatment and management of this patient (20 marks)