Higher Specialist Diploma

Immunology

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 question on a new page

4. Each question is worth 25 marks

1. You have been asked to determine the uncertainty of measurement in your laboratory for immunofluorescence and immunoblot assays. Describe the errors you may encounter, how they may affect results and how you will reduce them.

2. The cumulative results below are from a patient under the care of Haematology for MGUS monitoring. The clinician has phoned the laboratory to question the latest results. What are the possible causes, how would you investigate this and what action would you take?

Date	30/03/25	26/11/24	08/08/23	07/09/21	27/02/20	25/09/17
EPS	GK	GK	GK	GK	GK	GK
Band (g/L)	Not visible	<2.4	2.5	4.0	6.1	12.8
IgA (g/L)	7.85	3.6	1.72	1.03	0.79	0.31
IgG (g/L)	11.99	9.2	N.R.*	N.R.*	N.R.*	N.R.*
IgM (g/L)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Kappa	7.2	9.1	28.8	34.0	207.9	512.6
Lambda	127.9	20.1	17.4	8.4	7.1	4.0
SFLC ratio	0.06	0.45	1.7	4.0	29.3	128.2

*N.R. = not reported

3. You have been asked to present your testing strategy for Coeliac Disease to a group of junior doctors from gastroenterology, describe the key points you need to explain in your presentation.

4. Describe the internal quality control used in your laboratory for your random access autoimmunity platform, what actions would you take when there is a QC failure?

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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 appraise the laboratory methods available for the diagnosis of connective tissue disease.

2. Critically appraise the advantages and disadvantages of in vitro and in vivo testing in the diagnosis of allergic disease.

3. Critically discuss the use of flow cytometry and its technical challenges in the immunology laboratory.

4. Critically evaluate the role of the immunology laboratory in the diagnosis of systemic lupus erythematosus (SLE).

5. Discuss the pathophysiology of autoimmune atrophic gastritis (pernicious anaemia) and the laboratory investigations involved in the diagnosis of this condition.

Higher Specialist Diploma

Immunology

Examination – September 2025

Case Studies

120 minutes

Attempt all case studies

<u>Instructions to candidates</u>

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

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

7. Begin each new case study on a new page

8. Each question is worth 100 marks

9. 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.

A 3-month-old girl is referred to a children's outpatient clinic where past medical history revealed there had been delayed cord separation and skin infection at four weeks of age requiring antibiotics. Despite two further courses of antibiotics, some skin inflammation was visible and the patient had a persistently elevated temperature. Cultures from the inflamed skin grew *Staphylococcus aureus.* The patient has no siblings.

Laboratory investigations show:

Full blood count (FBC):

	Result	**Reference range**
Haemoglobin	138 g/L	90 - 140 g/L
WBC	31 x 10^9/L	6.0 - 17.5 x 10^9/L
Neutrophils	19 x10^9 / L	1.0 – 8.5 x 10^9/L
Lymphocytes	9.5 x 10^9/L	4.0 – 13.5 x 10^9/L
Platelets	310 x 10^9/L	150 - 450 x 10^9/L

Complement C3, C4 and immunoglobulins were all normal.

Lymphocyte subsets were normal.

Screening for leucocyte adhesion deficiency (LAD) by flow cytometry was requested.

Antigen expression on neutrophils	**Result**	**Normal Result**
CD18	Absent	Present
CD11a	Absent	Present
CD11b	Reduced	Present
CD11c	Reduced	Present
CD15	Present	Present

a. Based on the clinical information provided why was LAD considered a possible diagnosis?
(20 marks)

b. What do the results from the flow cytometry screen tell us, (what is the diagnosis and why are several of the adhesion molecules affected)? (20 marks)

c. Explain why despite the increase in neutrophil count there is increased susceptibility to bacterial infections. Give an example of another neutrophil disorder that may be considered as a part of a differential diagnosis and how it would be excluded from this case. (50 marks)

d. What are the treatment options? (10 marks)

UNSEEN CASE STUDIES

2.

A 62-year-old male presented with recurring nausea, diarrhoea, shortness of breath, fatigue and muscle pain that worsen when hot. The patient has known myelodysplasia and is under the care of haematology. Laboratory investigations show:

	Result	Reference Range
Haemoglobin	77 g/L	120 - 160 g/L
Platelets	110 x10^9/L	150 - 450 x10^9/L
Eosinophils	0.62 x10^9/L	0.02 – 0.5 x10^9/L
Tryptase	155 ug/L	2 - 14 ug/L

a. What is the likely diagnosis? Give your reasons. (20 marks)

b. What further tests would be indicated? (10 marks)

c. Discuss the clinical utility in serial tryptase monitoring in this condition. (30 marks)

d. Discuss the different types of this condition. (30 marks)

e. Discuss the treatment available for this condition. (10 marks)

3.

A 38-year-old female presented with fatigue, blurred vision, increased thirst, hunger, and frequent urination. The patient is not obese and eats a balanced diet but here is a family history of type 1 diabetes with three first-degree relatives diagnosed.

Laboratory investigations show:

	Result	Reference Range
HbA1c	52 mmol/mol	20 – 41 mmol/mol
Glucose	36.5 mmol/L	3 – 6 mmol/L
GAD	72 U/mL	0 – 5 U/mL
IA2	<5 U/mL	<5 U/mL negative 5.1-29.9 U/mL equivocal >30 U/mL positive
ZNT8	11 U/mL	0-15 U/mL
Insulin antibody	Positive	
C-Peptide	39 pmol/L	258 – 1718 pmol/L

a. What is the likely diagnosis? Give your reasons.   (20 marks)

b. Discuss why autoantibody results may be negative as disease progresses.   (10 marks)

c. Discuss the challenges of diagnosis and the clinical impact of delayed diagnosis.
                                                                        (30 marks)

d. Why is it important to monitor patients for other autoimmune diseases?   (20 marks)

e. Discuss the benefits and challenges of genetic testing in first degree relatives. (20 marks)