



## **Higher Specialist Diploma**

### **Immunology**

#### **Examination - September 2022**

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.

Your laboratory has recently changed from ANA (Hep2) testing to a Connective Tissue Disease (CTD Screen). You have been asked to present at the GP forum to explain the change.

Outline the key points you need to explain in your presentation.

2.

Your reception staff have given you a batch of allergy forms where the clinician has only indicated “?allergy / specific IgE please”.

For each of the following state with reasons which specific IgE / allergen tests you would recommend: (5 marks each)

- i. A&E ?anaphylaxis
- ii. ABPA
- iii. Seasonal Rhinitis (Spring)
- iv. Anaphylaxis after eating Snickers
- v. Laboratory worker with eczema on hands

3.

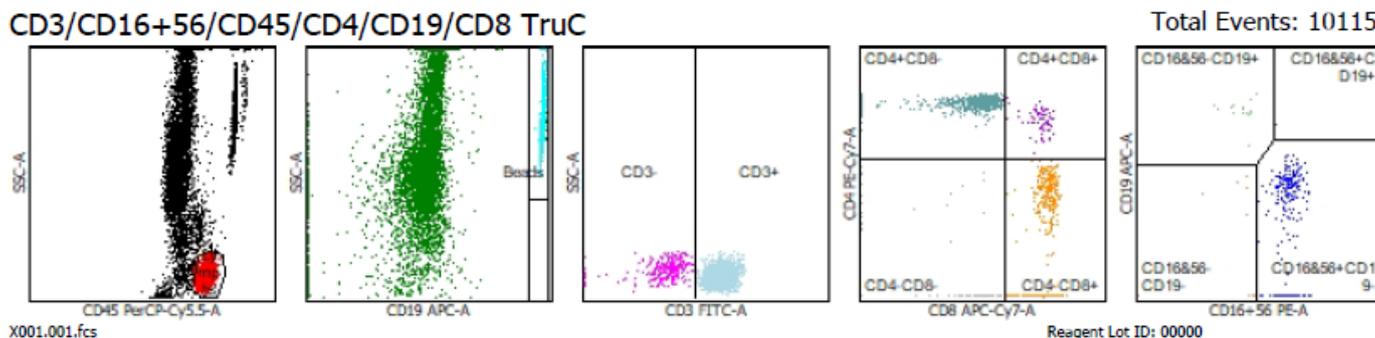
A doctor calls querying the serum free light results for a patient with a known diagnosis of IgG Kappa myeloma. The table below shows the most recent results and the previous two.

	<b>07/01/2022</b>	<b>05/02/2022</b>	<b>06/03/2022</b>	<b>Reference Range</b>
Kappa Light chains (mg/L)	86.33	90.21	150.66	3.30-19.40
Lambda Light chains (mg/L)	2.96	3.20	2.89	5.71-26.30
K/L Ratio	29.17	28.19	52.13	0.26-1.65

- a. Given the results above explain why the doctor may be concerned. (10 marks)
  
- b. Explain what the possible causes for this are and how would you investigate this further. (15 marks)

4.

Lymphocyte subsets have been performed on a patient with the clinical details 'recurrent ear infection'. The results are below:



Parameter	Percent	Value/AbsCnt
Lymph Events		2460
Bead Events		1130
CD3+	89.39	1934.34
CD3+CD8+	44.47	962.33
CD3+CD4+	38.33	829.51
CD3+CD4+CD8+	2.89	62.45
CD16+CD56+	9.55	206.72
CD19+	0	0
CD45+		2163.93
4/8 Ratio		0.86

**QC Messages**

Manual Gate is in effect.  
% T-Sum is: 6.59  
Lymphosum is: 98.94  
4/8 ratio is: 0.86

	Reference Range
CD3+	600-4500
CD3+CD8+	300-1600
CD3+CD4+	500-2400
CD3+CD4+CD8+	N/A
CD16+CD56+	100-1000
CD19+	200-2100
	N/A
4/8 Ratio	0.9-2.9

- Describe any abnormality in the results and give possible causes. (10 marks)
- Explain the internal quality control of this assay and can you be confident these results are accurate. (10 marks)
- What further tests may be appropriate? (5 marks)



**Higher Specialist Diploma**

**Immunology**

**Examination - September 2022**

**Essay Paper**

120 minutes

**Attempt 2 out of 5 questions**

Instructions to candidates

1. Record your candidate number and HSD discipline on the front sheet of the answer booklet
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3. Begin each new question on a new page
4. Each question is worth 100 marks

1. Critically appraise different approaches for the investigation of Anti Neutrophil Cytoplasmic antibodies [ANCA].
2. Discuss the role of laboratory tests in the diagnosis of specific antibody deficiency.
3. Critically appraise different approaches for the *in vitro* investigation of nut allergy.
4. Discuss the laboratory tests which you would use to investigate a patient with a suspected complement deficiency.
5. Discuss the laboratory criteria for diagnosis of multiple myeloma.



## **Higher Specialist Diploma**

### **Immunology**

#### **Examination - September 2022**

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.

9 year old boy presents unwell with fever and rash. His condition worsens and he is transferred to a children’s hospital for further investigation and management. They note splenomegaly and mild jaundice. The patient has an older brother who had non-Hodgkins lymphoma at the age of 13 and a sister who is well.

The following blood results are available:

	Result	Reference range
Haemoglobin	85 g/L	130 - 160 g/L
WBC	$2.9 \times 10^9/L$	$4.5 - 13.5 \times 10^9/L$
Neutrophils	$0.9 \times 10^9 / L$	$1.5 - 8.0 \times 10^9/L$
Platelets	$96 \times 10^9/L$	$150 - 450 \times 10^9/L$
Ferritin	>2000 $\mu\text{g/L}$	
IgG	1.6 g/L	4.9 – 16.1 g/L
IgA	0.04 g/L	0.5 – 2.40 g/L
IgM	0.4 g/L	0.5 - 2.0 g/L

No cause for the low WBC and platelets was known so a bone marrow aspirate was performed:

Hypocellular smear. Trilineage haemopoiesis is reduced but there are prominent debris-laden macrophages. Examples of active phagocytosis of red cells and of neutrophils are readily found.

- a. What syndrome may be diagnosed from this clinical picture? Give reasons for your answers. (30 marks)
  
- b. What further tests may aid in this diagnosis? (20 marks)

Virology screen was performed and returned the following results:

Epstein Barr virus (EBV) nuclear antigen (EBNA)	
IgM	POSITIVE
IgG	NEGATIVE

- c. What do these results indicate regarding the infection status of this patient? (20 marks)
  
- d. Discuss the possible underlying genetic causes for this reaction to EBV. (30 marks)

## Unseen Case Studies

2.

A 73-year-old lady presented with gradually increasing tiredness, exertional dyspnoea and ankle swelling. Two years earlier she had been found to be anaemic and had been treated with oral iron without symptomatic improvement. She had lost 5kg in weight, but denied any history of anorexia, dyspepsia or blood loss. On examination, she was very pale and had signs of congestive cardiac failure.

Laboratory investigations showed very low haemoglobin of 54g/l with a reduced white-cell count of  $3.6 \times 10^9/l$  (and a platelet count of only  $28 \times 10^9/l$ ). A blood film showed marked macrocytosis with a mean cell volume of 120fl.

Bone marrow examination revealed marked megaloblastic erythropoiesis with abundant iron stores. Serum vitamin B<sub>12</sub> was 50ng/l (NR 170-900ng/l) but serum folate, serum iron and total iron-binding capacity were normal. Antibodies to thyroid peroxidase and thyroglobulin were also found, although the patient was clinically and biochemically euthyroid.

- a. What is the likely diagnosis? Give your reasons. (30 marks)
- b. What further Immunology serological tests would be indicated? (20 marks)
- c. Discuss the relative sensitivities and specificities of the serological tests you have identified in b. (15 marks)
- d. Discuss the treatment available for this condition. (15 marks)
- e. Discuss the relevance of the current gold-standard test for this condition in the light of serological diagnosis. (20 marks)

3.

A 16 year old girl with no previous past medical history presented to her GP after returning from her holiday at the beach. She had developed a red rash on her cheeks and over the bridge of her nose. She was referred on to the Children's hospital where she was asked about any other problems she had noticed. She stated that when she woke up in the morning her finger joints and hips were stiff.

A blood sample was taken to test for anti-nuclear antibodies, this was positive to a titre of 1:1280. Enlarged lymph nodes were felt behind her ears and in her neck. She was told to avoid direct sunlight and was advised to take an anti-malarial agent (hydroxychloroquine).

- a. Interpret the results and explain the likely diagnosis? (10 marks)

- b. Which further tests would you recommend? Justify your decision. (20 marks)
- c. Explain why was she told to avoid direct exposure to sunlight? (10 marks)
- d. To assess renal function the patients' urine was tested, which was negative, explain the significance of this. (20 marks)
- e. Subsequent testing revealed a raised serum IgG level. How can this be explained? (30 marks)
- f. What would you expect to see if you looked at a biopsy of the patients swollen lymph nodes? (10 marks)