

## **WARNING**

This material has been reproduced and communicated to you by or on behalf of *Charles Darwin University* in accordance with section 113P of the *Copyright Act 1968 (Act)*.

The material in this communication may be subject to copyright under the Act.  
Any further reproduction or communication of this material by you may be the subject of copyright protection under the Act.

**Do not remove this notice**



Family Name					
Given Name/s					
Student Number					
Teaching Period	Semester 2, 2018				

<b>MLS202 – Haematology 2</b>	<b>DURATION</b>	
	Reading Time:	<b>10 minutes</b>
	Writing Time:	<b>120 minutes</b>
<b>INSTRUCTIONS TO CANDIDATES</b>		
<p>The examination has 2 sections.</p> <p>Section A:                    60 marks - Marks for each question are of equal value  Suggested Time:            60 mins  Multiple Choice Questions:    Answer ALL (60) questions.</p> <p>Section B:                    40 marks  Suggested Time:            60 mins  Short Essay Questions:        Answer ALL (9) questions</p> <p><b>Total marks for this examination: 100</b></p>		
<b>EXAM CONDITIONS</b>		
<u>You may begin writing from the commencement of the examination session.</u> The reading time indicated above is provided as a guide only.		
This is a CLOSED BOOK examination		
Any non-programmable calculator is permitted		
No handwritten notes are permitted		
No dictionaries are permitted		
<b>ADDITIONAL AUTHORISED MATERIALS</b>	<b>EXAMINATION MATERIALS TO BE SUPPLIED</b>	
No additional printed material is permitted	1 x 16 Page Book 1 x 5-Multiple Choice Answer Sheet 2 x Scrap Paper	

**THIS EXAMINATION IS PRINTED  
DOUBLE-SIDED.**

**THIS PAGE HAS BEEN INTENTIONALLY  
LEFT BLANK.**

**Section B**  
**Short Answer Questions**  
**Total No of Marks for this Section: 40**

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested time allocation for Section B: 60 mins

---

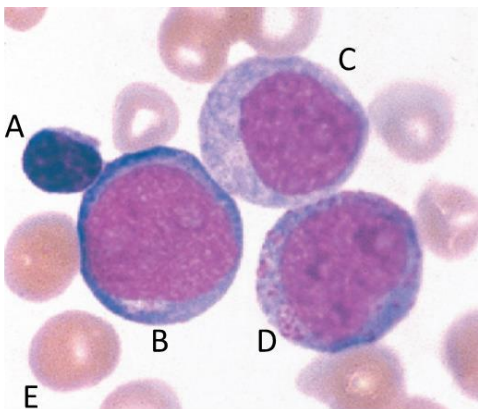
**Question 1**

Briefly describe the general principles of oncogenesis in the development of haematological neoplasms. Please include two examples for risk factors, describe what types of genes may be involved and what types of genetic changes may occur.

(Marks: 4)

**Question 2**

Label the cell types (A-E) in the following bone marrow aspirate smear (please write the answers in your Answer booklet):



(Marks: 5)

**Question 3**

List three myeloproliferative neoplasms, and for each give an example of a typical gene alteration.

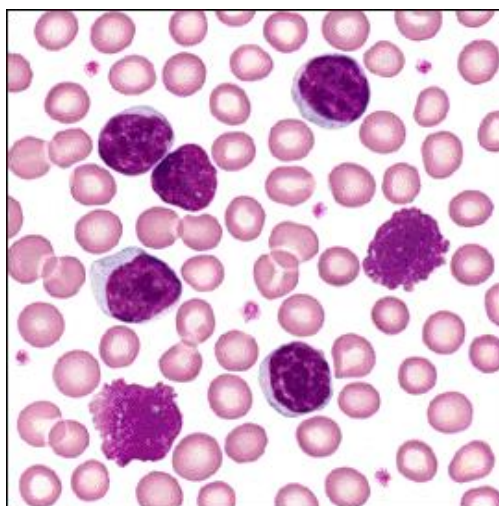
(Marks: 3)

#### Question 4

A 53-old male has recently noted fatigue and groin soreness. He is otherwise healthy and physically active. The physical exam showed adenopathy, with several (~1 cm diameter) soft nodes in supraclavicular and axillary areas, and two larger (>2 cm diameter) firm inguinal nodes. There were no other organomegaly. The rest of the exam was within normal limits. The full blood count (CBC) with microscopic differential is shown below.

CBC (with microscopic differential):

RBC	4.02	$\times 10^{12}/L$
HGB	13.6	g/dL
HCT	38.3	%
MCV	95.3	fL
MCH	33.8	pg
MCHC	35.5	g/dL
RDW	12.4	
WBC	51.3	$\times 10^9/L$
N	10	%
L	89	
M	1	
PLT	156	$\times 10^9/L$



- What morphologic alterations are seen in this blood smear field? (Marks: 3)
- What further laboratory studies, if any, are indicated? (Marks: 3)
- What is the possible diagnosis? (Marks: 1)

#### Question 5

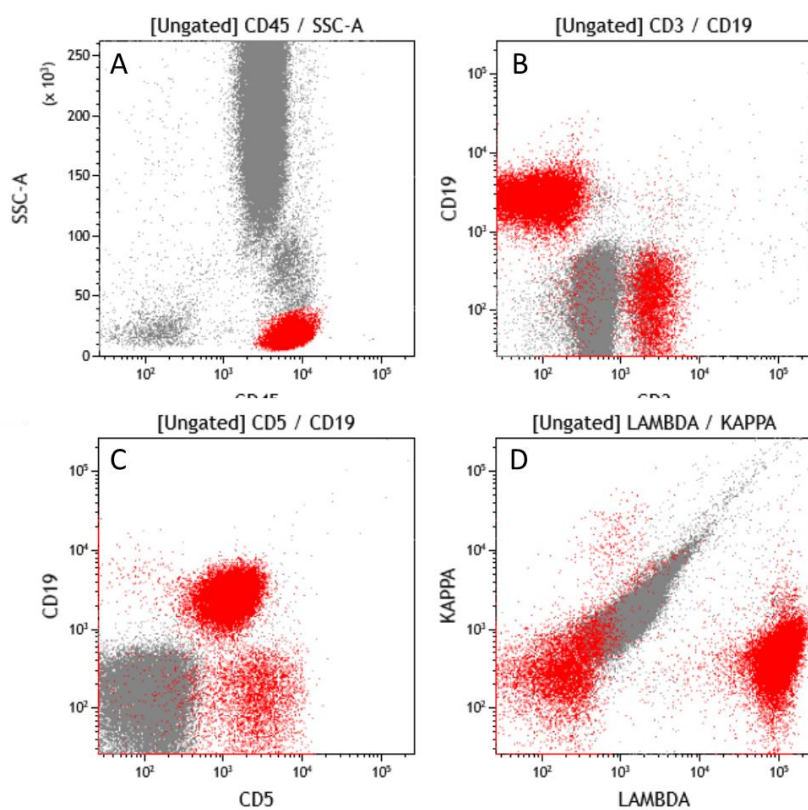
Please explain what cytogenetics is and how can it aid the diagnosis of haematological disorders?

(Marks: 2)

## Question 6

Examine the flow cytometry plots below and answer the following questions:

- a) The red cell population in dot plot A represents which cell lineage? (Marks: 1)
- b) What abnormal observations are seen in dot plots B, C and D? (Marks: 3)
- c) Based on your observations above, what is the most likely type of disorder for this patient? (Marks: 1)



### Question 7

Briefly describe the two stages of haemostasis.

(Marks: 6)

### Question 8

Please name two congenital and two acquired coagulopathies including their underlying defects.

(Marks: 4)

### Question 9

A 12-year old male has the following symptoms: visible bruising on arms and legs, bruising after sport activities, and excessive postoperative haemorrhage following tonsillectomy 3 months ago. His family history revealed that his mother suffers from heavy menstrual bleeding, and his maternal grandfather had recurrent nosebleeds and bruising.

#### Laboratory findings:

Platelet count:	350 x 10 <sup>9</sup> /L (200-450 x 10 <sup>9</sup> /L)
Bleeding time:	15 mins (3-8 min)
PT:	11 sec (10-12 sec)
APTT:	70 sec (28-37 sec)
TT:	13 sec (10-15 sec)

#### Confirmatory tests:

VWF:Rco	25% (45-140%)
VIII:C	20% (50-150%)
VWF:antigen	10% (45-185%)

a) Given these clinical manifestations and laboratory results are consistent with which diagnosis?

(Marks: 1)

b) Explain your answer.

(Marks: 3)