Higher Specialist Diploma

Transfusion Science

Examination - February 2021

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.

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 100 marks.

5. Each question is worth 100 marks.

1. Discuss the decision-making process in classifying anti-D identified in a sample from a D Negative pregnant woman as immune or prophylactic. (50 marks). What are the risks of misidentification of the source of the anti-D? (50 marks)

2. Your laboratory has purchased new automated blood grouping equipment; with regards to current guidelines discuss the steps required before you can put it into routine use. Explain how its ongoing effectiveness would be monitored.

3. Critically assess the effect of accreditation and legislation on quality in the hospital blood transfusion laboratory.

4. Identify patient cohorts requiring non-standard blood components, and why special requirements may be necessary (50 marks) and critically evaluate systems to ensure their ongoing provision (50 marks).

5. Discuss the laboratory investigation and clinical management of a female patient in her 2nd pregnancy who is found to have anti-D of 20.5 IU/ml in the plasma for the first time at 32 weeks. Discuss the management of this pregnancy from 32 weeks to term.

Higher Specialist Diploma

Transfusion Science

Examination February 2021

Paper 4 - Case studies

120 minutes

Attempt all case studies

Instructions to candidates

1. Record your candidate number, qualification title and where appropriate the discipline and examination paper number on the front sheet of the answer booklet
2. Record your candidate number and the page number in the spaces provided on the answer sheets
3. Begin each new answer on a new page
4. Each case study is worth 100 marks

Note:
Throughout this paper, unless otherwise stated, all panel cells are Lu(b+), Kp(b+) and Wr(a-).
"I" and "II" in the panel are screening cells 1 and 2.
"Pap" stands for Papain-treated red cells.
"IAT" stands for indirect antiglobulin technique using untreated red cells.
"DAT" stands for direct antiglobulin technique.

SEEN CASE STUDY

1.
A 65-year-old woman (Mrs. X) has presented with pallor and tiredness. She has a history of three live births, with no complications, and was given two units of blood four years ago for a total knee replacement. Her Hb was measured as 54gL^{-1} (normal range 135 – 175 gL^{-1}), but there was evidence of agglutination in the EDTA sample. A second EDTA sample gave identical results. Group and screen samples have been sent to your laboratory. The clinical team have requested three units of packed red cells, but have said that there is no urgency, as she is stable at present. The results of the ABO and D typing and the Rh and K typing can be seen below. All testing was carried out using column agglutination technology (CAT).

Anti-A	Anti-B	Anti-D (1)	A_1 cells	B cells	Control
4+	4+	4+	4+	4+	2+

Anti-A	Anti-B	Anti-D (2)
4+	4+	4+

Anti-C	Anti-c	Anti-E	Anti-e	Anti-K	Control
4+	4+	4+	4+	4+	2+

An antibody panel and Direct Antiglobulin Test (DAT) have also been performed. The results are shown below.

Anti-IgG	Anti-IgA	Anti-IgM	Anti-C3c	Anti-C3d	Control
2+	2+	3+	2+	4+	2+

	ABO	Rh	M	N	S	s	P1	Lu^a	K	k	Kp^a	Le^a	Le^b	Fy^a	Fy^b	Jk^a	Jk^b	Others	Enz IAT	IAT
1	**0**	**$R_1^wR_1$**	**0**	**+**	**0**	**+**	**0**	**0**	**0**	**+**	**0**	**0**	**+**	**0**	**+**	**0**	**+**		**5+**	**4+**
2	**0**	**R_1R_1**	**+**	**0**	**+**	**0**	**0**	**0**	**+**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**		**5+**	**4+**
3	**0**	**R_2R_2**	**0**	**+**	**0**	**+**	**+**	**0**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**0**	**+**		**5+**	**4+**
4	**0**	**r'r**	**+**	**0**	**+**	**0**	**0**	**0**	**0**	**+**	**0**	**0**	**+**	**+**	**0**	**+**	**0**		**5+**	**4+**
5	**0**	**r"r**	**+**	**0**	**+**	**0**	**+**	**0**	**0**	**+**	**0**	**0**	**+**	**0**	**+**	**+**	**0**		**5+**	**4+**
6	**0**	**rr**	**+**	**0**	**0**	**+**	**+**	**0**	**+**	**0**	**0**	**0**	**+**	**0**	**+**	**0**	**+**		**5+**	**4+**
7	**0**	**rr**	**0**	**+**	**0**	**+**	**+**	**0**	**+**	**+**	**0**	**+**	**0**	**+**	**0**	**0**	**+**	**Co(b+)**	**5+**	**4+**
8	**0**	**rr**	**0**	**+**	**0**	**+**	**0**	**0**	**0**	**+**	**+**	**0**	**+**	**+**	**0**	**+**	**0**		**5+**	**4+**
9	**0**	**rr**	**0**	**+**	**+**	**0**	**+**	**0**	**0**	**+**	**0**	**0**	**+**	**+**	**0**	**0**	**+**		**5+**	**4+**
10	**0**	**rr**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**0**	**+**	**+**	**0**		**5+**	**4+**
Auto																			**5+**	**4+**

a. Discuss the results provided, including the validity of your results. (20 marks)

b. What steps would you take to rectify them? (20 marks)

After the manipulation of the sample, as you have suggested in your answer to b), the DAT results are as shown below.

Anti-IgG	Anti-IgA	Anti-IgM	Anti-C3c	Anti-C3d	Control
0	0	1+	0	4+	0

c. Comment upon these results (10 marks)

d. How would you identify the antibody(s) (20 marks)

e. What blood would you select for this patient and how could you ensure compatibility/suitability? (20 marks)

f. Is transfused blood likely to remain in the patient's circulation for as long as would normally be expected and, if not, why not? (10 marks)

UNSEEN CASE STUDIES

2. A selection of anomalous ABO grouping results are shown below. Explain, ***in detail***, how you would go about investigating these and what possible explanation(s) there can be for each? Describe how you would select and provide red cells for each patient (20 marks for each example).

a. 33 year old pre op female patient

Anti-A	Anti-B	Anti-D VI-	Anti-DVI-	Control	A1 cells	B cells
4+	0	4+	4+	0	1+	4+

b. 56 year old male Haematology patient

Anti-A	Anti-B	Anti-D VI-	Anti-DVI-	Control	A1 cells	B cells
4+	4+	4+	4+	4+	4+	4+

c. 19 year old male patient

Anti-A	Anti-B	Anti-D VI-	Anti-DVI-	Control	A1 cells	B cells
0	$3+^{mf}$	2+mf	2+mf	0	4+	0

d. 82 year old male patient

Anti-A	Anti-B	Anti-D VI-	Anti-DVI-	Control	A1 cells	B cells
4+	0	0	0	0	0	0

e. Cord blood

Anti-A	Anti-B	Anti-D VI-	Anti-DVI-	Control	A1 cells	B cells
0	$2+^{mf}$	0	0	0	0	0

3.
The antibody panel sheet below is for a patient (Miss Y) who is a 30-year-old pregnant female, gestation 17/40 weeks.

Assume all panel cells are Lu(b+), Kp(b+) and Wr(a-).

Sample Name	**Miss Y**					**Requestor**		**St. Elsewhere Hospital**				**Database Ref No.**		**N/A**			**Tested by**	**C. Darwin**		
Date of Birth	**30/03/90**					**Hosp no**		**560978345**				**Sample No.**		**12344568**			**Date Tested**	**14/04/20**		
	Rh	**M**	**N**	**S**	**s**	**P1**	**Lu^a**	**K**	**k**	**Kp^a**	**Le^a**	**Le^b**	**Fy_a**	**Fy^b**	**Jk^a**	**Jk^b**	Other	**Pap**	**IAT**		
1	**$R_1^wR_1$**	**0**	**+**	**0**	**+**	**0**	**0**	**0**	**+**	**0**	**0**	**+**	**0**	**+**	**+**	**0**		**5**	**4**		
2	**R_1R_1**	**+**	**0**	**+**	**0**	**4**	**0**	**+**	**+**	**0**	**+**	**0**	**+**	**0**	**0**	**+**		**5**	**4**		
3	**R_2R_2**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**		**4**	**2**		
4	**r'r**	**+**	**0**	**+**	**0**	**0**	**0**	**0**	**+**	**0**	**0**	**+**	**+**	**0**	**+**	**0**		**5**	**4**		
5	**r''r**	**+**	**0**	**+**	**0**	**0**	**0**	**0**	**+**	**0**	**0**	**+**	**0**	**+**	**0**	**+**		**0**	**0**		
6	**rr**	**+**	**+**	**0**	**+**	**4**	**0**	**+**	**0**	**0**	**0**	**0**	**0**	**+**	**+**	**0**		**0**	**0**		
7	**rr**	**0**	**+**	**0**	**+**	**2**	**0**	**+**	**+**	**0**	**+**	**0**	**+**	**0**	**+**	**0**		**0**	**0**		
8	**rr**	**0**	**+**	**0**	**+**	**0**	**0**	**0**	**0**	**+**	**0**	**+**	**0**	**+**	**0**	**+**		**0**	**0**		
9	**rr**	**+**	**0**	**0**	**+**	**1**	**0**	**0**	**0**	**0**	**0**	**+**	**+**	**0**	**0**	**+**		**0**	**0**		
10	**rr**	**0**	**+**	**+**	**0**	**3**	**0**	**0**	**0**	**0**	**+**	**0**	**0**	**+**	**+**	**0**		**0**	**0**		
Auto	**rr**	**0**	**+**	**+**	**+**	**4**	**0**	**0**	**+**	**0**	**0**	**0**	**+**	**+**	**0**	**+**		**0**	**0**		
Antibody Titre														**Group** **AB, D negative.**				**Pheno** **C-, c+, E-, e+**			

a. Identify the antibody/ies present in the plasma of this patient and explain what would be required to prove your supposition. (20 marks)

b. What is the clinical significance of this/these antibody/ies? (10 marks)

c. How often would you retest the patient's blood during her pregnancy? (10 marks)

d. Discuss the significance of these antibody(s) with regards to the possibility of haemolytic disease of the foetus and newborn and what steps could be taken to prevent HDFN. (30 marks)

e. If the mother or newborn required blood post-delivery, discuss what components you would select and how you would ensure their suitability. (30 marks)