



Higher Specialist Diploma

Cellular Pathology

Examination – September 2021

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 pathologist asks you to rapidly process a fresh renal core biopsy from a patient with renal nephritis. Explain, with reasons, the steps you would take, the tissue processing options you would employ and the subsequent investigative staining tests you would use.

2. You have been notified that a serious error has occurred resulting in harm to a batch of histological patient sample.
 - a. Explain the value of root cause analysis approach to the investigations of such an incident. (20 marks)
 - b. Outline the processes that should follow once the outcomes of the investigation have been defined. (5 marks)

3. A colleague expects amyloid deposits are suspected in a liver core biopsy and has asked you to investigate this.
 - a. Explain the range of tinctorial and immunocytochemical tests that you can use to confirm this. (20 marks)
 - b. Describe the pathological impact of extensive amyloid deposits in the liver. (5 marks)

4. You have been asked to implement effective COVID 19 health and safety measures in your busy Cellular Pathology laboratory that help ensure the safety of your colleagues.

Explain the measures you would implement and how you would audit and monitor their success.



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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 answer on a new page
4. Each question is worth 100 marks

1. Critically discuss and appraise the value of solvent monitoring testing, including which solvents, how frequently they should be monitored, and which methods should be employed within a cellular pathology laboratory.
2. Critically review the statement 'Embedding does not require specialist cellular pathology and anatomical skills.'
3. Critically debate the applications and limitations of processing small biopsies.
4. Critically discuss the histological and cytological techniques used and pathological investigations needed in the assessment of lung tissue samples.
5. Discuss the role of the transmission electron microscope (TEM) in the modern-day cellular pathology laboratory.



Higher Specialist Diploma

Cellular Pathology

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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 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
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. A 15 year old boy presents at his GP's with tremors, muscle stiffness, anxiety and psychosis. In addition he reports of regular vomiting fits with associated abdominal pain, swelling in the legs and a striking 'yellowish' appearance to his skin associated with itching. There was also dark brown/ green rings around the cornea of boy eyes. The GP requests a full blood count plus liver and kidney function tests.

a. What would be measured in a liver function test? (10 marks)

The liver function test shows abnormal levels of key enzymes and also bilirubin. A liver core biopsy is requested.

b. Describe the reasons for doing a liver core biopsy and the histological fixation and processing of a liver core biopsy. (10 marks)

The liver core biopsy reveals evidence of steatosis and cirrhosis.

c. Describe the histopathological features of cirrhosis seen in the HE image (Figures 1 and 2 below). (15 marks)

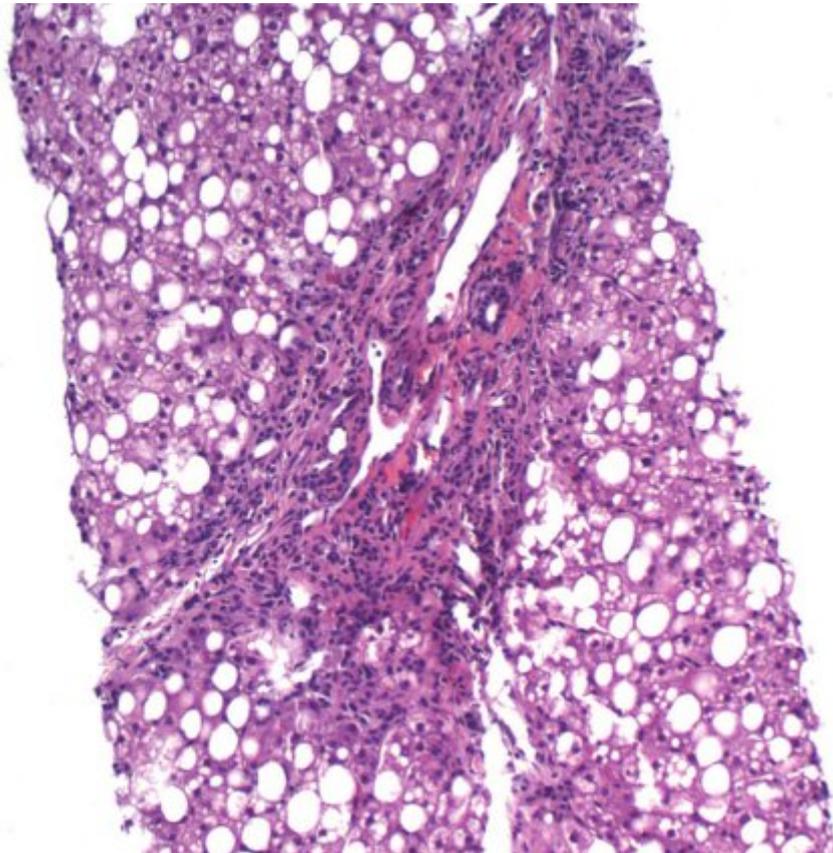


Figure 1: HE liver core biopsy x 10

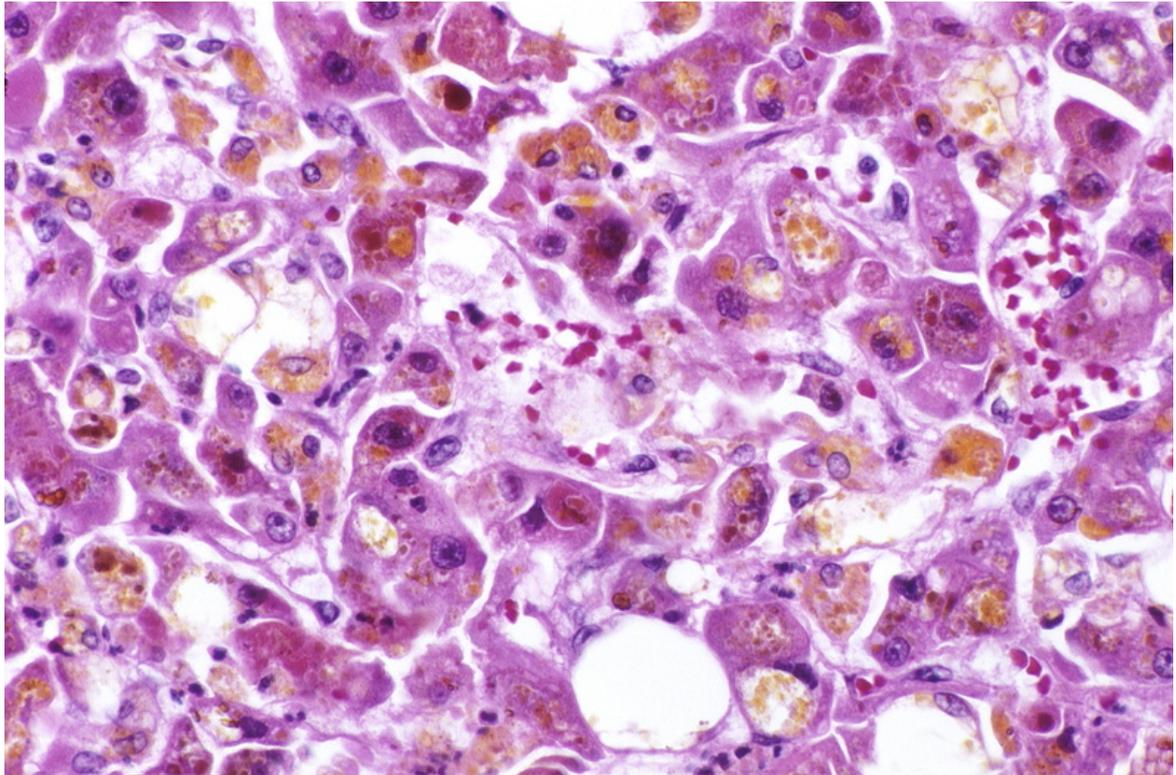


Figure 2: HE liver core biopsy x80

Special stains are requested.

- d. Describe, with reasons, the panel of special stains involved in the assessment of liver core biopsies. (15 marks)

The stains for glycogen demonstrate an increase within the nucleus of the hepatocytes. There is also extensive necrosis. Further analysis of the blood counts reveals a high level of ceruloplasmin and copper. Close inspection of the liver core biopsy revealed granular deposits of a yellow /brown /red nature within the hepatocytes.

- e. Critique the histochemical techniques that could be employed to demonstrate copper deposits within the liver core biopsy. What is the likely diagnosis of this boy's condition? (20 marks)

Despite a concerted patient management regime to lower plasma and liver copper levels. The patient continues to deteriorate. A liver transplant operation is required. A suitable transplant liver is provided.

- f. Describe the fixation and processing of the removed large cirrhotic liver. (15 marks)

The reporting pathologists requests mega cassette preparations of the cirrhotic liver.

- g. Critically discuss the benefits and drawbacks of employing Mega cassettes at cut up. (15 marks)

Unseen Case Studies

2.

A 17 year old lady presents at her GP's with mouth ulcers, diarrhoea, loose stools, flatulence chronic constipation weight loss and a skin rash with blister (bullae) formation on the arms and legs (flexor) areas. The GP requests a full blood count and also refers the patient for endoscopy investigations. In addition, a referral is also made to a dermatology clinic to investigate the nature of the extensive rash.

The endoscopy reveals villous atrophy within the small intestine, crypt hyperplasia, with increased intraepithelial lymphocytosis. Serological investigations were requested for antibody status. The skin rash was biopsied.

- a. Describe the biopsy that would be performed on the bullous area within the rash and explain what tissue samples would be sent for investigation and how. (20 marks)

Following processing, a HE preparation reveals the presence of sub epidermal blistering, with the presence of inflammatory cells.

- b. Describe the nature and type of the inflammatory cells that would be seen. (10 marks)

Immunofluorescence (IMF) was requested on the tissue sample.

- c. What type of IMF technique is used? Define the equipment used to undertake it and explain the rationale for employing it on this type of tissue sample. (20 marks)

- d. What would be the panel of IMF antibodies that would be investigated on a tissue sample of this condition? (10 marks)

The patient was found to also have a pronounced gluten sensitivity.

- e. Describe the IMF pattern that you would expect to see and the immunoglobulin anti-immune complex that would be involved. (10 marks)

- f. Explain with reasons the likely diagnosis for this patient including the skin rash condition that is associated with it. (10 marks)

- g. What pathodiagnostic test would be confirmatory for this condition? (10 marks)

- h. What other conditions and diseases are associated with this disease you have diagnosed in your answer to f. (10 marks)

3.

A 13 year old boy reports to his GP with pain and swelling in the left leg which worsens at night and is accompanied with a fever. The soft tissue area around the left knee joint area is also swollen and is tender to touch. The boy also has a slight limp and is losing weight.

The GP requests a variety of tests and investigations including an x-ray of the painful part of the bone, a chest x-ray and a full blood test. The child is then referred to a bone and soft tissue specialist centre where a bone scan, PET scan, MRI and CT scans along with a bone marrow biopsy are performed.

- a. Describe and discuss the procedures for fixation and processing of a bone marrow trephine biopsy and explain how sample quality can be best ensured. (20 marks)

Following processing and embedding in paraffin wax the BMT was then sectioned at 1 micron and a BMT staining panel was employed.

- b. Discuss and evaluate the panel of routine and special stains that would be employed in the assessment of the BMT. (20 marks)

The features seen within the BMT were regarded as advanced and aggressive cancer and involved soft tissue surrounding the main bones within the leg. The child was referred to a specialist orthopaedic surgery centre and an amputation of the left leg was performed. The removed limb with associated soft tissue was sent for histological assessment.

- c. Discuss, with reasons, the process of sample selection and dissection of a limb with bone cancer. (15 marks)

Following microscopic review of the HE stained sections from the leg amputation, small round cells, composed of sheets of small cells with high nuclear to cytoplasmic ratio were seen. The cytoplasm was scant, eosinophilic, and contained glycogen, which was detected by periodic acid Schiff stain and was also diastase degradable. The nuclei were round, with finely dispersed chromatin, and one or more tiny nucleoli.

- d. Considering this information and in light of the case history, state the likely diagnosis and your reasons for selecting this. (10 marks)

A panel of immunocytochemical antibody markers were then employed to evaluate the nature of the small round tumour cells.

- e. Discuss and debate the panel of markers that would be used to evaluate a tumour of this nature. (15 marks)

- f. Critically discuss how immunocytochemistry can be used to assist in delineating between types of 'small cell tumours'. (20 marks)