



**Higher Specialist Diploma**

**Cellular Pathology**

**Examination – September 2023**

**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





**Higher Specialist Diploma**

**Cellular Pathology**

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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
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





## **Higher Specialist Diploma**

### **Cellular Pathology**

**Examination - September 2023**

#### **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 case study 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”.

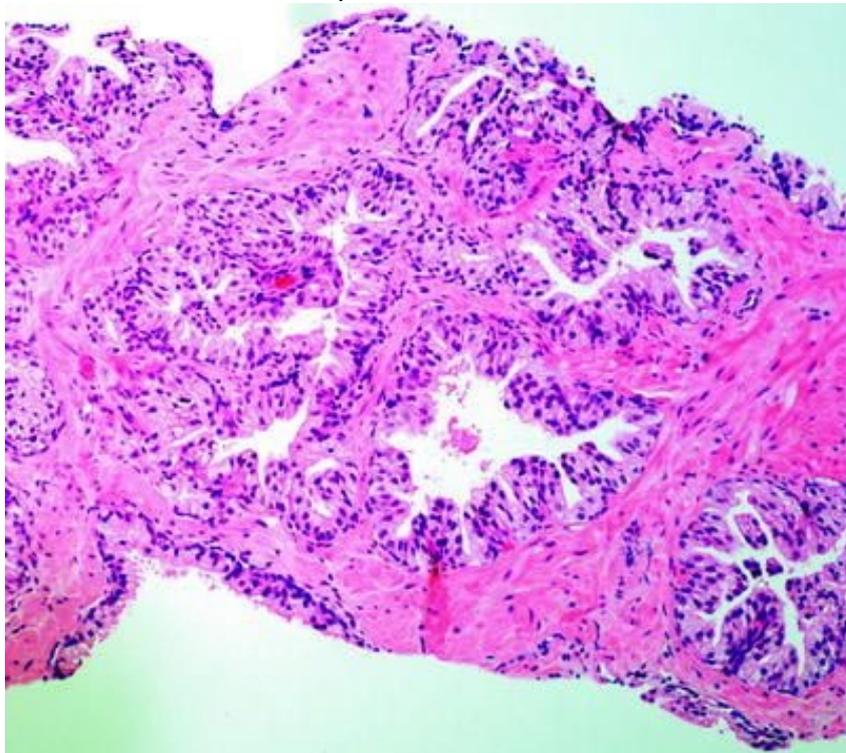
## SEEN CASE STUDY

1. A 67 year old man, with a family history of prostate cancer, presented at his local GP with a bladder flow obstruction. His GP ruled out prostate infection and then requested a PSA test. This showed a slightly raised PSA level of 5ug/ml and he was referred to the local hospital for further investigation.

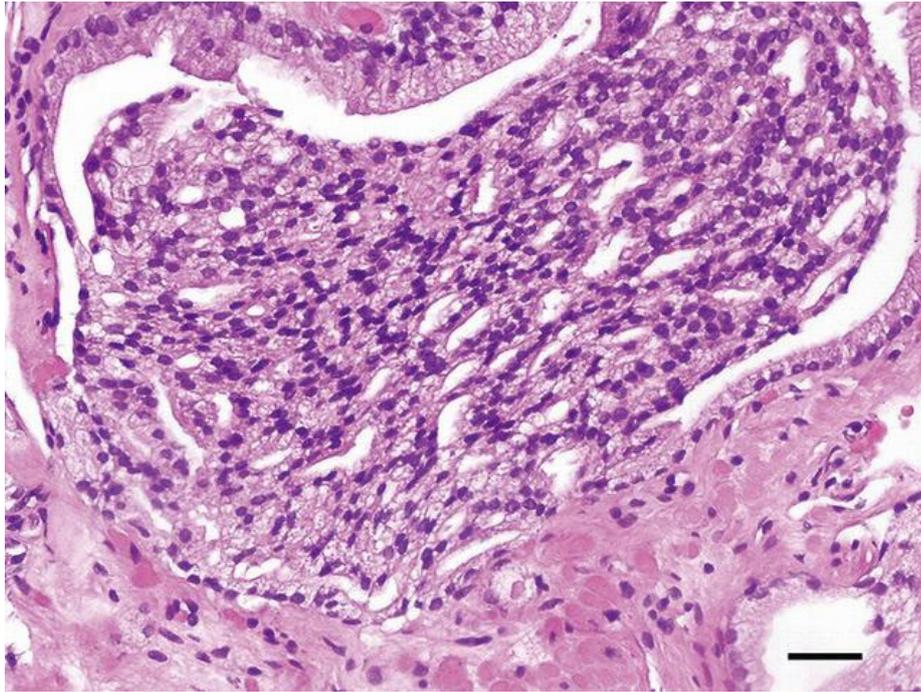
A trans rectal biopsy (6 cores) was negative. The case was reviewed at the local MDT. An MRI scan was then requested. The scan showed a possible lesion in the anterior prostate. He had a trans perineal biopsy (24 cores) plus biopsies from the anterior 'target' lesion.

- a. Explain the histological grossing, embedding and microtomy of such specimen samples. (20 marks)
- b. The samples blocks were difficult to section due to focal dense tissue. Evaluate what can be done to deal with this problem. What sections should be taken from the blocks? (20 marks)

One core only, from the target region, contained a 1mm focus of glands showing architectural atypia (infiltrative appearance), but lacked significant cytological atypia of malignancy (H&E images). This was therefore regarded as suspicious and further investigation with immunohistochemistry was needed.



**Figure 1: Normal Prostate**



**Figure 2: Prostate Adenocarcinoma**

- c. Figure 1 shows the appearance of normal prostate Figure 2 shows atypia. Compare and contrast the key features seen in the photomicrographs. (10 marks)
- d. What are the key antibodies you would employ in the evaluation of the prostate tissue samples? Justify your answer. (20 marks)
- e. Explain how the use of some of the markers stated above can help distinguish between benign and malignant changes. (15 marks)

The case was diagnosed as prostatic adenocarcinoma.

- f. Discuss the grading classification of prostate tumours. Outline the reason for defining the architectural features within this grading system. (15 marks)

### Unseen case studies

**2.**

A 62 year old man returns a faeces sample as part of routine colorectal screening.

- a. Describe the principles of the initial screening test for colorectal screening. (10 marks)

Following an initial positive test an endoscopy procedure is requested. A polyp is identified measuring 10mm in diameter.

- b. Critically describe the significance of identifying polyps within the bowel and why removal is important. (10 marks)

- c. Critically review the dissection procedure that should be followed to ensure optimal processing of the specimen to ensure the maximum clinical information is available. (10 marks)

The diagnosis of the polyp requires a colonic resection to be made.

- d. Describe the optimal way to open and fix the specimen prior to dissection. (10 marks)

On opening, a tumour is identified centrally within the specimen

- e. Critically describe the blocks that would be taken to ensure a complete diagnosis and staging. (20 marks)
- f. Fifteen lymph nodes are identified. Two nodes are suspicious for deposits of carcinoma. Critically review the use of different immunocytochemistry markers to confirm whether the nodes contain tumour. (20 marks)
- g. As part of the treatment plan, the oncologists want to investigate the patient's suitability for Erbitux. Critically review the investigation of K-ras as part of the therapeutic process. (10 marks)

18 months after the colonic resection the patient presents with blood in his urine. On cystoscopy a lesion is identified

- h. Critically review the role of immunocytochemistry in evaluating this lesion and discuss how the previous medical history might affect the markers selected. (10 marks)

### 3.

A 62 year old Caucasian woman reported to her GP with a firm hard lump in her left breast. On closer examination multiple other smaller lumps were palpable and in close proximity to the first larger lump. In addition swelling in her left arm pit was apparent and the lady complained of joint and bone pain in the left arm. The GP referred the lady for a mammogram and requested a fine needle biopsy (FNA) of the breast lumps detected.

The mammogram Breast Imaging Report and Data system (BI-RADS) graded the breast lumps as category 5 (from a scale of 1 to 6, with a score of 6 being severe). This result indicated a likely hood of cancer (95%) and strongly recommending a FNA and lumpectomy. The patient then had a subsequent mastectomy of the left breast.

- a. Describe the procedure for FNA analysis. (10 marks)

The FNA confirmed a high-grade breast carcinoma.

- b. Critically describe the procedures for grossing a cancerous mastectomy. (15 marks)

There were five tumour nodules found within the left breast following grossing. These all revealed invasive breast disease.

- c. Critically assess the investigative **diagnostic** immunocytochemical tests that would be helpful for diagnosis. (15 marks)

The patient was then elected for a sentinel lymph node biopsy (SLNB) assessment.

- d. Discuss and evaluate what a sentinel lymph node is and the general approach adopted to assess SLNB for breast cancer in a routine cellular pathology laboratory (your answer should include details on sectioning and routine staining and immunocytochemical assessments). (15 marks)
- e. Critically assess the One Step Nucleic Acid (ONSA) molecular based technique that can sometimes be used in the assessment of SLNB for breast cancer cases. (15 marks)
- f. Critically discuss predictive markers that can be employed to evaluate this case. What are the significant indicators of such assays? (15 marks)
- g. Critically assesses the methodology of the strategies of the common targeted therapy regimens employed within the field of breast carcinoma. (15 marks)