

**MVST IB Biology of Disease
PATHOLOGY PRACTICAL EXAMINATION
9:00 – 11:00 hrs**

Answer all four questions.

*Please answer questions 1, 4a and 4b in separate Answer Books writing your
Candidate Number and letter on the front cover.*

Questions 2 and 3 should be answered on the single answer sheets provided.

***THIS QUESTION PAPER BOOKLET MUST NOT BE TAKEN FROM THE
EXAMINATION ROOM***

Question 1 (30%)

The photograph (V) shows a blood agar that had been inoculated with a swab taken from an infected wound in a hospital patient following a surgical operation to pin a broken femur. The plate had been incubated aerobically.

The photograph also shows the Gram staining results for the three different organisms, present on the plate.

Examine the photograph:

- (a) Suggest the probable identity of each of the different organisms, and briefly provide an explanation of how you have arrived at these suggestions.
- (b) What simple tests could be carried out in order to verify your suggestions? Briefly describe the basis of each test.

(In this example, the plate has been inoculated with *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Enterococcus faecalis*).

questions may continue on to next page.....

Question 2 (20%)

For each of **three** cases, 2A, 2B, and 2C [note for the purposes of this example only two questions have been set, 2A and 2B], answer the following five questions.

Give your answer by marking the letter of the description against the question on the machine-markable form. **CHOOSE ONLY ONE LETTER.** In this practical exam, incorrect answers will NOT be penalised.

* NB, the lists of possible answers A-T, i.e. structures, diagnoses, etc. will be the same for all four slides, but will not be exactly the same as the list shown here *

(i). For the enlarged image D, identify the structure in the image

- A. adenocarcinoma
- B. adipose tissue
- C. atherosclerotic plaque
- D. adenoma
- E. blood vessel
- F. bronchus
- G. germinal centre
- H. glandular tissue
- I. granulation tissue
- J. granuloma
- K. infarcted lung
- L. infarcted muscle
- M. live muscle
- N. neutrophil-rich exudate
- O. normal columnar epithelium
- P. normal squamous epithelium
- Q. leiomyoma
- R. squamous carcinoma
- S. thrombus in vessel
- T. mural thrombus

(ii). Similarly, for the enlarged image E, identify the structure in the image, using the same list as in (i)

(iii). Which ONE of the descriptions in the table below BEST describes the predominant pathological process in the slide?

- A. Acute inflammation
- B. Repair, i.e. formation of granulation tissue
- C. Granuloma formation
- D. Atheroma (atherosclerosis)
- E. Thrombosis Infarction
- F. Infarction
- G. Benign neoplasia
- H. Malignant primary neoplasia
- I. chronic inflammation
- J. metastasis

(iv). Which ONE of the following diagnoses best fits the case

- A. bronchopneumonia
- B. lobar pneumonia
- C. metastasis from an adenocarcinoma
- D. metastasis from a squamous carcinoma

questions may continue on to next page.....

- E. metastasis from an adenoma
- F. primary adenocarcinoma
- G. primary squamous carcinoma
- H. adenoma
- I. leiomyoma
- J. leiomyosarcoma
- K. lipoma
- L. myocardial infarction, recent
- M. myocardial infarction with repair
- N. myocardial infarction with mural thrombus
- O. thrombo-embolism
- P. thrombosis
- Q. tuberculosis
- R. parasite infection
- S. squamous metaplasia
- T. leukaemia

(v). Which ONE of the following important pathologies would the patient now be at high risk of (assuming they are still alive), or likely to have already

- A. major haemorrhage
- B. metastasis to other sites
- C. immune suppression
- D. pulmonary embolism
- E. thrombo-embolism to brain, kidneys or mesentery
- F. myocardial infarction
- G. tuberculosis
- H. septicaemic shock

end of question 2

questions may continue on to next page.....

Question 3. (20%)

Give your answers by marking **ONE** letter of the description against the question on the machine-markable form. In this practical exam, incorrect answers will NOT be penalised.

A 42-year old tyre fitter went to his doctor because he had fainted on two recent occasions at work. He admitted to feeling under the weather for some months and was readily made breathless by exercise. The doctor noted he was pale and had a heart rate at rest of 105. She took a blood sample for haematological examination, and when it was reported as showing a haemoglobin of 8Ag/dl (normal reference range 12-15g/dl) and microcytic (small) hypochromic (weakly staining) erythrocytes, she prescribed a course of iron tablets. Over the next few months his symptoms improved slowly, but he reappeared in the surgery a year later complaining of cramp-like lower abdominal pains and a conspicuous change in bowel habit, with alternating constipation and diarrhoea. In the hospital admission that was immediately arranged, he underwent an operation in which a segment of the sigmoid colon and rectum was removed. The appearances, on opening along its length, are shown in **picture 3A**. Several lymph nodes were recovered from the paracolic tissues, one of them with the histology shown in **picture 3B**. He seemed to be doing well after the operation, apart from some discomfort in his right leg, which (in addition to his abdominal wound) made it painful to move around the ward. On the fifth postoperative day he was discovered, acutely breathless, cyanosed (i.e. bluish-coloured) and collapsed on the floor in the toilet. Attempts to resuscitate him were unsuccessful and he died within a few minutes. At autopsy there were significant findings in the lung and liver, a slice of liver is shown in **picture 3C**.

Questions (N.B. for all questions only mark only ONE answer)

3(i) Identify the significant feature in Picture A from the following list

- A. leiomyosarcoma
- B. adenoma
- C. adenocarcinoma
- D. bronchus
- E. granuloma
- F. infarct
- G. mural thrombus
- H. exudate
- I. squamous carcmoma
- J. thrombo-embolism
- K. haemorrhage
- L. rupture of gut wall

3(ii) Identify the significant feature in Picture B, from the following list

- A. metastatic leiomyosarcoma
- B. metastatic adenoma
- C. metastatic adenocarcinoma
- D. in situ adenocarcinoma
- E. granuloma
- F. infarct
- G. reactive hyperplasia
- H. abscess
- I. metastatic squamous carcinoma
- J. thrombo-embolism
- K. haemorrhage
- L. biliary hypertrophy

3(iii) Similarly, for Picture C, identify the significant feature, using the same list as in (ii)

3(iv) Which of the following is the most likely cause of the man's sudden death, based on the available information?

- A. ruptured bowel at site of operation
- B. ruptured bowel distal to site of operation
- C. haemorrhage from liver
- D. haemorrhage from bowel
- E. haemoglobin level dropping below 4g/dl
- F. ruptured aortic aneurysm
- G. Myocardial infarction with dysrhythmia
- H. brain metastases
- I. pulmonary embolism
- J. pneumonia secondary to pulmonary metastases
- K. embolism to brain

3 (v) How would this be confirmed by autopsy findings?

- A. blood in peritoneal cavity
- B. blockage of bile ducts
- C. mural thrombus in left ventricle
- D. patchy pus in lung
- E. large thrombo-embolus in lung arteries
- F. large thrombo-embolus in leg arteries
- G. thrombo-embolus in leg veins
- H. metastatic tumour deposits

3(vi) What features in the history place this patient at particular risk of such events?

- A. patient's age
- B. immobility post-operatively
- C. condition of the liver
- D. condition of the bowel
- E. anaemia
- F. aortic aneurysm
- G. hypersensitivity to bowel organisms
- H. overweight
- I. pneumoma
- J. metastatic spread

3(vii) What was the likely cause of the original low haemoglobin level

- A. patient's age
- B. post-operative blood loss
- C. condition of the liver
- D. blood loss from the bowel
- E. aortic aneurysm
- F. Crohn's disease
- G. heart failure
- H. lack of dietary iron
- I. pernicious anaemia

3(viii) In retrospect, there were serious errors of omission in the management of this case. In the light of your knowledge of the pathology involved, which of the following should have been done before hospital admission?

- A. vitamin B supplement prescribed
- B. aortic aneurysm repaired
- C. anaemia investigated
- D. blood transfusion

questions may continue on to next page

- E. electro-cardiogram (ECG)
- F. antibiotic treatment
- G. family history investigated
- H. prophylactic colon removal
- I. respiratory function test

3(ix) That this happened to a man of age 42 years suggests he might have had:

- A. the hereditary predisposition to colon cancer Familial Adenomatous Polyposis
- B. diet lacking in iron and/or vitamin B12
- C. the hereditary predisposition to colon cancer Hereditary Non- Polyposis Colorectal Cancer (Lynch Syndrome)
- D. a congenital malformation of the aorta
- E. chronic bacterial infection
- F. malignant melanoma
- G. an aortic aneurysm
- H. human papillomavirus infection
- I. mural thrombus
- J. atherosclerosis of coronary arteries

3(x) Subsequent molecular analysis of the abnormality shown in picture A is likely to show:

- A. Factor VIII mutation
- B. APC overexpression
- C. KRAS deletion
- D. PIK3CA deletion
- E. HPV 16 positivity
- F. APC mutation
- G. MSH2 overexpression
- H. BRCA1 mutation

end of Question 3

questions may continue on to next page.....

Question 4a (15%)

The photographs show complement fixation tests of sera taken from two women. **A** shows the test on serum from a woman who 5 years ago recovered from glandular fever (Epstein Barr Virus infection). **B** shows the results from serum from a woman whose symptoms are weight loss and tiredness. In both **A and B** the sera were diluted 1:10 and titrated by doubling dilutions against a standard dose of Epstein Barr Virus antigen.

- (a) Describes briefly the principle of the complement fixation test. How is it performed?
- (b) Tubes 7-9 are controls. What controls do you think are necessary?
- (c) What conclusions do you draw from the test?
- (d) In what circumstances might the test have given invalid results?

Question 4b (15%)

A question based upon the virology practical classes.

Figure for Question 2A.

Slide 71.663 Lymph node. Image A, about 10 times life size. B, enlarged to 20X, centred as shown by the dotted lines; C, E enlarged 80X; and D enlarged 160X from life.

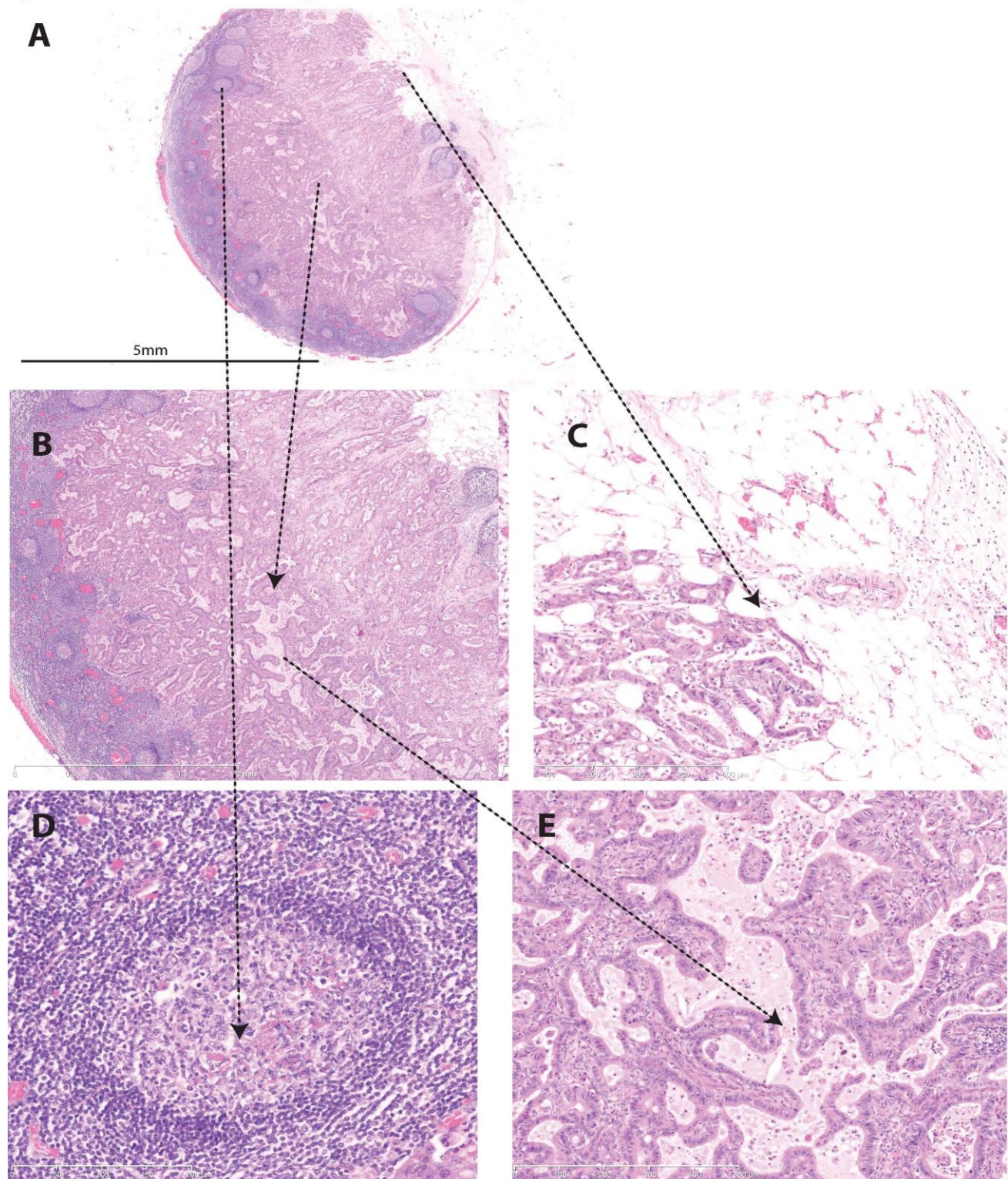
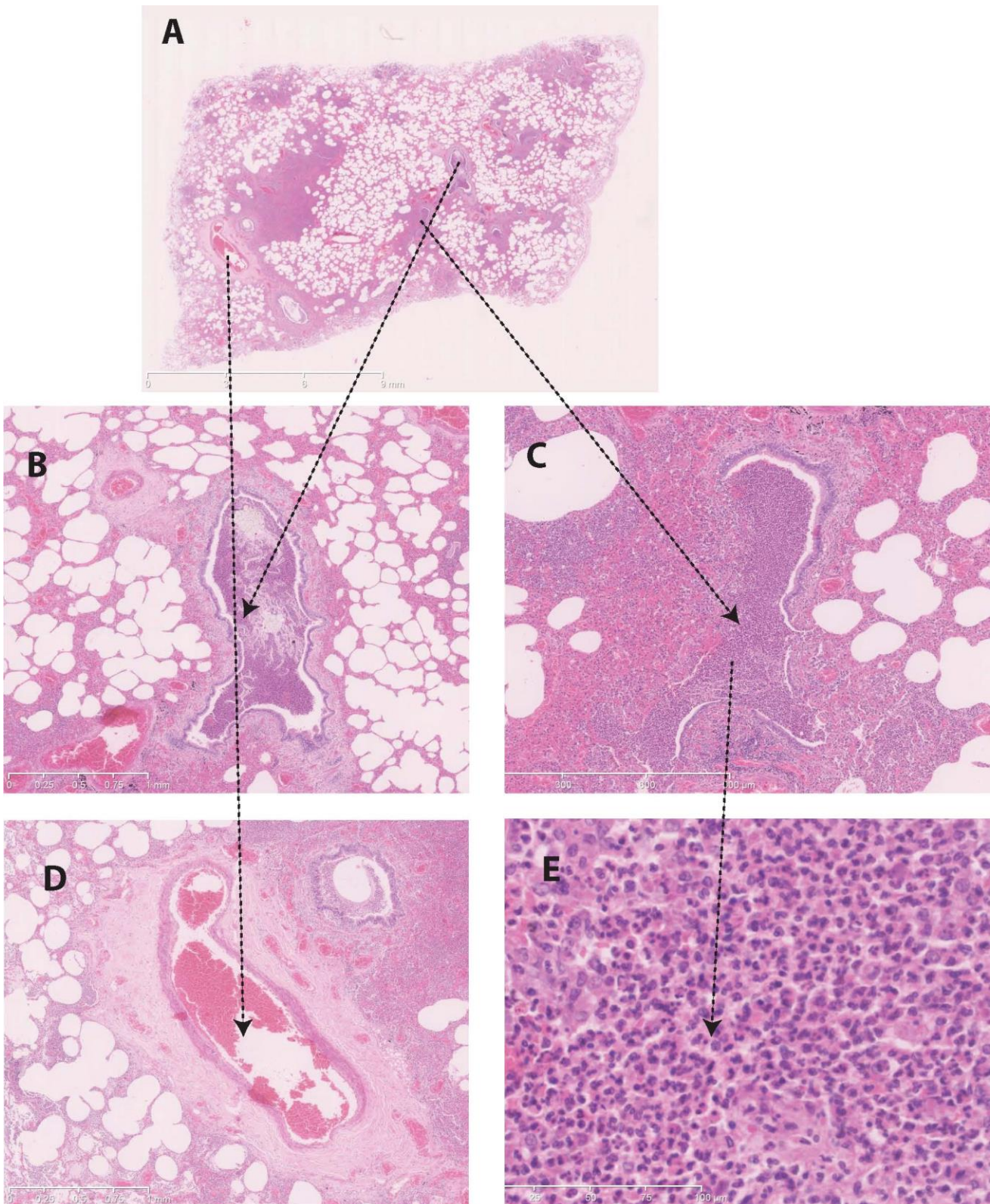


Figure for Question 2B.

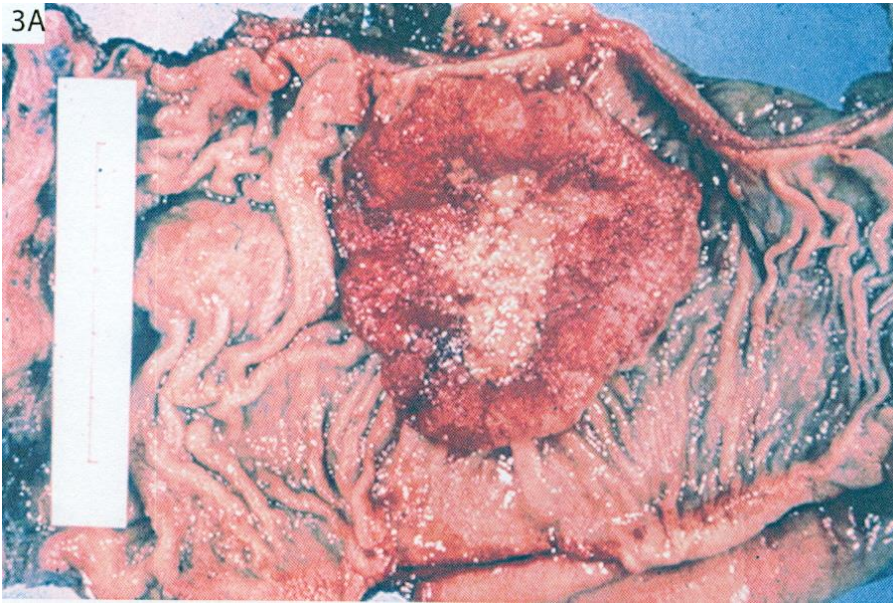
Lung. Image A, about 4.5 times life size. B, C, D enlarged respectively 25X, 50X and 25X, centred as shown by the dotted lines. E, enlargement from C a further 8 times to about X400.



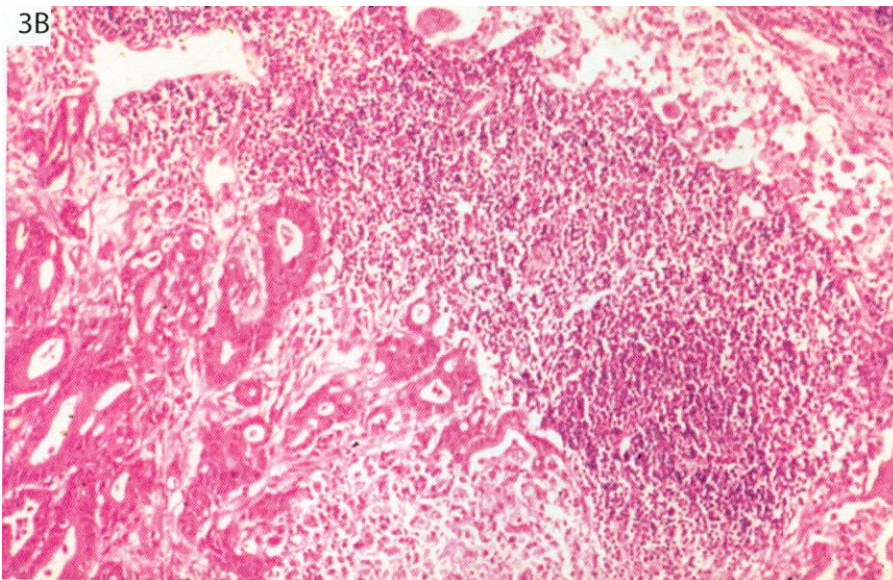
Images for Question 3

[revision PSE in Mock MCQ Exam format]

3A



3B



3C



MVST BOD
Practical Examination
Questions 2 & 3

Date

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First read the instructions in the Question Booklet.

Fill in the date.

Fill in your candidate number, as shown in the example.

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Mark your answer using a soft pencil.

The circles must be completely filled in as shown.

If you make a mistake, erase thoroughly the wrong answer and try again.

Choose only one option to answer each question.

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MVST BOD Practical Examination
Question 3

Q3

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