QUESTION 1 10 marks

Discuss the 5 main components that that are involved in haemostasis, clearly indicating the role they play in bleeding and coagulation.

QUESTION 2 10 marks

A 45-year-old male experienced a gradual weight loss for months, along with weakness, anorexia and easy fatiguability. On physical examination, there was marked splenomegaly. A full blood count showed Hb 12.9g/dL (13 – 17g/dL), haematocrit 0.38 (0.35 – 0.52), MCV 92fL (84 – 99fL), platelets $410x10^9$/L (150 – 450) and WBC count of $168x10^9$/L (4 – 10). Peripheral smear showed marked leukocytosis with left shifted granulocytes showing mostly myelocytes, metamyelocytes, band cells and segmented neutrophils. No blasts were seen.

a. Based on these findings, what is your provisional diagnosis?
b. What test would you do to confirm the diagnosis?
c. What is the underlying cause of the condition you have diagnosed?
d. What phase of the disease is the patient in?
e. How would you monitor for minimal residual disease in this particular patient?

QUESTION 3 10 marks

A 64-year-old male presents with inguinal, axillary and cervical lymphadenopathy. The nodes are firm and non-tender. A biopsy of a cervical node shows a histologic pattern of nodular aggregates of small cleaved lymphoid cells and larger cells with open nuclear chromatin, several nucleoli, and moderate amounts of cytoplasm. A bone marrow biopsy reveals lymphoid aggregates of similar cells.

a. What type of neoplasm does this man have?
b. Based on the morphologic findings, what further tests would you request to confirm the diagnosis?
c. Give two (2) tests you would perform as part of clinical staging for this disease.
d. According to the Ann Arbor staging system, what stage of disease is this?
e. Give two (2) subtypes of this condition.

QUESTION 4 20 marks

A 60 year old man presented with shortness of breath, which had developed gradually over several years. He had been a heavy smoker since age 20. On examination he was short of breath at rest and centrally cyanosed. He had a barrel-shaped chest and a marked expiratory wheeze.

- **CXR showed hyperinflation and other signs consistent with emphysema.**
- **Arterial blood gases : pH -7.2 (7.35-7.45), pO2 - 8.0 kPa (11-13 kPa), pCO2 - 9.0 kPa (4.7-6 kPa), SBC- 36 mmol/l (22-26mmol/l)**

a) Which type of emphysema is commonly associated with smoking? (2marks)

b) Briefly describe how smoking can lead to emphysema development. (6marks)

c) Based on the biochemical data, what acid-base imbalance has the patient developed. (2marks)

d) How do the biochemical results **of this patient** differ from those in a patient with an acute asthma attack? (4marks)

e) Describe what would happen if this patient were given oxygen to breathe by face mask.(4marks)

f) What complication of emphysema has this patient most likely developed? (2marks)

QUESTION 5 **20 marks**

You are the new doctor in town and on your first call day a 55-year old woman presents to the emergency room. On examination, you note that she has a low Glasgow coma scale (GCS) – 8/15 and a thread pulse. She appears jaundiced, multiple spider naevi are present on her trunk and she has massive ascites. Her JVP is raised and auscultation reveals 3rd and 4th heart sounds (aka a gallop rhythm).

Her husband tells you that she has been a heavy drinker with poor dietary habits and she had previously had "liver trouble". She had begun to vomit blood the previous day.

Blood was taken for emergency investigations which showed the following results:

Renal function tests:

- Na+ 129mmol/l (135-145), K+ 4.5mmol/l (3.5-5.0), urea 7.1mmol/l (1.7-6.7),creatinine 120µmol/l (50-100), glucose 1.5mmol/l (3.9-5.6), Ammonia 240µmol/l (<40)

Acid-base: pH 7.54, pCO2 6.5kPa (4.7-6), SBC 35mmol/l (22-26)

Liver function tests (LFTs):

- Total protein 80g/l (60-80), Albumin 20g/l (35-50), Total bilirubin 345 µmol/l (<17), Conj. bilirubin 290 µmol/l(<4), ALT 60U/l (1-41), Alk.Phos 445U/l (39-117), GGT 190U/l (7-49)

a. Give three (3) likely causes of the patients low GCS. (6marks)
b. What acid-base disturbance has this patient developed? And what is the most likely cause? (4marks)
c. What is the most likely explanation (s) for why the total protein remains normal despite the low levels of albumin? (4marks)
d. What life-threatening complication may arise in this patient because of her ascites? (2marks)
e. What underlying cardiac pathology might have developed in this patient? (2marks)

f. What x-ray finding would support your answer in 'e'? (2marks)

QUESTION 6 20 marks

A 40-year old woman presents to the hospital with a swelling in the anterior part of the neck around Adam's apple. When she is asked to swallow saliva, the mass also moves. Her Dr tells her that she has a goitre. The Dr further states that this patient's nodule is a cold nodule and hence surgery will be necessary. A pathologist makes a diagnosis of papillary thyroid carcinoma.

a. What is a goitre?
b. What is a cold nodule?
c. What special tests would you conduct to diagnose Medullary Thyroid Carcinoma? Also state what you expect to see.
d. Contrast Hashimoto's thyroiditis from Grave's Disease.
e. Why does a goitre develop in a patient with iodine deficiency?
f. List two important histologic features of Papillary Thyroid Carcinoma.

QUESTION 7 10 marks

James was a young (40 years old) and energetic athlete who played soccer for one of the big football clubs in Europe. He suddenly collapsed and died while on the soccer pitch two days before. An autopsy was conducted. The only significant finding was that he had an enlarged heart (approximately 490g). The left ventricular free wall was normal but the interventricular septum was enlarged. There were no muscular or valvular defects. Note that before his death, James was reported to have been very healthy. He did not have a history of suffering from hypertension.

a. What is your diagnosis in light of the history and the post-mortem findings (provide a complete diagnosis)? (2 marks)
b. What are the histological findings of this condition? (3 marks)
c. Which part of the heart would be affected if he was older and had a long history of hypertension? (2 marks)
d. Describe the pathogenesis of hypertensive heart disease. (3 marks)

QUESTION 8 10 marks

Elizabeth is a beautiful young lady from Chawama east. She presented to the clinic with complaints of a vaginal discharge for 5 days. You conduct a vaginal swab to rule out an infection.

a. What are the two possible causes of her infection? (2 marks)
b. Her doctor decides to screen her for cervical cancer. What is the cause of cervical cancer? (2 marks)
c. What is the pathogenesis of cervical cancer in light of your response in part b above? (4 marks)
d. What are the possible risk factors for cervical cancer that this young lady may have? (mention 4). (2 marks)

QUESTION 9 25 marks

A 21 year old lady presented at UTH Women and new born hospital complaining of an absence of monthly menstrual periods, a headache, and loss of peripheral vision. During you examination, you notice that she has a nipple discharge bilaterally.

a. What is the most likely diagnosis? (5 marks)

b. Why does the patient have the stated visual disturbance? (10 marks)

c. Explain the absence of menstrual periods in this lady. (5 marks)

d. What diagnostic tests would you order? (5 marks)

QUESTION 10 15 marks

A 70 year old man presents at UTH with a tremor in the hands, rigidity and a shuffling gait. You also notice reduced facial expression and slowness of movement (bradykinesis). A relative confirms elements of amnesia and dementia.

a. What is the most likely diagnosis? (2 marks)

b. Which part of the brain is affected? (3 marks)

c. What change is seen in this part of the brain and why? (5 marks)

d. What inclusions do we see in the cells of this part of the brain histologically in this disease? (2 marks)

e. What protein is in these inclusions? (3 marks)

Good luck

Quest
(ii) Platelets
(ii) Coagulation factors aggregation.
(iii) Coagulation inhibitors
(iv) Fibrinolytic factors
⇒ forming Meshwork over clot
(v) Blood vessels
⇒ Constriction of B.V to prevent more blood to travel to wound.

QUESTION 4.

a) Centriacinar Emphysema

b) Pathogenesis:

- Inflammatory Mediators + leukocytes
  these mediators break down / damage areolar ground substance
- Protease & Anti protease imbalance.
  - Released by inflammatory cells cause break down of connective tissues

- Oxidative stress
  Smoke irritants

- Infection : also does not just exacerbates inflammation.

SMOKING

⇒ Tobacco induces inflamation by causing accumulation of neutrophils, Macrophages & lymphocytes.
- these cells all release inflammatory mediators such as cytokine IL-8 Elastases & Oxidants
- Mediators cause de-epithelial damage injury & proteolysis of extracellular Matrix
- Wastes further ↑ inflammation.

(c) Respiratory Alkalosis with partial metabolic compensation.

(d)

(e) Oxygen would cause the Respiratory centres to depress the RR of patient as it responds to O_2 levels in blood mostly thus the depressed RR would cause further excerbation of Acidotic state.

(e) Hypoxaemia (Cor Pulmonale)

Question 4.

a) Chronic Myeloid Leukemia.

b) Cytophenotype to identify BCR-ABL1 and Philadelphia Chromosom t(9,22)

Uncontrolled Proliferation of Myeloid progenitor cells resulting in immature cells Blast Myelocytic release into Blood.

c) Acute Phase

e) Conventional follow-ups to test for BCR-ABL1 mutations in cells:

Karyotyping, Bone Marrow

PCR analysis of for BCR-ABL/L