



PROGRAM : PODIATRY

SUBJECT : **PATHOLOGY AND MEDICINE**

CODE : **HPMB211**

DATE : SUMMER EXAMINATION SUPPLEMENTARY
ASSESSMENT – DECEMBER 2016

DURATION : 8:30-11:30

WEIGHT : 50 : 50

TOTAL MARKS : 200

EXAMINER : DR M CAMINSKY

MODERATOR : DR L CHELLA PRONK

NUMBER OF PAGES : 16 PAGES

INSTRUCTIONS : QUESTION PAPERS MUST BE HANDED IN.

REQUIREMENTS : 8-PAGE ANSWER BOOKLET

INSTRUCTIONS TO CANDIDATES:

PLEASE ANSWER ALL THE QUESTIONS.

TABLES MUST BE COMPLETED ON THE ANSWER SHEET.

MULTIPLE CHOICE MUST BE DONE IN THE TABLE ON THE LAST
PAGE OF THE PAPER.

QUESTION 1:

Mr X, a 68-year old man who works as a long-distance truck driver, presents with fatigue and breathlessness. He can barely speak as he is so out of breath. He says that he has always had a “bad chest” – he has a daily cough with the production of large amounts of green sputum. He also gets breathless on exertion. Over that past 3 days, his chest has become so bad that he can hardly walk from breathlessness.

He has smoked 30 cigarettes per day for 40 years. As he is usually on the road, he lives on “coffee, Coca Cola, pies and Kentucky Fried Chicken”. He also occasionally develops a squeezing chest pain on exertion or when he gets very upset about something – the pain goes away when he sits down for a few minutes. He was recently given a course of antibiotics, but he is not taking any other medication. He has no significant family history of disease.

On examination, he has central cyanosis and a fever. He weighs 120 kg, and carries a lot of his weight in his abdomen. His jugular venous pressure (JVP) is elevated, he has pitting oedema on his ankles and mild hepatomegaly. The ankle oedema is much worse on the left leg, and on palpation, he says that the mid-calf region of the left leg is tender. Examination of his chest shows a right parasternal heave (indicating right ventricular hypertrophy) and coarse expiratory crackles at the base of the left lung. [24]

You do a few blood tests and the results are as follows:

- FBC – elevated red blood cell (RBC) count
 - Lipogram – elevated total cholesterol, triglycerides and LDL, and a decreased HDL
 - CRP – elevated
- a. What is your most likely diagnosis for his breathlessness and the rest of his respiratory symptoms? (1)
 - b. What is happening in his bronchi that will cause this presentation? (3)
 - c. Why would he have an elevated JVP, pitting oedema, hepatomegaly and right ventricular hypertrophy? Please explain the processes that are taking place to cause these symptoms. (5)
 - d. The tenderness in his calf leads you to suspect a DVT. What special investigation can you send him for to determine if he has a DVT? (1)
 - e. Which 3 factors **in his case** could predispose him to developing a DVT? Based on your knowledge of Virchow’s triad, please explain briefly how these factors contribute to this condition. (6)
 - f. What is the most likely diagnosis for his transient and intermittent chest pain? (1)
 - g. If you asked him more questions about his chest pain, what signs and symptoms would help you to confirm this diagnosis? Please be specific when describing the characteristics of his pain. (4)
 - h. What is the medical term for his elevated RBC count (1)? Why is this happening to him (2)? (3)

QUESTION 2:

A 54-year old man presents with sudden onset of decreased strength in his left hand, loss of sensation on the left side of his face, and slightly slurred speech. You have been treating him for many years to support the allopathic treatment of his hypertension, elevated cholesterol and diabetes. Despite having had a myocardial infarction 2 months ago, he still smokes between 10-20 cigarettes daily. [3]

- a. Please list 2 differential diagnoses for his presentation. (2)
- b. What is the main clinical difference between these two conditions? (1)

QUESTION 3:

A 17-year old boy is brought to the hospital emergency room in a coma. According to his mother, he has been losing weight for the last few months, despite eating large amounts of food. He has also been extremely thirsty, and often wakes his brother at night when he goes to pass urine. His blood results show a normal peripheral blood smear, and no signs of an infection, but a blood glucose level of 27 mmol / L and a HbA_{1c} of 9% (normal is 4-6%). Physical examination is not significant, except for tachycardia and tachypnoea, with a slightly fruity odour to his breath. [13]

- a. How would you diagnose a patient as being diabetic – starting with a screening test you can do in your practice (even though your patient had lunch an hour ago). Please also list the blood values that would suggest that your patient is diabetic. (5)
- b. What does HbA_{1c} test for? When would you use it in practice? (2)
- c. Diabetes mellitus presents with a characteristic triad of symptoms. Please list these symptoms, and explain the pathogenesis behind these characteristic features of diabetes. (6)

QUESTION 4:

A mother brings her 12-year old son to you. She says that he is “just not himself lately”. He is the captain of his school soccer team, and usually excels at it, but even his coach has remarked that he doesn’t have his usual energy. The patient says that he can’t even play a full game, as he gets too out of breath and dizzy, and even gets palpitations. He has also noticed that he has multiple bruises all over his legs, and even a few on his arms and trunk. His mom says he has had 3 antibiotics in the last 6 months, and he keeps getting low grade fevers. On physical examination, he has generalized lymphadenopathy, and pallor of his skin and mucous membranes. An FBC is performed, and the results are as follows: [6]

Test:	Result:	Reference ranges:
Red blood cell (RBC) count	4.23	$4.89 - 6.11 \times 10^{12} / L$
Platelets	112	$137 - 373 \times 10^9 / L$
White blood cell (WBC) count	12.74	$3.92 - 9.88 \times 10^9 / L$

The peripheral smear shows that the white blood cells are small and immature.

- a. What is your most likely diagnosis? (1)
- b. Please explain his symptoms based on the pathophysiology of this condition. (5)

QUESTION 5:

A woman brings her 71-year old husband to you. He has started showing certain neurological changes, and she is concerned that he may have Parkinson's disease, as his father developed the disorder at the age of 75 years. [8]

- a. What clinical features you will look for in this patient that would suggest this as a diagnosis? (6)
- b. The use of L-dopa is currently one of the most common treatment options for a patient with idiopathic Parkinson disease. What are the benefits / advantages and disadvantages of this treatment? (2)

QUESTION 6:

A 37-year old woman presents with intermittent abdominal pain. As far as she can remember, she had the pain for the first time when she was busy writing matric. The pain comes and goes for a few days at a time, but tends to be worse in times of stress or around the time of her menstruation. The pain is a cramping pain, felt in the lower part of her abdomen. The pain is usually associated with a change in the frequency and / or consistency of her bowel movements, and usually feels better after she has passed stool. The pain is sometimes associated with abdominal bloating as well.

Her GP had sent her for a full blood count and a liver function test, but all results were normal. A stool sample showed no ova, parasites or blood. She has even been for a colonoscopy and a gastroscopy, as well as an abdominal ultrasound, but nothing abnormal was found in any special investigations. [6]

- a. What is your most likely diagnosis? (1)
- b. How would you diagnose a patient as having this condition? (5)

QUESTION 7:

A mother brings her 4-year old son to you. The boy is crying. The mom says that she had collected her son from his play school 2 hours earlier, after the school had phoned her to come and collect him after he started crying and wouldn't settle down again. She had taken him home, but he wouldn't go down for a nap either. When she went back to his room, he was crying again and holding his scrotum.

On physical examination, you notice that his left testicle is swollen and extremely tender. His temperature and all other examinations are normal. [3]

- a. What is the most likely diagnosis for his condition? (1)
- b. Why is the time interval since the onset of his symptoms important? (2)

QUESTION 8:

A 23-year old student presents to her doctor because she had developed a fishy-smelling, frothy vaginal discharge. She has associated vulval and vaginal itching and tenderness. She is otherwise well. A vaginal swab shows flagellated protozoa. [4]

- a. What is your most likely diagnosis? (1)
- b. How did she get this condition? (1)
- c. List 2 other conditions that could be differential diagnoses for this condition as they also present with vulval or vaginal itching and discomfort and a vaginal discharge? (2)

QUESTION 9:

A 28-year old woman presents with acute onset of severe abdominal pain in the left lower quadrant. The pain started about 4 hours ago, and is getting progressively worse. She is also feeling slightly nauseous. [4]

You run a series of blood tests, and find the following:

- ↑ oestrogen
- ↑ testosterone
- ↑ blood glucose

- a. What is your most likely diagnosis? (1)
- b. What would you be looking for while observing the patient, taking a history and doing a physical examination? (3)

QUESTION 10:

During a routine health screen, a 48-year old man was found to have a raised serum PSA level. Which examinations and special investigations can be performed to assist in making a diagnosis? [3]

QUESTION 11:

Discuss the treatment of breast cancer, discussing localized (3) as well as systemic (2) forms of treatment. Please label the treatments as “localized” or “systemic”. [5]

QUESTION 12:

Please complete the following table on the clinical evaluation of endocrine conditions: [17]

Please **be specific when listing clinical features, laboratory tests and special investigations** – e.g. “blood tests” will not get a mark.

Please state whether **laboratory values are increased or decreased**.

List the **most relevant laboratory tests** that would help you to make a diagnosis of a specific condition.

Sections **blocked out in grey** do not have to be completed.

Disease condition:	Characteristic clinical features:	Laboratory tests – <u>increased / normal / decreased</u> :	Special investigations:
Diabetes insipidus:	1. 2.	1.	1. Urine test result:
Hyperthyroidism:		1. 2. Additional test with suspected Graves disease: 3.	
Nodule palpated in the thyroid on physical examination:			1. 2. 3.
Primary hyperparathyroidism:	1. 2. 3. 4.		
Primary & secondary hyperaldosteronism:	1. (both conditions present with the same feature)	1. 2.	

QUESTION 13:

A 54-year old man with a history of alcohol abuse and chronic hepatitis B infection presents with jaundice. You do a liver function test (LFT), and the results are as follows: [12]

Test:	Result:	Reference ranges:
Total bilirubin	283 $\mu\text{mol} / \text{L}$	(up to 17 $\mu\text{mol} / \text{L}$)
Albumin	24 g / L	(30-48 g / L)
Alanine transaminase (ALT)	79 U / L	(up to 50 U / L)
Alkaline phosphatase (ALP)	193 U / L	(40-120 U / L)
Gamma-glutamyl transferase (GGT)	549 U / L	(up to 70 U / L)

- a. On physical examination and further case taking, there is a wide range of physical findings. Please complete the following table – make sure you answer in enough detail to allow for the mark allocation given (1 mark per fact): (8)

Physical examination and case taking findings:	Explanation of why the patient presents with this feature of cirrhosis: i.e. what is happening in his liver to cause these signs / symptoms?
Ascites & oedema	(2)
Caput medusa, haemorrhoids & splenomegaly	(2)
Testicular atrophy, spider naevi, palmar erythema & gynecomastia	(1)
Easy bruising	(1)
Pruritis	(1)
Muscle wasting	(1)

- b. The patient is admitted to hospital. While in hospital, he suddenly starts to vomit up large amounts of bright red blood. Please explain why this would happen. (1)
- c. 8 years later, the patient presents with a dull, constant pain in the right upper quadrant of his abdomen. On physical examination, you find that his liver has increased in size, and his ascites has increased significantly over a short period of time. On blood tests, he has an elevated level of α -feto-protein of more than 1000 ng / mL.

i. What is your most likely diagnosis? (1)

ii. Although the elevation of α -feto-protein / mL above 1000 ng / mL is highly significant, it is not specific to this condition and cannot be used to diagnose the condition. Please explain this statement. (2)

QUESTION 14:

Please complete the table on various skin conditions.

[25]

Make sure that your **descriptions** of conditions, features and all other components of the table are **characteristic** of the conditions, and that you adhere to the indicated mark allocation (1 x mark per fact).

All answers must be done in **point-form**!!

Sections **blocked out in grey** do not have to be completed.

Name of condition:	Aetiology, morphology and pathogenesis:	Clinical features:	Other:
(1)	Due to partial / complete loss of melanocytes – considered to be due to auto-immune destruction of melanocytes, and is often seen with other auto-immune conditions	(2)	How does this condition differ from albinism? (1)
(1)	Chronic immune mediated aetiology, but it is poorly understood Histology shows marked epidermal thickening and massively increased cell turnover May have a genetic link Up to 20% of patients have associated arthritis	Briefly name and explain the 3 x main features of this condition (6): 1. 2. 3.	

Acne vulgaris	Briefly explain the pathogenesis of this condition with regards to the 4 factors that are considered to contribute to this condition (4):	Comedones and / or inflammatory lesions Mainly face and neck Also back, chest, shoulders	
Impetigo:	(1)		How is this condition diagnosed and treated (2)? Dx: Rx:
(1)	Skin infection of the feet caused by fungi (dermatophytes)	(3)	Treatment: Topical antifungal agents
(1)	Caused by a pox virus Usually affects children	(2)	

QUESTION 15:

One of the most common causes of acute hypoadrenalism is rapid withdrawal of long-term corticosteroid therapy. Why does this happen? [2]

QUESTION 16:

An 84-year old woman fractures her hip after a minor fall. She is otherwise healthy, and takes no medication or supplements. She has arthritis of her knees and hips, which prevents her from walking for more than a few minutes at a time. [5]

- a. There are well defined aetiological factors that contribute to the development of osteoporosis. By looking carefully at the limited information that you have **in this case**, please list 3 aetiological factors that could have contributed to the **development of osteoporosis in this patient**, and briefly explain how each factor contributes. (3)
- b. Osteoporosis can affect different parts of the skeletal system. How would osteoporosis of the vertebral column present? (2)

QUESTION 17:

Mrs X is a 65-year old house wife who complains of: [12]

- Deep, aching pain in her left knee and right hip for the last 15 years
- It is now also starting to affect her hands, with stiffness and pain
- She has also noticed little “bumps” on the last joint of two of her fingers
- The pain is getting progressively worse, and her joints are feeling stiff (especially in the morning)
- On physical examination, there is limited range of motion in her left knee and right hip

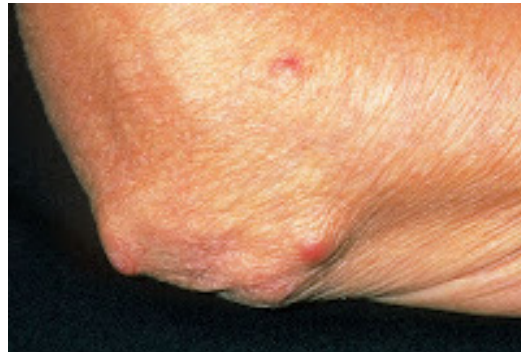
The appearance of her hands can be seen in the image below:



- a. What is your initial diagnosis, based on the presenting case? (1)
- b. What are the “bumps” on her fingers called? What are they? (2)

If the case presented with:

- Joint pain involving her fingers, knees, hands, wrists and elbows bilaterally
- Small bumps around her elbows
- Progressive deformity of her hands, making her unable to perform certain tasks
- Hands and elbows that look like the images below:



- What would your diagnosis be, based on the new facts provided? (1)
- How would you diagnose this condition? (5)
- What is pannus formation? How does it lead to permanent joint ankylosis? (3)

QUESTION 19:

A 54-year old female with a long history of systemic lupus erythematosus (SLE) presents with sudden weight gain – she gained over 6 kg in about 1 month. She says that her feet and ankles are very swollen, she is unable to put on any of her rings, her eyes are puffy in the morning, and even her pants are too tight. Her doctor has warned her before that she should keep an eye on her kidney function as SLE may affect her kidneys. A urine dipstick shows massive proteinuria, but no red blood cells, white blood cells or glucose in her urine. Physical examination confirms widespread oedema, but no other physical findings. Blood tests show a normal FBC and normal liver function. [6]

- What is this condition called? (1)
- Please explain the pathogenesis behind this condition. (5)

QUESTION 20:

A 5-year old girl presents with sudden onset of pain on urination. She also complains of a dull pain in her back and that she is feeling tired. On physical examination, she has a fever, and kidney thump is very sensitive. [8]

- What is your diagnosis? (1)
- Explain how incompetence of the vesicoureteral orifice contributes to the development of this condition. (3)
- List four other predisposing conditions have been implicated in the pathogenesis of this condition (in any patient). (4)

QUESTION 21:

A 32-year old woman presents with a headache. Through careful case taking and examination, many common forms of headaches can be distinguished from one another. [6]

- a. People who suffer from migraines can often pinpoint / identify specific “triggers” for their headaches. List 6 common triggers of migraine headaches. (6 x ½)
- b. How will trigeminal neuralgia present (1)? List 4 potential triggers of this type of head pain. (4 x ½) (3)

QUESTION 22:

What are the two main presenting features of a central nervous system tumour? [2]

QUESTION 23:

Your patient is a 78-year old man with a long history of hypertension and uncontrolled diabetes. His wife brings him for a consultation, and says that he is generally becoming weak, lethargic and occasionally confused – he is even starting to forget the names of people and basic day-to-day objects. She has also noticed that he keeps moving his legs around at night when they are lying in bed – when she asked him why he was doing it, he stated that it feels as if something is “crawling on his legs”. He also says that up until 3 months ago he was waking up many times a night to urinate – now he hardly ever passes any urine, even during the day.

After careful history taking and a physical examination, you decide to do some special investigations and laboratory tests.

Please **explain** why each of the following findings would be seen:

- Please note that you need to explain the **reason** for the finding, not just an answer for what he has
- E.g. for (a) – don’t say he has oedema, I want to know **why** he has it – the mechanism or reason behind the finding: [10]
 - a. He says that he cannot close his pants anymore, and that his ankles are swollen (1)
 - b. Bone pain / tenderness, and also a problem with getting up from a chair and walking up the stairs – please give a detailed explanation all elements involved in this presentation (5)
 - c. Fatigue, pallor of his skin and mucous membranes, dyspnoea, palpitations (2)
 - d. Increased BUN (1)
 - e. Nose bleeds (epistaxis) (1)

QUESTION 24: Please answer in the table at the end of the question paper. Answers in you answer booklet will NOT BE MARKED.

1. In a car accident, a person's forehead strikes the windshield of the car. The coup / contrecoup injury would be in the:
 - a. Frontal / parietal region
 - b. Frontal / occipital region
 - c. Parietal / occipital region
 - d. Occipital / frontal region
2. The substance produced by the kidneys that raises blood pressure is:
 - a. Platelet-activating factor
 - b. Angiotensin
 - c. Angiotensinogen
 - d. Aldosterone
 - e. Renin
 - f. Potassium
3. All of the statements about myasthenia gravis are true except:
 - a. Ocular muscles are characteristically weakened
 - b. Muscle strength improves with administration of anticholinesterase agents
 - c. The condition doesn't affect sensory or autonomic function
 - d. The risk of developing auto-immune conditions is increased
 - e. The disease leads to diminished muscle strength by blocking the uptake of serotonin at the neuromuscular junction
4. All of the following statements about a malignant melanoma are true, except:
 - a. It is aetiologically related to sun exposure
 - b. It is typically uniformly pigmented
 - c. It does not metastasize during its horizontal growth phase
 - d. The risk of metastasis increased with depth of infiltration into the skin
 - e. Early diagnosis improves the prognosis
5. All of the following conditions can produce transient or chronic systemic hypertension except for:
 - a. Acute glomerulonephritis
 - b. Acute pyelonephritis
 - c. Chronic glomerulonephritis
 - d. Chronic pyelonephritis
 - e. Renal vasculitis
6. A 30-year old woman has had coldness and numbness in her arms and decreased vision in her right eye for the past 5 months. On physical examination, she has no fever, and her blood pressure is 100 / 70 mmHg. Radial pulses are not palpable, but her femoral pulses are strong. She has decreased sensation and cyanosis in her arms, but no warmth or swelling. Her condition remains stable for the next year. Which of the following is her most likely diagnosis?
Answers on next page

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- a. Aortic dissection
 - b. Kawasaki disease
 - c. Microscopic polyangiitis
 - d. Takayasu arteritis
 - e. Tertiary syphilis
 - f. Thromboangiitis obliterans
 7. An 8-year old boy falls off the jungle gym and fractures his arm. The bony ends can be seen through a wound in his skin, this type of fracture is called a:
 - a. Pathological fracture
 - b. Greenstick fracture
 - c. Complete fracture
 - d. Compound fracture
 - e. Comminuted fracture
 8. Factors strongly implicated in the causation of cystitis in females include all of the following except:
 - a. Sexual intercourse
 - b. The use of tampons and scented bubble bath
 - c. Pregnancy
 - d. Menopause
 - e. Increased androgen levels
 9. A 34-year old motivational speaker has noticed that the quality of his voice has started to change over the last few months, and he is becoming progressively hoarser. On examination, he is afebrile, and there are no palpable masses in his head and neck area. He doesn't have significant sputum production, but had been advised before to give up smoking. Which of the following is most likely to produce these findings?
 - a. Croup
 - b. Epiglottitis
 - c. Laryngeal polyps
 - d. Acute pneumonia
 - e. Chronic bronchitis
 - f. Emphysema
 10. A common cause of both pyelonephritis and cystitis is:
 - a. Urinary calculi
 - b. Invading micro-organisms, such as *E. coli*
 - c. Allergic reactions
 - d. Auto-immune conditions, such as systemic lupus erythematosus (SLE)
 - e. Heavy metals

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11. A 10-year old girl comes to the clinic with multiple excoriations on her hands. She says that she scratches her hands because they are very itchy. Physical examination shows 0.2 – 0.6 cm linear streaks in the inter-digital regions (between her fingers). What is the most likely diagnosis?
- a. Molluscum contagiosum
 - b. Scabies
 - c. Herpes zoster
 - d. Infection with human papilloma virus
 - e. Psoriasis
12. A 66-year old woman died of an acute myocardial infarction. At autopsy, both her kidneys are decreased in size. The kidneys also showed hyaline arteriosclerosis. Which of the following conditions is most likely to have caused this appearance of her kidneys?
- a. Acute pyelonephritis
 - b. Vesico-ureteral reflux
 - c. Benign hypertension
 - d. Malignant hypertension
 - e. Wilm's tumour
13. A 19-year old woman has had pelvic pain and an unusual vaginal discharge for 1 week. A pelvic examination shows mild erythema of the ectocervix. A Pap smear shows many neutrophils but no dysplastic cells. A cervical culture grows *Neisseria gonorrhea*. If this infection is not treated appropriately, the patient will be at an increased risk for which of the following conditions?
- a. Ectopic pregnancy
 - b. Dysfunctional uterine bleeding
 - c. Cervical carcinoma
 - d. Endometrial hyperplasia
 - e. Endometriosis
 - f. Placenta previa
14. A 10-year old girl develops subcutaneous nodules over the skin of her arms and torso. She has choreiform movements and starts to complain about pain in her knees and hips, particularly with movement. A friction rub is heard on auscultation of her chest. Which of the following is usually found in these patients on history?
- a. Diabetes mellitus
 - b. Kidney failure
 - c. Peripheral oedema
 - d. Acute streptococcal pharyngitis 2-3 weeks before onset of these symptoms
 - e. Liver cirrhosis
 - f. Ventricular septal defect
15. A 2-year old child is brought to his physician because of failure to thrive. Physical examination shows that the child is short, and has coarse facial features, a protruding tongue, and an umbilical hernia. Profound mental retardation becomes apparent as the child matures. A deficiency of which of the following hormones is most likely to explain these findings?

Answers on next page

- a. Cortisol
- b. Norepinephrine
- c. Somatostatin
- d. Thyroxine (T4)
- e. Insulin

16. A 25-year old woman has noticed a breast secretion for the past month. She is not breastfeeding, and has never been pregnant. She has not menstruated for the past 5 months. Physical examination yields no abnormal findings. MR imaging of the brain shows a 0.7 cm mass in the pituitary gland. Which of the following additional complaints is most likely to be present in this patient?

- a. Hyperthyroidism
- b. Acromegaly
- c. Infertility
- d. Cushing disease
- e. Syndrome of inappropriate antidiuretic hormone

MULTIPLE CHOICE ANSWERS:			
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	
8		16	