



**UNIVERSITI KUALA LUMPUR
ROYAL COLLEGE OF MEDICINE PERAK**

**FINAL EXAMINATION
JULY 2025 SEMESTER**

COURSE CODE	: RPD21303
COURSE NAME	: PHARMACOLOGY AND THERAPEUTICS
PROGRAMME NAME	: DIPLOMA IN PHARMACY
DATE	: 17 SEPTEMBER 2025
TIME	: 9.00 AM – 11.00 AM
DURATION	: 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please **CAREFULLY** read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of **TWO (2)** sections; Section A and Section B.
4. Answer **ALL** questions in Section A. For Section B, answer **THREE (3)** questions where Question 1 and Question 2 are **COMPULSORY**, answer either Question 3 or Question 4.
5. Please write your answers on the OMR answer script and answer booklet provided.
6. Answer all questions in English language **ONLY**.

THERE ARE 16 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 25 marks)

INSTRUCTION: Answer ALL questions.**Please use the objective answer sheet provided.**

1. Activated charcoal cannot be used for which of the following?
 - A. Ingestion of Iron tablets
 - B. Ingestion of Aspirin
 - C. Patient is conscious and cooperative
 - D. Within 1 hour of toxin ingestion

2. Which of the following is **CORRECT** about histamine and antihistamines?
 - A. Histamine has important clinical uses in treating allergic reactions.
 - B. Antihistamines are used therapeutically because they block the actions of histamine.
 - C. Antihistamines stimulate histamine receptors to reduce allergic responses.
 - D. Histamine is stored in the bloodstream and directly acts on distant organs.

3. Rheumatoid arthritis (RA) is primarily classified as a/an
 - A. degenerative joint disease
 - B. autoimmune inflammatory disorder
 - C. infectious arthritis
 - D. mechanical wear and tear disorder

4. Histamine is produced in the body through which of the following processes?
 - A. Oxidation of serotonin
 - B. Decarboxylation of tryptophan
 - C. Decarboxylation of tyrosine
 - D. Decarboxylation of histidine

5. Which enzyme is responsible for the final step in uric acid formation?
 - A. Xanthine oxidase
 - B. Cytochrome P450
 - C. Cyclooxygenase
 - D. Uricase

6. In psoriasis, the immune system becomes overactive and affects the skin. Which of the following best describes how this leads to plaque formation?
- A. Mast cell activation leads to histamine release, resulting in red, itchy skin.
 - B. Low white blood cell count causes poor skin healing and chronic inflammation.
 - C. Reduced antibody production weakens the skin barrier and allows bacteria to grow.
 - D. Cytokines released by T-cells speed up skin cell growth, causing thick, scaly patches.
7. Which term correctly describes histamine as a substance that is released at a local site in the body to act on nearby cells?
- A. Autacoid
 - B. Cytokine
 - C. Enzyme
 - D. Hormone
8. Which of the following best describes the early changes in RA?
- A. Necrosis of chondrocytes
 - B. Loss of cartilage
 - C. Fibrosis and thickening of ligaments
 - D. Synovial thickening and infiltration by immune cells
9. Which statement accurately describes a key mechanism involved in the formation of microcomedones in acne?
- A. Keratinocytes over-proliferate and fail to desquamate properly
 - B. Bacterial enzymes dissolve follicular walls, forming cystic lesions
 - C. Inflammatory cells accumulate and rupture the follicular wall
 - D. Excessive sebum hardens and blocks the pilosebaceous duct
10. What is the most accurate meaning of the term "drug abuse"?
- A. Using drugs strictly according to a doctor's prescription
 - B. Using drugs excessively or inappropriately for non-medical purposes
 - C. Using herbal supplements for medical conditions
 - D. Using over-the-counter drugs for minor illnesses

11. Which of the following factors plays a key role in the progression of osteoarthritis?
- A. Increased joint mobility
 - B. Repetitive mechanical stress and overloading
 - C. Decreased joint fluid production
 - D. Autoimmune activation
12. The risk of drug-drug interactions is highest in
- A. neonates
 - B. adults aged 35–50
 - C. patients on multiple drugs
 - D. pregnant women
13. What is drug dependence?
- A. A person who abuses drugs only on weekends
 - B. A state where a person uses drugs occasionally for fun
 - C. A condition where a person needs a drug to feel normal
 - D. A situation where drugs have no psychological effect on the user
14. A drug interaction that reduces therapeutic effect due to opposing actions is called
- A. synergism
 - B. potentiation
 - C. antagonism
 - D. inhibition
15. Osteoporosis is best defined
- A. inflammation of bone and joints
 - B. loss of articular cartilage
 - C. reduction in bone mass and density
 - D. loss of height in elderly

16. Which of the following is most likely to interact with multiple drugs due to its narrow therapeutic index?
- A. Paracetamol
 - B. Warfarin
 - C. Amoxicillin
 - D. Cetirizine
17. Which of the following best describes the role of the immune system in eczema?
- A. It weakens over time, making the skin more prone to infections.
 - B. It overreacts to triggers, causing inflammation and skin irritation.
 - C. It produces excess oil, leading to clogged pores and inflammation.
 - D. It shuts down when exposed to allergens, reducing skin protection.
18. During anaphylaxis, what is the main reason a person may feel lightheaded or faint?
- A. High blood pressure
 - B. High cholesterol
 - C. Low blood pressure
 - D. Rapid heartbeat
19. What is the main way opioids work in the central nervous system?
- A. They stop neurotransmitters from being released
 - B. They attach to opioid receptors
 - C. They make muscles work better
 - D. They cause histamine to be released

Question 20 to 25 requires the following answer.

A	B	C	D
I and III	II and IV	I, II and III	II, III and IV

20. Which of the following are strategies for long-term management of gout?
- I. Uric acid-lowering therapy
 - II. Weight loss and diet control
 - III. Avoiding alcohol and high-purine foods
 - IV. Increase fluid intake
21. Which of the following are typical clinical features of RA?
- I. Asymmetrical joint involvement
 - II. Morning stiffness lasting more than 30 minutes
 - III. Swelling of small joints (e.g., hands, wrists)
 - IV. Fever and fatigue
22. Which hormones are important in maintaining bone mass?
- I. Estrogen
 - II. Parathyroid hormone
 - III. Calcitonin
 - IV. Thyroxine
23. Which investigations are useful in the diagnosis of gout?
- I. Serum uric acid level
 - II. Erythrocyte level
 - III. Synovial fluid analysis
 - IV. Presence of anticitrullinated antibodies
24. Which of the following methods are aimed at preventing the absorption of toxins?
- I. Activated charcoal
 - II. Whole bowel irrigation
 - III. Gastric lavage
 - IV. Hemodialysis

A	B	C	D
I and III	II and IV	I, II and III	II, III and IV

25. Which drug pair shows a synergistic pharmacodynamic interaction?
- I. Warfarin and Aspirin
 - II. Warfarin and Vitamin K
 - III. Paracetamol and Codeine
 - IV. Hypnotic and caffeine

SECTION B (Total: 75 marks)

INSTRUCTION: This section consists of FOUR (4) modified essay questions (MEQ).

You are required to answer THREE questions in the answer booklet provided.

Question 1 and Question 2 are COMPULSORY.

Answer either Question 3 OR Question 4.

Question 1

- (a) i. Explain the drug interaction between Warfarin and antibiotics. (2 marks)
- ii. Explain the consequence of taking Rifampicin in a woman who is on oral contraceptive. (2 marks)
- (b) Mr. Haris, a 52-year-old man with systemic lupus erythematosus (SLE), presented to the outpatient clinic complaining of pain and difficulty walking after he had a fall in his bathroom. He has been on oral Prednisolone 15 mg daily for the past 18 months, along with Hydroxychloroquine for SLE maintenance. An X-ray was ordered and he was found to have suffered a fracture in his femor. A DEXA-scan was also done and he was diagnosed with osteoporosis.
- The doctor started him on a Bisphosphonate.
- i. Based on the scenario above, state the most likely cause of osteoporosis in Mr. Haris. (1 mark)
- ii. Explain how the doctor diagnosed him with osteoporosis. Justify your answer. (2 marks)
- iii. Name **ONE (1)** bisphosphonate used in osteoporosis and explain how it works. (3 marks)
- iv. Advise him on how to take the bisphosphonate you mentioned in (b) iii. above. (2 marks)

(c) Puan Hasnah, a retired teacher, has been experiencing right knee pain for the past 3 years, worsening over the last 6 months. The pain is described as a deep ache, worse after walking long distances or going up stairs. Morning stiffness is brief (less than 10 minutes). She had been taking Paracetamol and occasionally oral NSAIDs but now reports limited relief and gastric discomfort with NSAIDs.

She has tried physiotherapy and weight reduction without significant improvement. She wants to avoid surgery.

The doctor suggested she undergoes viscosupplementation.

i. Name **TWO (2)** examples of NSAIDs that might have caused gastric discomfort in Puan Hasnah.

(2 marks)

ii. Explain how viscosupplementation can relieve Puan Hasnah's pain.

(2 marks)

(d) Sook Mun, a 38-year-old woman, visits the pharmacy with complaints of red, itchy, and flaky patches on her elbows and lower legs. She mentions that the symptoms started two weeks ago after returning from a business trip to a cold country. During the trip, she also consumed alcohol more frequently than usual during client dinners. On examination, you observe thick, well-demarcated plaques with silvery scales on the extensor surfaces of her arms and legs. The doctor diagnoses her with plaque psoriasis and prescribes a combination of Clobetasone butyrate cream and an emollient.

i. Identify **TWO (2)** possible trigger factors that may have contributed to Sook Mun's psoriasis flare-up.

(2 marks)

ii. State the classification of Clobetasone butyrate and explain its mechanism of action in treating psoriasis.

(2 marks)

- (e) Azharuddin, a 23-year-old student, started taking Tramadol after a minor surgery. Over time, he increased the dose without a doctor's advice and continued using them even after the pain had subsided. Despite knowing the risks, Azharuddin finds it hard to stop using the drug.

With reference to the scenario, answer the following questions:

- i. Give a reason why Azharuddin's condition is considered drug addiction.
(2 marks)
- ii. Predict **THREE (3)** possible symptoms Azharuddin may face if he discontinues Tramadol suddenly.

(3 marks)

Question 2

- (a) Farah, a 30-year-old woman with severe plaque psoriasis, was recently started on oral Cyclosporine after failing topical treatments. She comes to the pharmacy for her refill and reports experiencing a tingling sensation in her legs and occasional headaches. She also checks her blood pressure at home and noticed it has been slightly elevated. Farah is concerned whether these symptoms are related to the medication. She mentions that she is trying to improve her lifestyle and wants to avoid long-term health issues. She asks what steps she can take to manage these symptoms while on treatment.

Answer the following questions based on the above scenario.

- i. Identify **ONE (1)** side effect of Cyclosporine that Farah is experiencing. (1 mark)
 - ii. Explain the mechanism of action of Cyclosporine in the management of psoriasis. (2 marks)
 - iii. Suggest **TWO (2)** actions that Farah should take while using Cyclosporine. (2 marks)
- (b) Madam Aini, 28, presents with severe nodulocystic acne affecting her face and upper back. She has undergone multiple courses of topical treatments and oral antibiotics over the past year with limited success. After a full assessment, the dermatologist prescribes oral Isotretinoin and refers her to the pharmacy for counselling and dispensing. Baseline liver function tests and lipid profile have been ordered. Madam Aini is not currently on any form of contraception. During the medication review session, she expresses uncertainty about the precautions required during Isotretinoin therapy.
- i. State **TWO (2)** oral antibiotics that Madam Aini may have received previously for acne management. (2 marks)
 - ii. List **TWO (2)** potential side effects during Isotretinoin therapy. (2 marks)
 - iii. Explain why Isotretinoin must be avoided during pregnancy. (2 marks)

- iv. Give **TWO (2)** reasons why Isotretinoin is a suitable treatment option for Madam Aini.

(2 marks)

- (c) Mr. Johan was brought to the Emergency Department by his friend, who found an empty blister pack of Panadol® (500 mg/tablet, 40 tablets) beside him. The ingestion was believed to be intentional following a personal crisis. It happened 2 hours ago. He complains of nausea, abdominal discomfort, and malaise. No vomiting or altered mental status.

Blood tests were performed by the doctor in the emergency department to determine the subsequent treatment plan.

- i. Suggest suitable treatment to be given to Mr. Johan immediately before obtaining the blood test results.

Explain how it works.

(2 marks)

- ii. Explain the method used by the doctor to determine if the amount of Paracetamol taken will cause toxicity in Mr. Johan.

(2 marks)

- iii. Rationalize how ingestion of large dose of Paracetamol can cause liver failure.

(4 marks)

- iv. Suggest another drug that can be used to treat Paracetamol poisoning if N-acetylcysteine is not available.

(1 mark)

- (d) Identify the class of opioid to which Pethidine belongs.

(1 mark)

- (e) Compare the potency and solubility of Pethidine with Morphine.

(2 marks)

Answer either Question 3 OR Question 4

Question 3

- (a) Mr. Farid presents for follow-up of his chronic gout. He has experienced four gout attacks in the past year, affecting both big toes and his left ankle. His most recent attack was 3 weeks ago and which has resolved. He is keen to start a new long-term treatment to prevent further attacks. After investigation, the doctor prescribes Probenecid 250mg twice daily and Colchicine 0.5mg twice daily.
- Rationalize why the doctor prescribed Colchicine even though Mr. Farid's pain has been resolved.
(2 marks)
 - Explain the mechanism of action of Probenecid in treating chronic gout.
(2 marks)
- (b) Akmal, a 32-year-old man, has red, itchy rashes behind his knees and on his elbows for the past few months. He was previously using corticosteroid creams with minimal improvement. He mentions that the itching becomes worse after showering and that some areas have started to feel more sensitive. Despite treatment, the rash has become more persistent and is beginning to interfere with his daily comfort. During his follow-up, the doctor prescribed Tacrolimus ointment and advised him to apply it twice daily. Akmal was also told to continue using moisturizers.
- State **TWO (2)** reasons why Tacrolimus is considered a suitable alternative to corticosteroids in Akmal's case.
(2 marks)
 - Explain **ONE (1)** important precautions Akmal should follow while using Tacrolimus ointment.
(2 marks)
- (c) Albert has fungal infection and was prescribed Ketoconazole, an acidic drug. Two weeks ago, he has gastritis and was put on Famotidine for 4 weeks. Comment on how Famotidine will affect the therapeutic effect of Ketoconazole.
(2 marks)

- (d) A patient has overdosed on a basic drug which is excreted mainly by the kidneys. Suggest a way to increase the renal excretion of this drug.

(2 marks)

- (e) Madam Tan, 67, 80kg, presents with a 6-month history of progressively worsening pain in her right knee, particularly when walking or standing for long periods. She describes morning stiffness lasting less than 30 minutes and difficulty climbing stairs. On physical examination, there is crepitus, mild swelling, and tenderness over the medial joint line of the right knee. There is no swelling or warmth around the joint. An X-ray of the knee reveals: Joint space narrowing and osteophyte formation. She was diagnosed with osteoarthritis.

- i. Identify **TWO (2)** risk factors for osteoarthritis present in Madam Tan.

(2 marks)

- ii. State **TWO (2)** non-pharmacological approaches to improve Madam Tan's condition.

(2 marks)

- iii. The doctor told her that if her symptoms persist, he may want to give her an injection to her joint. Predict the drug that the doctor may use and explain its function.

(3 marks)

- (f) Zarina, a 45-year-old woman, goes on her first cruise holiday with her family. Halfway through the trip, she starts feeling nauseous, dizzy, and pale, which makes her quite uncomfortable. To relieve her symptoms, Zarina takes Dramamine® - a medication she had brought just in case - and rests in a cool spot on the ship. After a few hours, her symptoms ease, and she begins to feel better, allowing her to enjoy the rest of the cruise.

Based on the above scenario, answer the following questions.

- i. State the drug classification of Dramamine®.

(1 mark)

- ii. Explain the mechanism of action of Dramamine®.

(2 marks)

- iii. If Zarina forgot to bring Dramamine®, suggest a non-pharmacological method she could use to manage her motion sickness symptoms, and explain how it helps.

(3 marks)

Question 4

- (a) Mr. Raj, 58, a retired accountant, presents to the rheumatology clinic with joint pain and swelling in his big toes, ankles and elbows. He reports similar attacks (4–5 episodes per year) that have gradually worsened despite using medications. This latest episode happened early this morning. On physical examination, the doctor noticed hard, painless nodules on his fingers and elbows. His serum uric acid was found to be 9.5mg/dL.

Past Medical History:

Gout (diagnosed 10 years ago)

Hypertension

Chronic kidney disease (CKD stage 3)

Obesity (BMI 32 kg/m²)

Current Medications:

Allopurinol 300 mg once daily

Amlodipine 5 mg once daily

Indomethacin 25mg prn

- i. Suggest **TWO (2)** possible reasons why this patient still experiencing frequent gout attacks and hyperuricemia despite taking Allopurinol.

(2 marks)

- ii. Suggest another drug that can be used to help relieve his symptoms now and how it should be administered.

(2 marks)

- (b) Amira, a 4-year-old girl, presents with eczema, showing red, itchy rashes on her cheeks, elbows, and knees for the past 3 weeks. Her mother reports that the rashes worsen during cold weather and become more irritated when scratched. Amira was prescribed Hydrocortisone 1% cream, but there has been minimal improvement. Her constant scratching, especially at night, makes it difficult for her to sleep and appears to aggravate the condition. On examination, the affected areas appear red, dry, cracked, and slightly thickened, with visible scratch marks.

- i. State **TWO (2)** reasons why Amira should avoid using alcohol-based sanitizers and perfumed hand creams.

(2 marks)

- ii. Give **TWO (2)** counselling points on the correct use of corticosteroid cream for Amira.
(2 marks)
- (c) Madam Jamilah, 58, is recently started on Warfarin after suffering a stroke. She was advised by the doctor that she should avoid eating too much vegetables such as kailan and broccoli.
Rationalize the doctor's advice.
(2 marks)
- (d) Elaborate on the beneficial interactions between the active ingredients in Unasyn®.
(2 marks)
- (e) Julia, a 52-year-old woman with severe rheumatoid arthritis (RA) presents to the rheumatology clinic with complaints of persistent joint pain, swollen hands, headaches, and tremors. She was diagnosed with RA 15 years ago. The doctor decides to put her on Cyclosporine which is a disease modifying anti-rheumatic drugs (DMARDs).
- i. Name **THREE (3)** other drugs classified as DMARDs.
(3 marks)
- ii. Explain the role of DMARDs in managing RA.
(1 mark)
- iii. State **TWO (2)** serious side effects of Cyclosporine.
Suggest the monitoring tests that Julia should take to detect these side effects.
(3 marks)
- (f) Ahmad, a 30-year-old office employee, comes to the pharmacy with complaints of a persistent runny nose, sneezing, and a mild cough — symptoms that seem to worsen at night — for the past two days. He mentions feeling tired but does not have a fever. After consulting with the pharmacist, he is advised to take Benadryl® at night and Clarityne® during the day to control his allergy symptoms. Ahmad follows the pharmacist's recommendation, and within three days, his condition improves, allowing him to resume his usual activities.
Based on the above scenario, answer the following questions.
- i. State the generic name of Benadryl®.
(1 mark)

ii. Explain the mechanism of action of Clarityne®. (2 marks)

iii. Based on its pharmacological properties, explain why Clarityne® is recommended for daytime use in patients like Ahmad. (3 marks)

END OF EXAMINATION PAPER