UNIVERSITI KUALA LUMPUR
ROYAL COLLEGE OF MEDICINE PERAK

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE	: RPD21303
COURSE NAME	: PHARMACOLOGY AND THERAPEUTICS
PROGRAMME NAME	: DIPLOMA IN PHARMACY
DATE	: 22 JUNE 2026
TIME	: 02.30 PM – 4.30 PM
DURATION	: 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read CAREFULLY 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 and THREE (3) questions in section B.
5. Please mark/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. Which of the following is a characteristic of acute gout?
   A. Gradual onset of mild pain
   B. Sudden onset of severe joint pain
   C. Painless joint swelling
   D. Generalized muscle stiffness

2. Which of the following represents a musculoskeletal complication of rheumatoid arthritis?
   A. Hypertension
   B. Joint deformities
   C. Scleritis
   D. Anemia

3. Which of the following factors contributes to the development of osteoarthritis?
   A. Increased synthesis of cartilage matrix
   B. Increased degradation of cartilage matrix
   C. Increased production of synovial fluid
   D. Increased bone elasticity

4. A 68-year-old woman presents with a wrist fracture following a minor fall and reports no prior symptoms.
   Which statement best explains her condition?
   A. Increased bone formation
   B. Reduced bone fragility
   C. Asymptomatic bone loss until fracture occurrence
   D. Acute inflammatory joint disease

5. Which of the following patients is at the highest risk of experiencing clinically significant drug interactions?
   A. A young adult receiving a single medication for an acute infection
   B. An elderly patient receiving multiple medications for chronic conditions
   C. A patient with osteoporosis and normal hepatic function
   D. A school-aged child with asthma using regular inhaler therapy

6. A patient with psoriasis has epidermal turnover reduced from 28 days to 4 days. What is the most direct consequence of this change?
   A. Increased shedding of fully matured cells maintaining normal skin texture
   B. Reduced keratinocyte proliferation causing thinning of the epidermis
   C. Decreased immune activity leading to reduced epidermal inflammation
   D. Accumulation of immature keratinocytes forming thick scaly plaques

7. An adolescent develops acne during puberty due to increased androgen levels. Which mechanism best explains this effect?
   A. Reduction of immune signaling limiting lesion development
   B. Inhibition of bacterial activity decreasing inflammatory response
   C. Stimulation of sebaceous glands leading to excess sebum production
   D. Suppression of keratinocyte growth reduces follicular blockage

8. A patient with eczema has defective skin barrier function. Which effect directly contributes to disease worsening?
   A. Increased lipid production improving moisture retention in the skin
   B. Reduced penetration of irritants resulting in decreased inflammation
   C. Increased transepidermal water loss leading to dry and irritable skin
   D. Enhanced barrier protection preventing allergen entry into epidermis

9. Which behaviour best exemplifies drug abuse?
   A. Taking medication at irregular time
   B. Occasionally skipping doses
   C. Consuming a higher dose than prescribed
   D. Stopping medication after symptoms improve

10. What is histamine?

A. A synthetic drug used to treat allergies
B. An endogenous substance that acts locally
C. An enzyme produced in the liver
D. A hormone secreted by the pancreas

11. A patient with allergic rhinitis presents with sneezing and nasal congestion. Which histamine receptor is primarily involved?

A. H1
B. H2
C. H3
D. H4

12. Which of the following best defines acute poisoning?

A. Prolonged exposure to low doses
B. Gradual development of symptoms
C. Exposure to a high dose resulting in rapid onset of symptoms
D. A condition without observable symptoms

13. A child ingests bleach and develops burns in the mouth and throat. This condition is classified as

A. systemic poisoning
B. chronic poisoning
C. localized poisoning
D. environmental poisoning

Question 14 to 25 requires the following answer.

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

14. Which of the following factors contribute to the development of hyperuricemia?
    I. Increased production of uric acid
    II. High cell turnover rate
    III. Reduced excretion of uric acid
    IV. Increase excretion of uric acid

15. Which of the following statements about acute gout attacks are correct?
    I. Pain develops gradually over several weeks
    II. Symptoms frequently begin at night
    III. The affected joint appears cold and pale
    IV. Pain typically peaks within 6–12 hours

16. Which of the following statements accurately describe the role of nonsteroidal anti-inflammatory drugs (NSAIDs) in the management of rheumatoid arthritis?
    I. Provide relief from pain and inflammation
    II. Used for symptomatic control
    III. Act by inhibiting cyclooxygenase (COX) enzymes
    IV. Prevent joint destruction

17. A 45-year-old woman presents with symmetrical pain in both hands and morning stiffness lasting more than one hour. Laboratory findings reveal elevated inflammatory markers.
    Which of the following pathophysiological mechanisms are most likely involved?
    I. Deposition of monosodium urate crystals
    II. Autoimmune-mediated synovial inflammation
    III. Pannus formation
    IV. Cytokine-mediated inflammatory response

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

18. Which of the following statements correctly describe normal bone physiology?
    I. Bone is a static tissue
    II. Osteoblasts are responsible for bone formation
    III. Osteoclasts are responsible for bone resorption
    IV. Bone remodeling occurs continuously

19. What are the pharmacokinetic effects of enzyme induction on drug levels?
    I. Increases plasma drug concentration
    II. Decreases plasma drug concentration
    III. Reduces drug metabolism
    IV. Enhances drug metabolism

20. Which of the following statements accurately describe drug interactions?
    I. They always lead to toxicity only
    II. They may involve food or herbal products
    III. They occur only between two or more drugs
    IV. They can modify the pharmacological effect of a drug

21. Which of the following are potential clinical consequences of drug interactions?
    I. Therapeutic failure
    II. Drug toxicity
    III. Unpredictable or unexpected effects
    IV. Improvement in drug stability only

22. Which factors increase the abuse potential of a drug?
    I. Intravenous route of administration
    II. Rapid onset of action
    III. High lipophilicity
    IV. Long half-life

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

23. Which of the following are indicative of opioid addiction?

I. Social withdrawal
II. Doctor shopping
III. Slurred speech
IV. Improved concentration

24. Which of the following statements describe antigen-mediated histamine release?

I. It involves IgE antibodies
II. It requires prior sensitization
III. It causes mast cell degranulation
IV. It occurs due to membrane damage

25. A patient is stung by an insect and develops edema and urticaria.
Which vascular changes explain these findings?

I. Increased capillary permeability
II. Vasodilation
III. Fluid leakage into tissues
IV. Decreased blood flow

SECTION B (Total: 75 marks)

INSTRUCTION: This section consists of FOUR (4) short answer question (SAQ).
You are required to answer THREE (3) questions in the answer booklet provided.
Question 1 and Question 2 are COMPULSORY.
Answer either Question 3 OR Question 4.

Question 1

A 58-year-old obese woman presents with knee pain for 6 months. The pain worsens when climbing stairs and improves with rest. She reports morning stiffness lasting about 15 minutes. Physical examination shows mild swelling and crepitus.

(a) Based on the scenario above, answer the following questions:

i. Explain **TWO (2)** clinical features that support a diagnosis of osteoarthritis.

(2 marks)

ii. Suggest **ONE (1)** appropriate initial non-pharmacological management and justify your choice.

(2 marks)

A 70-year-old postmenopausal woman presents with a vertebral compression fracture following a minor lifting activity. She reports a history of low dietary calcium intake and limited sun exposure. A DEXA scan is performed, and the result shows a T-score of −2.8. Based on the findings, the physician initiates treatment with Alendronate and calcium with vitamin D supplementation.

(b) Based on the scenario above, answer the following questions:

i. Explain why a DEXA scan is used in the diagnosis of osteoporosis.

(2 marks)

ii. Interpret the DEXA scan result and explain your answer.

(2 marks)

iii. Justify the selection of Alendronate for this patient.

(2 marks)

iv. Suggest **TWO (2)** counselling points when dispensing Alendronate.

(2 marks)

(c) Explain what is meant by the additive effect in pharmacodynamic interactions.

(2 marks)

(d) Explain how the combination of Levodopa and Carbidopa improves therapeutic outcomes in patients with Parkinson's disease.

(2 marks)

Sarah, a 19-year-old, often uses Codeine cough syrup mixed with soft drinks during parties with friends. She believes it helps her feel relaxed and escape her problems. Lately, she noticed she needs to consume more to feel the same effect.

(e) Based on the scenario above, answer the following questions:

i. Give a reason why Sarah's condition is considered drug tolerance.

(2 marks)

ii. Based on Sarah's case, explain how peer pressure and the desire for euphoria contribute to drug abuse.

(3 marks)

Joana, a 28-year-old woman presents with plaque psoriasis for the past 5 years, affecting her elbows, knees, and lower back. She reports dry, scaly, itchy lesions that are sometimes painful, especially during cold weather. Her symptoms worsen during periods of work-related stress. She has been taking multivitamins regularly. She was recently prescribed Calcipotriol cream to be applied twice daily. However, in preparation for her upcoming wedding photoshoot, she has been applying the cream four times daily without consulting her doctor. After two weeks, she develops burning and itching at the application sites. She is unsure whether the treatment is effective and asks if a stronger medication is needed.

(f) Based on the scenario above, answer the following questions:

i. Identify **TWO (2)** factors that may have worsened the patient's psoriasis.

(2 marks)

ii. Identify the most likely cause of the patient's new symptoms of burning and itching.

(1 mark)

iii. Suggest appropriate action that should be taken to manage her burning and itching symptoms.

(1 mark)

Question 2

Renia, a 29-year-old married woman with moderate plaque psoriasis affecting her scalp and lower limbs was recently prescribed Acitretin 25 mg once daily. After two weeks, she returns complaining of dry, cracked lips, difficulty wearing contact lenses, and increased skin redness after spending time outdoors. Upon further discussion, she admits she has been sunbathing during the weekend and has stopped using contraception, thinking her skin condition is improving.

(a) Based on the scenario above, answer the following questions:

i. Explain how the patient's recent behavior may have worsened the adverse effects of Acitretin therapy.

(2 marks)

ii. State the reason why a patient taking Acitretin should avoid alcohol consumption.

(1 mark)

iii. Based on your answer (a) i. suggest **ONE (1)** counseling point and justify your answer.

(2 marks)

A 19-year-old college student, Amir, presents with persistent acne affecting his forehead, nose, and upper back. He has red, inflamed pimples, along with whiteheads and blackheads. The acne involves a large area of his face and back but does not include deep nodules or cysts. He has been using a topical antibiotic together with Benzoyl Peroxide for the past one month, with only slight improvement. He also reports frequently washing his face with an over-the-counter (OTC) cleanser and recently started taking protein supplements for gym training. He is now asking for stronger treatment options. The doctor decides to start him on oral Doxycycline.

(b) Based on the scenario above, answer the following questions:

i. Name a topical antibiotic used in acne treatment.

(1 mark)

ii. Name **ONE (1)** topical keratolytic agent besides Benzoyl Peroxide for acne treatment.

(1 mark)

iii. Explain why the doctor decided to start Amir on oral Doxycycline instead of continuing with topical therapy.

(2 marks)

iv. Explain **ONE (1)** appropriate counselling point for Amir when taking oral Doxycycline.

(2 marks)

v. Justify why Isotretinoin is not the most appropriate treatment for Amir at this stage.

(2 marks)

(c) i. State the pharmacological class of Pethidine.

(1 mark)

ii. Describe **TWO (2)** reasons why Pethidine is commonly used in obstetrics.

(2 marks)

A 23-year-old female is brought to the emergency department at Penang General Hospital 5 hours after ingesting approximately 9 g of Paracetamol following a personal conflict. She complains of nausea and vomiting. Serum Paracetamol level is above the treatment line. The doctor orders liver function tests (LFT) for further assessment.

(d) Based on the scenario above, answer the following questions:

i. Explain the metabolism of Paracetamol in overdose.

(4 marks)

ii. State the appropriate antidote for this patient and justify its use.

(2 marks)

iii. Explain the rationale for performing liver function tests (LFT) in this patient.

(2 marks)

iv. State **ONE (1)** parameter (other than (d) iii.) to monitor the patient condition.

(1 mark)

Answer either Question 3 OR Question 4

Question 3

A 46-year-old male presents with acute onset of severe pain, redness, and swelling in the first metatarsophalangeal joint that developed overnight. His medical history includes hypertension, hyperlipidemia, and peptic ulcer disease. He is diagnosed with acute gout and prescribed Colchicine, with a follow-up appointment scheduled in two weeks.

(a) Based on the scenario above, answer the following questions:

i. Explain the mechanism of action of Colchicine.

(2 marks)

ii. Justify why Colchicine is preferred over NSAIDs in this patient.

(2 marks)

A 50-year-old female presents with persistent joint pain, swelling, and morning stiffness lasting more than one hour. She reports that her mother was diagnosed with rheumatoid arthritis. After clinical assessment and laboratory investigations, she is newly diagnosed with rheumatoid arthritis. The doctor prescribes low-dose Prednisolone, Methotrexate, and folic acid as part of her initial treatment plan.

(b) Based on the scenario above, answer the following questions:

i. Prednisolone is used as a short-term bridging therapy.
Describe the meaning of bridging therapy and state the duration for its use.

(4 marks)

ii. Explain the rationale for combining Prednisolone, Methotrexate, and folic acid in this patient.

(3 marks)

A 45-year-old male was diagnosed with pneumonia and prescribed Ciprofloxacin 500 mg twice daily for 7 days. On day 3 of treatment, he developed epigastric discomfort and symptoms of gastritis. He visited a pharmacy and purchased Gelusil® for relief.

(c) Based on the scenario above, answer the following questions:

i. Analyse the potential interaction between Ciprofloxacin and Gelusil® in this patient.

(2 marks)

ii. Propose **TWO (2)** appropriate management strategies and patient counselling to optimise therapy.

(2 marks)

A 20-year-old student is experiencing sneezing, runny nose, and itchy eyes during spring season. She has her final exam in 2 days and is worried that her symptoms will affect her concentration. She visits a pharmacy to obtain medication for relief and is given Loratadine.

(d) Based on the scenario above, answer the following questions:

i. State the pharmacological classification of Loratadine.

(1 mark)

ii. Explain the mechanism of action of Loratadine.

(2 marks)

iii. Explain why Loratadine is preferred over Chlorpheniramine for this patient.

(3 marks)

Mr. Lim, a 45-year-old construction worker, visits the clinic with a 2-week history of an intensely itchy, red rash on his hands and lower legs. He says the rash worsens after handling industrial chemicals and harsh cleaning agents at work. He has mild eczema since childhood but no other allergies. On examination, his skin shows erythema, scaling, and small blisters on the palms and fingers. He has been using Mometasone Furoate and regular moisturizer as prescribed, but the rash has not improved.

(e) Based on the scenario above, answer the following questions:

i. Name **ONE (1)** alternative drug that can be considered.

(1 mark)

ii. Explain why the drug in (e) i. is appropriate for Mr. Lim.

(1 mark)

iii. Mr. Lim develops pus and increased pain in the affected areas.
Recommend **ONE (1)** additional treatment and justify your answer.

(2 marks)

Question 4

After completing 2 weeks of treatment for acute gout, a 46-year-old man returns for a follow-up appointment. His symptoms have improved. Laboratory investigations reveal a serum uric acid level of 10.3 mg/dL (normal range: 3.5–7.2 mg/dL). Based on this finding, the doctor initiates Allopurinol 150 mg once daily for long-term management.

(a) Based on the scenario above, answer the following questions:

i. Explain the mechanism of action of Allopurinol.

(2 marks)

ii. Justify the need to initiate Allopurinol therapy in this patient.

(2 marks)

After a few months of treatment with Methotrexate and folic acid, the patient continues to experience joint pain, swelling, and morning stiffness. Clinical assessment and laboratory findings indicate persistent active disease. The doctor decides to add Sulfasalazine to her treatment regimen.

(b) Based on the scenario above, answer the following questions:

i. Explain the rationale for adding Sulfasalazine to Methotrexate in this patient.

(2 marks)

ii. Sulfasalazine is a prodrug.
Describe its characteristics in relation to metabolism.

(2 marks)

iii. Describe the appropriate monitoring parameters and state **TWO (2)** counselling points after initiating Sulfasalazine.

(3 marks)

A 65-year-old patient with a history of heart failure is receiving Digoxin therapy. He is subsequently prescribed Clarithromycin for a respiratory tract infection. A few days later, he presents with nausea and visual disturbances.

(c) Based on the scenario above, answer the following questions:

i. Identify the type of drug interaction involved and explain its mechanism.

(2 marks)

ii. Explain why toxicity occurs in this patient.

(2 marks)

A 60-year-old patient with a history of hypertension, hypercholesterolemia, and type 2 diabetes mellitus presents with symptoms of gastritis. The patient is currently taking Amlodipine, Simvastatin, and Janumet®. The doctor prescribes Famotidine.

(d) Based on the scenario above, answer the following questions:

i. State the pharmacological classification of Famotidine.

(1 mark)

ii. Explain the mechanism of action of Famotidine.

(2 marks)

iii. Rationalize why Famotidine is preferred over Cimetidine in this patient.

(3 marks)

Amy, a 4-year-old girl, has red, itchy rashes on her cheeks, elbows, and knees for 3 weeks. Her mother informs that the rashes usually get worse during cold weather and often become more irritated when Amy scratches them. She was prescribed Hydrocortisone 1% cream, but there has been minimal improvement. Amy's constant scratching, especially at night, is making it difficult for her to sleep. On physical examination, the affected areas appear red, dry, cracked, and slightly thickened.

(e) Based on the scenario above, answer the following questions:

i. State **ONE (1)** appropriate topical treatment for long-term management to prevent Amy's condition from getting worse.

(1 mark)

ii. Explain why the treatment in (e) i. is appropriate for Amy.

(1 mark)

iii. Amy continues to itch despite treatment, especially at night.
Recommend **ONE (1)** oral drug and justify why it is suitable for her condition.
(2 marks)

END OF EXAMINATION PAPER