



UNIVERSITI KUALA LUMPUR
ROYAL COLLEGE OF MEDICINE PERAK

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE : RPD12003
COURSE NAME : SYSTEMIC PHARMACOLOGY
PROGRAMME NAME : DIPLOMA IN PHARMACY
DATE : 23 JUNE 2026
TIME : 09.00 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 14 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 best describe a peptic ulcer?
 - A. Superficial irritation of the stomach lining without tissue damage
 - B. Inflammation is limited to the gastric mucosa
 - C. A deep open sore affecting the stomach or duodenal lining
 - D. Temporary acid reflux into the esophagus

2. A 45-year-old man complains of epigastric pain that worsens 2–3 hours after meals, along with nausea and weight loss.
Which condition is most likely?
 - A. Duodenal ulcer
 - B. Gastroesophageal reflux disease
 - C. Gastric ulcer
 - D. Acute gastritis

3. Which statement best describes chronic diarrhea?
 - A. Resolves within 48 hours without treatment
 - B. Always caused by viral infections
 - C. Persists for more than 4 weeks and may indicate underlying disease
 - D. Occurs only after food poisoning

4. A patient presents with diarrhea, abdominal cramps, dehydration, and fever.
Which cause is most likely?
 - A. Lactose intolerance
 - B. Irritable bowel syndrome
 - C. Infectious diarrhea
 - D. Drug-induced osmotic diarrhea

5. Which term best describes vomiting?
- A. A mild feeling of stomach discomfort
 - B. Passive regurgitation of food without effort
 - C. Forceful expulsion of stomach contents through the mouth
 - D. Increased bowel movement due to irritation
6. A patient experiences nausea after exposure to toxins circulating in the blood. Which pathway is most likely responsible for activating the vomiting center?
- A. Vestibular system
 - B. Gastrointestinal tract
 - C. Higher cortical centers
 - D. Chemoreceptor Trigger Zone (CTZ)
7. Which statement best describes irritable bowel syndrome (IBS)?
- A. An inflammatory disease-causing permanent bowel damage
 - B. A structural disorder of the colon
 - C. A functional gastrointestinal disorder without structural damage
 - D. A bacterial infection of the intestine
8. Constipation is best described as
- A. passage of watery stools more than three times daily
 - B. painful bowel movements with blood
 - C. infrequent bowel movements with hard, dry stools
 - D. increased intestinal secretion
9. A patient with chronic kidney disease develops hypertension. This condition is best classified as
- A. primary hypertension
 - B. lifestyle-induced hypertension
 - C. secondary hypertension
 - D. white-coat hypertension

10. Arrhythmia is best defined as
- A. reduced blood flow to the heart muscle
 - B. structural damage to heart valves
 - C. an abnormal heart rhythm due to disturbed electrical signals
 - D. inflammation of the heart muscle
11. The primary consequence of heart failure is
- A. increased oxygen delivery to tissues
 - B. reduced blood viscosity
 - C. inadequate oxygen and nutrient supply to body tissues
 - D. excessive fluid loss from the body
12. Which symptom of heart failure is mainly caused by fluid accumulation in the lungs?
- A. Fatigue
 - B. Peripheral edema
 - C. Dyspnea
 - D. Chest pain
13. Which mechanism is the main pathophysiological cause of ischemic heart disease?
- A. Cardiac muscle hypertrophy
 - B. Atherosclerotic plaque
 - C. Increased heart rate alone
 - D. Reduced blood viscosity
14. A patient with long-standing ischemic heart disease develops irregular heartbeats. This is best described as which complication?
- A. Cardiogenic shock
 - B. Heart valve disease
 - C. Arrhythmia
 - D. Pericarditis

15. A patient presents severe chest pain occurring at rest and not relieved by nitroglycerin. Which diagnosis is most likely?
- A. Stable angina
 - B. Unstable angina
 - C. Gastroesophageal reflux disease
 - D. Musculoskeletal chest pain
16. A patient presents with bilateral leg swelling and pitting edema. Which mechanism best explains this in heart failure?
- A. Increased red blood cell production
 - B. Reduced sodium absorption in intestines
 - C. Fluid retention due to poor cardiac pumping
 - D. Increased lymphatic drainage
17. Which organ is commonly affected by chronic hypertension-related damage?
- A. Liver
 - B. Pancreas
 - C. Kidneys
 - D. Spleen
18. The main physiological consequence of anemia is
- A. increased blood pressure
 - B. improved tissue oxygenation
 - C. reduced oxygen supply to body tissues
 - D. increased carbon dioxide removal
19. A pregnant woman with untreated anemia is at higher risk of
- A. gestational diabetes
 - B. preeclampsia only
 - C. premature birth and low-birth-weight infant
 - D. congenital heart disease

20. Blood coagulation is best described as a process that
- A. increases blood pressure after injury
 - B. prevents excessive bleeding by forming a stable blood clot
 - C. dissolves platelets at the injury site
 - D. causes permanent vessel narrowing
21. Which physical sign may be seen in patients with severe hyperlipidemia.
- A. Skin rash
 - B. Yellowish fatty deposits around the eyelids
 - C. Blue discoloration of the lips
 - D. Severe abdominal swelling
22. A patient experiences airway narrowing due to smooth muscle tightening and inflammation that can be reversed with treatment. This condition is best described as
- A. asthma
 - B. Chronic Obstructive Pulmonary Disease (COPD)
 - C. bronchitis
 - D. chronic cough
23. Which feature best differentiates Chronic Obstructive Pulmonary Disease (COPD) from asthma in terms of disease progression?
- A. COPD symptoms occur only when triggered
 - B. COPD is progressive and persistent
 - C. Asthma is progressive while COPD is not
 - D. Asthma causes permanent airway damage
24. Choose the reason why a patient undergoing dialysis develops multiple vitamin deficiencies.
- A. Dialysis decreases vitamin production
 - B. Dialysis removes waste and essential nutrients
 - C. Dialysis reduces appetite
 - D. Dialysis improves absorption

25. A patient with chronic kidney disease (CKD) develops weak bones.

What is the underlying reason?

- A. Reduced vitamin C production
- B. Reduced calcium absorption
- C. Excess protein synthesis
- D. Increased red blood cell production

SECTION B (Total: 75 marks)

INSTRUCTION: This section consists of **FOUR (4)** short answer questions (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) Answer the following questions.

- i. List **TWO (2)** classifications of drugs used to treat peptic ulcer disease. (2 marks)
- ii. Identify the mechanism of action of omeprazole in reducing gastric acid secretion. (2 marks)
- iii. Identify **ONE (1)** indication for senna. (1 mark)

(b) A 28-year-old woman with heavy menstrual bleeding is diagnosed with iron deficiency anemia. The doctor prescribes ferrous sulfate tablets and advises her not to take the medication together with milk.

- i. Identify the classification of ferrous sulfate. (1 mark)
- ii. Explain the mechanism of action of ferrous sulfate in treating anemia. (1 mark)
- iii. Explain why the patient should avoid taking ferrous sulfate together with milk. (3 marks)
- iv. List **TWO (2)** common side effects of ferrous sulfate. (2 marks)

(c) A patient with chronic kidney disease develops anemia and is prescribed epoetin alfa.

- i. Identify the classification of epoetin alfa. (1 mark)
- ii. Explain the mechanism of action of epoetin alfa. (2 marks)

- iii. Explain why epoetin alfa is commonly used in patients with chronic kidney disease.

(3 marks)

- (d) Mr. Tan, a 55-year-old man is prescribed rosuvastatin to reduce his risk of cardiovascular disease.
Explain how rosuvastatin helps reduce the risk of cardiovascular disease.

(3 marks)

- (e) Name **TWO (2)** types of vitamins.

(2 marks)

- (f) Explain why a chronic kidney disease (CKD) patient who has adequate sunlight exposure still develops vitamin D deficiency.

(2 marks)

Question 2

- (a) Mr. Ahmad, a 52-year-old man with hypertension, is prescribed losartan to control his blood pressure. He was previously taking enalapril, but he developed a persistent dry cough, so the doctor switched his medication.
- Identify the classification of losartan.
(1 mark)
 - Explain the mechanism of action of losartan in lowering blood pressure.
(2 marks)
 - Explain why the doctor changed enalapril to losartan for this patient.
(4 marks)
- (b) Mr. Lim, a 60-year-old patient with stable angina, is prescribed glyceryl trinitrate (GTN) sublingual tablets to relieve chest pain during angina attacks.
- Identify the drug classification of glyceryl trinitrate (GTN).
(1 mark)
 - Explain the mechanism of action of GTN in relieving angina.
(2 marks)
 - Explain why the patient should sit down before taking GTN sublingual tablets.
(3 marks)
 - Explain why proper storage of GTN tablets is important.
(2 marks)
- (c) Mr. Rahman, a 67-year-old patient with heart failure, is treated with digoxin to improve cardiac function. The doctor advises regular monitoring during his treatment.
- Identify the classification of digoxin.
(1 mark)
 - Explain **TWO (2)** symptoms that may indicate digoxin toxicity.
(2 marks)
 - Explain why regular monitoring is necessary for patients receiving digoxin therapy.
(3 marks)

(d) List **ONE (1)** side effect for each drug.

i. Metoprolol

(1 mark)

ii. GTN

(1 mark)

(e) List **ONE (1)** indication for each drug.

i. Propranolol

(1 mark)

ii. Perindopril

(1 mark)

Answer either Question 3 OR Question 4

Question 3

- (a) i. Explain the mechanism of action of pantoprazole. (2 marks)
- ii. Explain why ketoconazole absorption decreases when taken with pantoprazole. (3 marks)
- (b) Mr. Rahim, a 60-year-old man with chronic knee pain due to osteoarthritis, has been taking ibuprofen regularly for several months to relieve his pain. Recently, he complained of burning epigastric pain and indigestion, and he is diagnosed with a gastric ulcer.
Analyse why long-term use of ibuprofen can increase the risk of peptic ulcer. (2 marks)
- (c) A 30-year-old pregnant woman at 8 weeks of pregnancy planned to take misoprostol for prevention of NSAID-induced gastric ulcer after hearing about it from a friend. During a clinic visit, the doctor informed her that the drug is contraindicated in pregnancy.
- i. Explain the mechanism of action of misoprostol. (2 marks)
- ii. Explain why misoprostol is contraindicated during pregnancy.
Justify its implication for the fetus. (3 marks)
- (d) A cancer patient undergoing chemotherapy develops severe nausea and vomiting after treatment. The doctor prescribes ondansetron before the next chemotherapy cycle to prevent these symptoms.
Explain why chemotherapy causes nausea and vomiting. (3 marks)

- (e) Mrs. Lim has a history of chronic constipation and recently developed painful and swollen hemorrhoids. The doctor prescribes a topical preparation containing lidocaine and hydrocortisone to relieve her symptoms.

Analyze how these medications help relieve hemorrhoid symptoms caused by chronic constipation.

(2 marks)

- (f) A 30-year-old woman presents to the pharmacy with a 5-day history of wet cough. She reports that her cough is worse in the morning and feels the need to clear her chest when coughing. She has no fever, breathlessness, or underlying medical conditions. Suggest a suitable medication for this patient, including its type and mechanism of action.

(4 marks)

- (g) Mr. Lim, 55, works in a furniture manufacturing factory where he is regularly exposed to wood dust. He has never smoked, but he has been exposed to secondhand smoke at home for many years, as his spouse is a heavy smoker. Recently, he has developed a chronic cough and worsening breathlessness. He also has a history of high cholesterol and mild eczema. Spirometry test confirms a diagnosis of COPD.

- i. Identify **TWO (2)** risk factors of COPD based on the above information.

(2 marks)

- ii. Mr. Lim says he is on a regular inhaler containing two medications and uses another inhaler when needed for quick relief.

Predict the types of inhalers he is taking.

(2 marks)

Question 4

- (a) Mr. Tan, a 62-year-old patient with peptic ulcer disease, has been taking cimetidine for several weeks. He is also on warfarin therapy for atrial fibrillation. During a follow-up visit, the doctor notices that his International Normalized Ratio (INR) level has increased significantly, indicating a higher risk of bleeding.
- Explain the mechanism of action of cimetidine.
(2 marks)
 - Analyse how cimetidine may contribute to the increased bleeding risk in this patient.
(4 marks)
- (b) Mrs. Lee, a 60-year-old woman with chronic constipation, is advised by her pharmacist to take psyllium husk to help regulate her bowel movements.
- Explain the mechanism of action of psyllium husk in relieving constipation.
(2 marks)
 - Explain why psyllium husk may not be suitable for patients with kidney failure.
(3 marks)
 - Suggest **ONE (1)** non-pharmacological approach for constipation.
(1 mark)
- (c) A 30-year-old traveler develops watery diarrhea and abdominal cramps after eating contaminated street food. He visits a pharmacy and is given loperamide to control his symptoms.
- Explain the mechanism of action of loperamide in controlling diarrhea.
(2 marks)
 - Explain why loperamide should be avoided in infectious diarrhea caused by invasive bacteria.
(3 marks)
- (d) A 30-year-old woman presents to the pharmacy with a 5-day history of dry cough. She reports that the cough is irritating, occurs frequently throughout the day, and does not provide relief after coughing. She has no fever, breathlessness, or underlying medical conditions.
- Suggest a suitable medication for this patient, including its type and mechanism of action.

(4 marks)

- (e) Mr. Soleh, a 45-year-old office worker, comes to the clinic for a follow-up appointment. He has been living with asthma for many years but feels his condition has worsened. Over the past month, he has experienced frequent wheezing, chest tightness, and coughing, even during the day, despite using his inhaler X when needed. The doctor then adds inhaler Y, which he is advised to use regularly every day to reduce airway inflammation and prevent symptoms.

i. Predict **TWO (2)** possible medications that could be inhaler Y.

(2 marks)

ii. State **TWO (2)** common side effects of inhaler Y.

(2 marks)

END OF EXAMINATION PAPER