



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Industrial Management

PAPER NO: 606/23/M06

DURATION: 3 Hours

MAY/JUNE 2025 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Each question carries 20 marks.

This paper consists of 2 printed pages.

QUESTION 1

- (a) Explain some common challenges that managers face when performing the functions of management. (10 marks)
- (b) Explain how do the four (4) functions of management contribute to the overall success of an organisation. (10 marks)

QUESTION 2

- (a) Define the term disputes and identify the various types of disputes at work places. (8 marks)
- (b) Explain the importance of setting organisational policies. (12 marks)

QUESTION 3

Explain the effects of organisational policies and provide examples of how patient care policies are implemented in medical organisation. (20 marks)

QUESTION 4

- (a) Discuss the importance of strategic planning process in management. (10 marks)
- (b) Define the term deadline and outline how to adhere deadline. (5 marks)
- (c) Explain how managers effectively evaluate the performance of their subordinates. (5 marks)

QUESTION 5

Explain providing examples of specific targets that organisation commonly set and how should target be reviewed and adjusted. (20 marks)

QUESTION 6

- (a) Explain how a positive organisational culture can contribute to improve organisational performance. (10 marks)
- (b) Describe how can organisation measure employee engagement and track progress. (10 marks)

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**HIGHER EDUCATION EXAMINATIONS COUNCIL
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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Human Anatomy and Physiology

PAPER NO: 606/23/M01

DURATION: 3 hours

MAY/JUNE 2025 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

- 1. Answer any five (5) questions.**
- 2. Each question carries 20 marks.**

This paper consists of 3 printed pages.

QUESTION 1

- a) Define the following terms:
- | | |
|-----------------|----------|
| i) Cell | (1 mark) |
| ii) Organelle | (1 mark) |
| iii) Tissue | (1 mark) |
| iv) Organ | (1 mark) |
| v) Organ system | (1 mark) |
- b) Differentiate anatomy and physiology. (4 marks)
- c) State any one (1) type of epithelial tissue and explain it. (1 mark)
- d) State one (1) reason why pancreas is called exocrine gland. (1 mark)
- e) Describe the structure of the human body in terms of its levels of organisation. (9 marks)

QUESTION 2

Describe the causes and symptoms of the following common endocrine disorders:

- a) Hypothyroidism (5 marks)
- b) Diabetes mellitus (5 marks)
- c) Hyperthyroidism (5 marks)
- d) Cushings syndrome (5 marks)

QUESTION 3

- a) By means of a well-labelled diagram illustrate the positions of the endocrine glands. (9 marks)
- b) Describe the primary functions and characteristics of the following tissues:
- | | |
|------------------------|-----------|
| i) Epithelial tissue | (2 marks) |
| ii) Muscle tissue | (2 marks) |
| iii) Connective tissue | (2 marks) |
- c) Describe the causes and symptoms of Addison's Disease Endocrine disorder. (5 marks)



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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Pharmacology

PAPER NO: 606/23/M02

DURATION: 3 hours

MAY/JUNE 2025 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Do not write anything on the question paper.
3. Do not write your name on the answer booklet.

This paper consists of 3 printed pages.

QUESTION 1

- a) with the aid of relevant medicine examples, describe the following types of drug interactions:
- i) Drug - food interactions (5 marks)
 - ii) Drug – drug interactions (5 marks)
- b) Describe pharmacodynamic concepts under the following:
- i) Synergism (4 marks)
 - ii) Antagonism (6 marks)

QUESTION 2

- a) Define the term bioavailability, giving an example. (3 marks)
- b) Discuss the processes involved in pharmacokinetics under the following:
- i) Binding sites (4 marks)
 - ii) Metabolism (6 marks)
- c) For the following drug classes, give two examples, explain their mechanism of action (specific mechanism of action) and side effects thereof.
- i) Calcium channel blockers (6 marks)
- d) Define the term pharmacokinetics. (1 mark)

QUESTION 3

- a) Define the following terms:
- i) Pathophysiology (3 marks)
 - ii) Adverse drug reaction (3 marks)
 - iii) Idiosyncrasy (3 marks)
 - iv) Therapeutic index (4 marks)
- b) Explain how the following factors affects or contribute to Adverse Drug Reactions:
- i) Hepatic function (4 marks)
 - ii) Pregnancy (3 marks)

QUESTION 4

- a) For the following Central Nervous System conditions, briefly describe the mechanism of action of one named drug, its side effects and how the conditions come about.
- i) Parkinson's disease (6 marks)
 - ii) Migraine headache (6 marks)
- b) Describe the clinical use of depolarising muscle relaxants. (3 marks)
- c) Outline the signs and symptoms of rheumatoid arthritis. (3 marks)
- d) State two (2) examples of drugs used to suppress the immune system. (2 marks)

QUESTION 5

- a) Describe the different types of Diabetes Mellitus. (8 marks)
- b) State and explain any three (3) types of diuretics. (6 marks)
- c) Explain the mechanism of action of any one drug used for the induction of labour. (4 marks)
- d) State any two (2) signs and symptoms of Angina pectoris. (2 marks)

QUESTION 6

- a) Describe anticoagulants under the following:
- i) Classification (3 marks)
 - ii) Side effects (2 marks)
- b) Outline the steps to be taken to ascertain rational drug use. (5 marks)
- c) Highlight the causes of irrational drug use. (6 marks)
- d) Discuss the mode of action of any one drug used for the treatment of cancer. (4 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Herbal Formulations

PAPER NO: 606/23/M03

DURATION: 3 Hours

MAY/JUNE 2025 EXAMINATION

REQUIREMENTS

Blue /Black pen, Ruler.

INSTRUCTIONS TO CANDIDATE

- 1. Answer any five (5) questions each questions carries twenty (20) marks.**
- 2. Do not write anything on the question paper.**
- 3. Do not write your name on the answer booklet.**

This paper consists of 2 printed pages.

PAPER NO: 606/23/M03- HERBAL FORMULATIONS

QUESTION 1

- a) Define the term "complimentary medicine". (5 marks)
- b) List and explain three (3) types of complimentary medicines. (15 marks)

QUESTION 2

- a) State and explain five (5) cultural; uses of natural medicines. (10 marks)
- b) Give five (5) examples of official books used to document guidelines for the manufacturing, quality control, packaging, storage, dose regiments, indications, contraindications, etc of different pharmaceutical products/ medicines for the treatment of diseases. Include the abbreviations of the stated books. (10 marks)

QUESTION 3

- a) State and explain the classification of drugs. (10 marks)
- b) Distinguish between monocots and dicots. (10 marks)

QUESTION 4

Elaborate on the factors that influence the selection of solvents or herbal extraction, including, polarity, volatility and selectivity. State at least five (5). (20 marks)

QUESTION 5

- a) What are the key challenges and best practices in implementing GMP in the production of verbal medicines. (10 marks)
- b) Explain the importance of quality control and documentation in the production of GMP- compliant herbal medicines. (10 marks)

QUESTION 6

- a) Describe the different methods of harvesting medicinal herbs. State at least five (5). (10 marks)
- b) Explain the factors considered when determining the optimal time for harvesting medicinal plants. List at least five (5) factors. (10 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Management

PAPER NO: 606/23/M06

DURATION: 3 Hours

MAY / JUNE 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Do not write anything on the question paper.
3. Do not write your name on the answer booklet.

This paper consists of 2 printed pages.

❧ QUESTION 1

Describe in detail the different types of resources required by pharmaceutical technician and their relevance in their day to day activities. (20 marks)

❧ QUESTION 2

- a) Outline any five (5) causes of disputes in a pharmaceutical organisation. (10 marks)
- b) Briefly discuss any five (5) effective conflict/disputes resolution strategies for the workplace. (10 marks)

❧ QUESTION 3

Discuss the five (5) main theories of management. (20 marks)

❧ QUESTION 4

- a) Briefly outline the appraisal cycle. (10 marks)
- b) Explain three (3) advantages and two (2) disadvantages of appraisals. (10 marks)

QUESTION 5

- a) Explain the managerial roles as identified by Henry Mintzberg. (10 marks)
- b) Briefly discuss how organisational culture impacts decision-making and employee behaviour in an organization. (10 marks)

❧ QUESTION 6

With the reference to relevant examples discuss five (5) attributes of a good management team. (20 marks)

QUESTION 7

- a) Describe good and bad organisational behaviour. (10 marks)
- b) Distinguish with the aid of relevant examples the terms manager and subordinate. (10 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Pharmaceutical Formulation

PAPER NO: 606/23/M04

DURATION: 3 Hours

MAY / JUNE 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Do not write anything on the question paper.
3. Do not write your name on the answer booklet.

This paper consists of 3 printed pages.

QUESTION 1

- a) State any five (5) ideal properties of bases used in the formulation of semi-solid dosage forms. (5 marks)
- b) Differentiate the following:
 - i) Ointment and cream (4 marks)
 - ii) Lotion and liniment (4 marks)
- c) State the bases used in the formulation of ointment. (4 marks)
- d) Briefly describe how solids or powders are incorporated in the base when preparing an ointment. (3 marks)

QUESTION 2

- a) With the aid of a labelled diagram, outline the structure of a transdermal patch. (7 marks)
- b) Define the term 'radiopharmaceutical' and give two (2) examples of radiopharmaceuticals. (4 marks)
- c) Outline any five (5) uses of transdermal preparation. (5 marks)
- d) Differentiate diffusible and indiffusible powders giving relevant examples. (4 marks)

QUESTION 3

- a) State and explain any five (5) types of tablets. (10 marks)
- b) Describe the wet granulation process of manufacturing tablets. (5 marks)
- c) State any five (5) quality control tests used to analyse tablets. (5 marks)

QUESTION 4

- a) Define the following terms:
- | | |
|-------------------|-----------|
| i) Sterilisation | (2 marks) |
| ii) Disinfection | (2 marks) |
| iii) Bioburden | (2 marks) |
| iv) Antiseptic | (2 marks) |
| v) Bacteriostatic | (2 marks) |
- b) Describe the following sterilisation methods:
- | | |
|------------------------------|-----------|
| i) Steam sterilisation | (5 marks) |
| ii) Filtration sterilisation | (5 marks) |

QUESTION 5

- a) Provide any five (5) factors that affect the stability of pharmaceutical preparations. (5 marks)
- b) State any three (3) tests used to evaluate the following dosage forms:
- | | |
|----------------|-----------|
| i) Tablets | (3 marks) |
| ii) Capsules | (3 marks) |
| iii) Solutions | (3 marks) |
- c) Explain the meaning of product quarantine. (3 marks)
- d) Outline the purposes of product quarantine. (3 marks)

QUESTION 6

- a) Explain the meaning of total parenteral nutrition. (2 marks)
- b) List the components of total parenteral nutrition. (5 marks)
- c) List any five (5) methods of sterilisation. (5 marks)
- d) Outline the manufacturing process of capsules. (8 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

SUBJECT: Human Anatomy and Physiology PAPER NO: 606/23/M01

DURATION: 3 hours

OCTOBER/NOVEMBER 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

- 1) Answer any five (5) questions.
- 2) Do not write anything on any paper of the question paper.
- 3) Do not include your name on the booklet.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M01-HUMAN ANATOMY AND PHYSIOLOGY

QUESTION 1

- a) State the functions of the nervous system? (4 marks)
- b) Differentiate between the nervous system and endocrine system? (10 marks)
- c) Briefly describe thermo-regulation by the skin. (6 marks)

QUESTION 2

- a) Describe the contributions made by the following in the digestive process?
 - i) Pancreas (6 marks)
 - ii) Gastric juices (8 marks)
- b) Outline the roles of the following hormones in the digestive system?
 - i) Insulin (2 marks)
 - ii) Glucagon (2 marks)
 - iii) Motilin (2 marks)

QUESTION 3

- a) Define the terms:
 - i) The cell (2 marks)
 - ii) Human anatomy (2 marks)
 - iii) Organ system (2 marks)
 - iv) Tissue (2 marks)
 - v) Physiology (2 marks)
- b) List four (4) types of tissues in the human body. (4 marks)
- c) Identify any six (6) specific cell types in the human body. (6 marks)

QUESTION 4

- a) Define the terms:
 - i) Menopause (2 marks)
 - ii) Puberty (2 marks)

PAPER NO: 606/23/M01-HUMAN ANATOMY AND PHYSIOLOGY

- b) Describe the physiological of menstrual cycle. (8 marks)
- c) Highlight the changes that occur in male and female at puberty stage. (8 marks)

QUESTION 5

- a) Describe the structure of cell, use a clearly labelled diagram. (10 marks)
- b) Explain any two (2) functions of the liver? (4 marks)
- c) Outline any two (2) function of the liver? (4 marks)
- d) Pancreas is called exo-endocrine gland, state two (2) reasons.(2 marks)

QUESTION 6

- a) Describe mechanical pumping of the heart. (15 marks)
- b) Articulate the mode of action of steroid hormones? (5 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Pharmacy Regulations

PAPER NO: 606/23/M09

DURATION: 3 hours

OCTOBER/NOVEMBER 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Do not write anything on the question paper.
3. Do not write your name on any part of the script.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M09 – PHARMACY REGULATIONS

QUESTION 1

a) Define the terms:

- | | | |
|------|---------------|-----------|
| i) | Medicine | (5 marks) |
| ii) | Advertisement | (2 marks) |
| iii) | Prescriber | (2 marks) |
| iv) | Supervisor | (2 marks) |
| v) | Dispense | (2 marks) |

b) List seven (7) drugs included in the Dangerous Drugs Act (Chapter 15:2).
(7 marks)

QUESTION 2

a) Highlight important information that should be on a medicine label.
(10 marks)

b) For the following categories of medicines distribution, state what they stand for and state one (1) example of drugs that fall in each category:

- | | | |
|------|-------|-----------|
| i) | N | (2 marks) |
| ii) | PP | (2 marks) |
| iii) | PIM | (2 marks) |
| iv) | P | (2 marks) |
| v) | PPVet | (2 marks) |

QUESTION 3

a) Indicate any five (5) common poor dispensing practices? (10 marks)

b) Examine the roles of Health Professions Authority of Zimbabwe? (10 marks)

QUESTION 4

Cite the ten (10) functions and powers of Pharmacist Council of Zimbabwe (PCZ).
(20 marks)

PAPER NO: 606/23/M09 – PHARMACY REGULATIONS

QUESTION 5

- a) What are the five (5) minimum requirements for premises licensing? (10 marks)
- b) The Medicines and Allied Substances Control Act (MASCA) provides for? (10 marks)

QUESTION 6

- a) Illustrate with the aid of clearly labelled diagram important information that should appear on a standard prescription? (10 marks)
- b) According to the Dangerous Drugs Act regulations which persons are authorized to be in possession of any dangerous drugs? (5 marks)
- c) List any five (5) members of the MCAZ body? (5 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Clinical Pharmacy Practice

PAPER NO: 606/23/M06

DURATION: 3 Hours

OCTOBER/ NOVEMBER 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. This question paper comprises of six (6) questions.
2. Answer any five (5) questions. Each question carries twenty (20) marks.
3. Start each question on new page.
4. This question paper comprises of three (3) printed pages.
5. Do not write anything on the question paper.
6. Do not write your name on the Answer Booklet.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M08 – CLINICAL PHARMACY PRACTICE

QUESTION 1

Identify common drugs that can be toxic to the fetus or cause birth defects and explain their mechanism of toxicity. (20marks)

QUESTION 2

Explain the general principles of drug monitoring in neonates , infants and children, considering their unique developmental and physiological characteristics. (20 marks)

QUESTION 3

Discuss how to identify potential drug interactions based on patient profiles and medication lists. (20 marks)

QUESTION 4

- a) According to the Essential Drug List in Zimbabwe (EDLIZ), briefly explain the first aid procedure for a poisoned patient. (8 marks)
- b) Give a brief explanation for the treatment of the following poisonings:
- | | | |
|------|------------------------------|-----------|
| i) | Antidepressants | (4 marks) |
| ii) | Aspirin/Salicylate Poisoning | (4 marks) |
| iii) | Paracetamol poisoning | (4 marks) |

QUESTION 5

Define the terms “abuse”, “dependence” and “addiction” and explain their distinctions. (20 marks)

QUESTION 6

- a) Emphasize the importance of patient counselling in preventing drug and substance abuse. (10 marks)
- b) Explain the term "compliance" and "adherence" and their importance in drug therapy. (10 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

SUBJECT: Quality Assurance

PAPER NO: 606/23/M05

DURATION: 3 hours

MAY/JUNE 2024 EXAMINATION

REQUIREMENTS

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INSTRUCTIONS TO CANDIDATE

- 1. This question paper comprises of six (6) questions. Each question carries twenty-five (25) marks.**
- 2. Answer any four (4) questions.**
- 3. Do not write anything on the question paper.**
- 4. Do not write your name on the answer script.**

This paper consists of 3 printed pages.

PAPER NO: 606/23/M05 - QUALITY ASSURANCE

QUESTION 1

Describe the following as applied in pharmaceutical quality control and quality assurance.

- a) Key considerations when purchasing raw materials (10 marks)
- b) Recommend disposal methods of pharmaceutical waste. (10 marks)
- c) Good manufacturing practices (GMPs) and World Health guidelines for handling raw materials. (5 marks)

QUESTION 2

Discuss reliability as applied in quality assurance during manufacturing of pharmaceutical drugs. (25 marks)

QUESTION 3

Outline in detail the steps involved in carrying out quality audits. (25 marks)

QUESTION 4

Discuss the implementation of ISO 9001:2005 in manufacturing of pharmaceuticals. (25 marks)

QUESTION 5

Describe in detail the best practices for developing and updating standard operating procedures (SOPs) in a pharmaceutical manufacturing company to ensure regulatory compliance and maintain quality standards. (25 marks)

PAPER NO: 606/23/M05 – QUALITY ASSURANCE

QUESTION 6

With the aid of relevant examples distinguish in the following aid of examples:

- a) i) Acceptance sampling and for attributes and acceptance sampling for variables. (10 marks)
- ii) Quality costs and quality control. (10 marks)
- b) Briefly explain proper storage of biological samples in optimum conditions. (5 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Infectious Disease Management

PAPER NO: 606/23/M10

DURATION: 3 Hours

OCTOBER/ NOVEMBER 2024 EXAMINATION

REQUIREMENTS

Answer Booklet

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Do not write anything on the question paper.
3. Do not write your name on the Answer Booklet.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M10 - INFECTIOUS DISEASE MANAGEMENT

QUESTION 1

- a) Define the following terms giving relevant examples.
- | | |
|---------------|-----------|
| i) Endemic | (3 marks) |
| ii) Epidemic | (3 marks) |
| iii) Pandemic | (3 marks) |
- b) State any two (2) diseases caused by the following:
- | | |
|----------------------------|-----------|
| i) Pyrogenic cocci | (2 marks) |
| ii) Gram negative bacilli | (2 marks) |
| iii) Gram positive bacilli | (2 marks) |
- c) Discuss the social and economic impact of Tuberculosis. (5 marks)

QUESTION 2

- a) Describe the treatment of the following infectious diseases.
- | | |
|----------------|-----------|
| i) Cholera | (4 marks) |
| ii) Amoebiasis | (3 marks) |
| iii) Rabies | (3 marks) |
- b) Describe the life cycle of bilharzias. (10 marks)

QUESTION 3

- a) Describe the mechanism of action of the following antibacterial agents.
- | | |
|---------------------|-----------|
| i) Sulphonamides | (3 marks) |
| ii) Aminoglycosides | (3 marks) |
| iii) Cephalosporins | (3 marks) |
- b) For the above stated antibacterial agents, give two (2) examples that fall under each. (6 marks)
- c) Explain the use, adverse effects and contraindication of chloramphenicol. (5 marks)

PAPER NO: GOG/23/M10 - INFECTIOUS DISEASE MANAGEMENT

QUESTION 4

- a) Outline the different forms of bacterial resistance to drugs. (6 marks)
- b) Indicate the signs and symptoms of the following parasitic infections. (5 marks)
- i) Malaria (4 marks)
 - ii) Trypanosomiasis (4 marks)
 - iii) Entamoeba histolytica (4 marks)

QUESTION 5

- a) Explain how the following methods are used to measure bacterial growth.
- i) Membrane filter method (4 marks)
 - ii) Plate counts (4 marks)
- b) Describe how the following factors affect microbial growth:
- i) Osmotic pressure (4 marks)
 - ii) Temperature (4 marks)
- c) Explore the principle of ionising radiation during sterilisation. (5 marks)

QUESTION 6

- a) Describe the following host-defense systems:
- i) Interferons (4 marks)
 - ii) Complement system (4 marks)
- b) State any five (5) sources of contamination. (5 marks)
- c) Define the following terms:
- i) Pathogenicity (3 marks)
 - ii) Phagocytosis (2 marks)
 - iii) Virulence (2 marks)

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DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

SUBJECT: Supply Chain Management PAPER NO: 606/23/M07

DURATION: 3 Hours

OCTOBER/NOVEMBER 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

- 1) Answer any five (5) questions.
- 2) Do not write anything on the question paper.
- 3) Do not write your name on the answer booklet.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M07-SUPPLY CHAIN MANAGEMENT

QUESTION 1

- a) State any five (5) socio-economic determinants of health. (5 marks)
- b) State the five (5) WHO building blocks of a health care system. (5 marks)
- c) State the criteria for medicine selection into the essential medicines list. (10 marks)

QUESTION 2

- a) Differentiate drug abuse and drug misuse. (4 marks)
- b) Explain the consequences of irrational medicine use. (8 marks)
- c) Outline interventions to promote rational medicine use. (8 marks)

QUESTION 3

- a) Give any five (5) components that are recorded on a stock card. (5 marks)
- b) Differentiate aggregated and disaggregated data, outlining the advantages and disadvantages. (8 marks)
- c) Define the following in relation to stock management:
 - i) Consumption (2 marks)
 - ii) Losses and adjustments (3 marks)
 - iii) Stock on hand (2 marks)

QUESTION 4

- a) Outline the roles of the following regulatory bodies:
 - i) FDA (3 marks)
 - ii) MCAZ (3 marks)
- b) Explain the SABC classification of drugs, giving one example of drugs that fall in each category. (8 marks)
- c) Outline the rationale behind having an essential medicines list. (4 marks)

PAPER NO: 606/23/M07-SUPPLY CHAIN MANAGEMENT

QUESTION 5

- a) Briefly describe the following historical data:
- i) Morbidity based data (4 marks)
 - ii) Consumption based data (4 marks)
 - iii) Demographic based data (4 marks)
 - iv) Suppliers based data (4 marks)
- b) State any four (4) forecasting assumptions (4 marks)

QUESTION 6

- a) State any five (5) storage requirements of various health commodities. (5 marks)
- b) Explain how supply chain effectiveness differs from efficiency. (4 marks)
- c) Write the following in full:
- i) LMIS (2 marks)
 - ii) HMIS (2 marks)
- d) Differentiate LMIS from HMIS. (4 marks)
- e) State any key essential data items to monitor supply chain performance. (3 marks)

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**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
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**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Pharmaceutical Formulation

PAPER NO: 606/23/M04

DURATION: 3 hours

MAY/JUNE 2025 EXAMINATION

REQUIREMENTS

1. Master Formula Sheet
2. Scientific calculator

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Do not write anything on the question paper.
3. Do not write your name on the booklet.

This paper consists of 3 printed pages.

QUESTION 1

Using a worksheet provided answer the following questions given the formula below.

Rx Benzoic acid compound (whitfields)
Sig Ung Appy pa bd
Mitte 500g

The following formula is provided:

Benzoic acid	6kg
Salicylic acid	3kg
Wax emulsifying	27.3kg
Soft paraffin	45.5kg
Liquid paraffin	18.2kg

The patient is Ruth Ncube admitted at Mpilo Hospital on the 15/04/24.

- i) Using the calculating factor, work out the above for preparing 500g. (7 marks)
- ii) List the equipment you would use for the preparation. (3 marks)
- iii) Outline the method of preparation for the ointment. (5 marks)
- iv) Label the preparation according to the prescription. (5 marks)

QUESTION 2

- a) List five (5) different types of ingredients used in the preparation of compressed tablets, their functions and one example of each type of ingredient. (15 marks)
- b) Outline the five (5) advantages of tablets over liquid preparations. (5 marks)

QUESTION 3

- a) Outline the five (5) uses of eye drops and an example of an eye drop for each use. (10 marks)
- b) Define the term isotonic and explain what happens when a hypotonic intravenous solution is infused into the vein. (5 marks)
- c) Discuss the aseptic technique in the production of eye drops. (5 marks)

QUESTION 4

- a) Define the following terms:
- i) Parenteral (2 marks)
 - ii) Nutrition (2 marks)
 - iii) Total parenteral nutrition (2 marks)
- b) Outline the composition of total parenteral nutrition. (5 marks)
- c) List five (5) ideal properties of a preservative. (5 marks)
- d) Describe the rationale of using Transdermal Drug Delivery System (TDDS), (4 marks)

QUESTION 5

Discuss good manufacturing practice, giving reasons why it is in the pharmaceutical industry. (20 marks)

QUESTION 6

- a) Outline differences between dry heat and moist heat sterilisation. (8 marks)
- b) Explain the differentiating characteristics of the following:
- i) Cream and ointment (4 marks)
 - ii) Ointment and paste (4 marks)
 - iii) Hard gelatine capsule and soft gelation capsule. (4 marks)

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**HIGHER EDUCATION EXAMINATIONS COUNCIL
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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Pharmacology

PAPER NO: 606/23/M02

DURATION: 3 Hours

MAY/JUNE 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any five questions.
2. Each question carries 20 marks.
3. Do not write your name on the answer script.
4. Do not write anything on the question paper.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M02 – PHARMACOLOGY

• QUESTION 1

- (a) What is a diuretic? (2 marks)
- (b) There are four types of diuretics, list the different types and give examples for each group. Explain their mode of action indicating the site of action. (18 marks)

• QUESTION 2

Define the following pharmaceutical terms:-

- (a) Pharmacology (2 marks)
- (b) Pharmacodynamics (2 marks)
- (c) Active transport (2 marks)
- (d) Facilitated diffusion (2 marks)
- (e) Pinocytosis (2 marks)
- (f) Bioavailability (4 marks)
- (g) Pharmacokinetics (2 marks)
- (h) Potency (2 marks)
- (i) Tachyphylaxis (2 marks)

QUESTION 3

- (a) How do you manage grand mal seizures? Briefly explain the mechanism of action of at least three drugs. (8 marks)
- (b) For the two types of epilepsy, state two drugs used to treat each type, the mode of action and two important side effects and for each type give two example. (12 marks)

• QUESTION 4

- (a) Define the term peptic ulcers. (2 marks)
- (b) Discuss the three main mechanism of the pharmacological treatment of peptic ulcers. (18 marks)

PAPER NO: 606/23/M02 - PHARMACOLOGY

• QUESTION 5

- (a) Discuss the two types of diabetes and for each type, explain the symptoms associated with each type. (10 marks)
- (b) Outline the classes of antidiabetic drugs, giving at least two examples in each class and their mechanism of action. (10 marks)

• QUESTION 6

- (a) When do you use the following meanings:
- (i) may cause drowsiness (2 marks)
 - (ii) do not chew or crush tablets (2 marks)
 - (iii) avoid dairy/ milky products (2 marks)
 - (iv) take with or after food (2 marks)
 - (v) take with lots of fluids in the morning (2 marks)
- (b) Explain the use and mechanism of action of the following drugs
- (i) suxamethonium (2 marks)
 - (ii) adrenaline (2 marks)
 - (iii) atropine (2 marks)
 - (iv) captopril (2 marks)
 - (v) digoxin (2 marks)

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**HIGHER EDUCATION EXAMINATIONS COUNCIL
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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

SUBJECT: Herbal Formulation

PAPER NO: 606/23/M03

DURATION: 3 hours

MAY/JUNE 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. This question paper comprises of six (6) questions.
2. Answer any five (5) questions. Each question carries 20 marks.
3. Start each question on a fresh (new) page.
4. Do not write your name on the answer script/booklet.
5. Do not write anything on the question paper.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M03 – HERBAL FORMULATION

QUESTION 1

- a) Distinguish clearly between fixed oils and volatile oils, giving examples where necessary (at least two examples). (10 marks)
- b) Briefly explain why it is important to have a standardized system of plant nomenclature. (3 marks)
- c) State two (2) examples of gums. (2 marks)
- d) Outline the four (4) natural sources of drugs (crude). (4 marks)
- e) Define the term crude drug. (1 mark)

QUESTION 2

- a) Briefly describe the different methods of harvesting materials herbs. State at least five (5) methods. (10 marks)
- b) Outline the factors that are considered when determining the optimal time for harvesting medicinal plants. (5 marks)
- c) Describe the various techniques used to extract active compounds from medicinal herbs. List at least five (5) techniques. (5 marks)

QUESTION 3

- a) Identify the appropriate storage conditions for different types of herbal medicines. (5 marks)
- b) Discuss the potential signs of adulteration in complementary medicines. State at least five (5) signs. (10 marks)
- c) Describe how stability of herbal formulations can be affected by factors such as temperature, humidity and light. (5 marks)

QUESTION 4

Identify and explain five (5) applications and five (5) limitations of UV-VIS spectroscopy in distinguishing between different organic compounds. (20 marks)

PAPER NO: 606/23/M03 - HERBAL FORMULATION

QUESTION 5

Elaborate on the factors that influence the selection of solvents for herbal extraction, including polarity, volatility and selectivity. (20 marks)

QUESTION 6

Describe the proper methods for disposing of solvents used in herbal extraction, emphasizing environmental safety and regulatory compliance. (20 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Pharmaceutical Formulation

PAPER NO: 606/23/M04

DURATION: 3 Hours

OCTOBER/NOVEMBER 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any 5 questions.
2. Do not write your name on the answer booklet.
3. Do not write your name on the answer booklet.

This paper consists of 3 printed pages.

QUESTION 1

- a) Describe the four (4) bases used in preparing semi solid dosage forms. (12marks)
- b) State the situations when ointments are preferred over creams. (3marks)
- c) Outline the ideal properties of semi solid dosage forms (creams, ointments, pastes and gels). (5marks)

QUESTION 2

- a) State and explain the function of any five (5) excipients used in tablet manufacturing. (10marks)
- b) Differentiate hard gelatine capsules and soft gelatine capsules. (6marks)
- c) Describe the geometric dilution method of mixing powders. (4marks)

QUESTION 3

- a) Briefly describe the manufacturing process of eye drops including the excipients used. (6marks)
- b) State any three (3) conditions where total parenteral nutrition is indicated for use. (3marks)
- c) Give any (5) examples of parenteral nutrition. (5marks)
- d) Define transdermal drug delivery and give the components that make up a transdermal patch. (6marks)

QUESTION 4

- a) Briefly explain the following sterilisation methods:
 - i) Dry heat (3marks)
 - ii) Radiation (3marks)
 - iii) Filtration (3marks)
- b) Describe sterility testing including the different sterilisation indicators used in sterility testing. (8marks)
- c) Define aseptic technique highlighting any one employed in aseptic technique. (3marks)

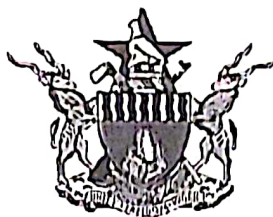
QUESTION 5

- a) For the following types of degradation, state any two (2) example of mechanisms. Give any two(2) examples:
- i) Physical degradation (2marks)
 - ii) Chemical degradation (2marks)
 - iii) Microbiological degradation (2marks)
- b) State any three (3) factors for controlling degradation. (3marks)
- c) Describe the following quality control tests for analysing tablets.
- i) Friability test (4marks)
 - ii) Dissolution test (4marks)
- d) State any three (3) ingredients used in the formulation of transdermal patches. (3marks)

QUESTION 6

- a) State any five (5) factors that affect the absorption of drug through the skin. (5marks)
- b) Briefly describe the use of a pressurised metered dose inhaler (pMDI). (5marks)
- c) State any five (5) uses of eye drops. (5marks)
- d) Outline the ideal packaging, labelling and storage condition for creams. (5marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

SUBJECT: Pharmacology

PAPER NO: 606/23/M02

DURATION: 3 hours

OCTOBER/NOVEMBER 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. This question paper comprises of six (6) questions.
2. Answer any five (5) questions. Each question carries twenty (20) marks.
3. Start each question on a fresh new page. This question paper comprises of two (2) printed pages.
4. Do not write your name on the answer script.
5. Do not write anything on the question paper.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M02 - PHARMACOLOGY

QUESTION 1

a) Define the following terms:

- | | |
|----------------------|-----------|
| i) Pathophysiology | (2 marks) |
| ii) Hypersensitivity | (2 marks) |
| iii) Drug metabolism | (2 marks) |
| iv) Bioavailability | (2 marks) |
| v) Teratogenicity | (2 marks) |

b) Describe the steps in Adverse Drug Reaction (ADR) monitoring up to national level. (10 marks)

QUESTION 2

Explain any four (4) factors that can lead to drug to drug or drug to food interactions during absorption giving suitable examples. (20 marks)

QUESTION 3

- a) Illustrate the pathophysiology of gout including any metabolic pathways. (15 marks)
- b) Outline at least five (5) drugs that are used to treat gout. (5 marks)

QUESTION 4

- a) State and explain the six (6) types of Adverse Drug Reactions. (12 marks)
- b) Outline the three (3) main approaches used in the therapy of cancer. (6 marks)
- c) Define the term cancer. (2 marks)

QUESTION 5

- a) Discuss the following contraception methods:
- | | |
|--|-----------|
| i) Sterilisation | (2 marks) |
| ii) Barrier methods | (2 marks) |
| iii) Combined oral contraception | (2 marks) |
| iv) Intra-uterine contraceptive device | (2 marks) |
- b) List four (4) examples of drugs used for the induction of labour (4 marks)
- c) Using one (1) example of a contraception method:
- | | |
|--|-----------|
| i) State the major side effects | (4 marks) |
| ii) Outline two (2) advantages of the chosen method. | (4 marks) |

QUESTION 6

- a) Describe the role of leukotriene modifiers in the treatment of asthma, including their mechanism of action and clinical efficacy. (8 marks)
- b) Briefly explain how theophylline improves respiratory function in patients with asthma and what are its potential side effects. (6 marks)
- c) Outline the mechanisms of action of inhaled corticosteroids in preventing asthma exacerbations. Give two (2) examples of inhaled corticosteroids drugs. (6 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Quality Assurance

PAPER NO: 606/23/M05

DURATION: 3 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. This question paper comprises of six (6) questions. Each question carries twenty (20) marks.
2. answer any five (5) questions.
3. Do not write on the question paper.
4. Do not write your name on the answer booklet

This paper consists of 3 printed pages.

QUESTION 1

- (a) Briefly describe any two (2) types of quality costs. (10 marks)
- (b) In the context of system reliability briefly describe
- (i) Facilities failure (5 marks)
- (ii) Customer failure (5 marks)

QUESTION 2

Describe ISO9001 standard requirement include advantages and disadvantages to the organisation. (20 marks)

QUESTION 3

- (a) Examine the significance of adhering to Good Manufacturing Practices (GMP) and World Health Organisation (WHO) guidelines when handling raw materials. (10 marks)
- (b) With the aid of relevant examples discuss the importance of performing equipment calibration. (10 marks)

QUESTION 4

Outline standard operating procedures relevant to the following

- (a) Laboratory environment and housekeeping (10 marks)
- (b) Chromatography equipment (10 marks)

QUESTION 5

During an external audit of a certain pharmaceutical manufacturing company by regulatory authorities several issues were found related to failure to comply to Good Manufacturing Practices (GMP).

Outline the steps involved in conducting an effective audit to ensure compliance with GMP guidelines. (20 marks)

QUESTION 6

A pharmaceutical company needs to establish a sampling plan for incoming raw materials to ensure they meet quality specification before use in production. Discuss how sampling for attributes and acceptance sampling by variables can be used to determine whether raw materials should be accepted or not. (20 marks)

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IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Infectious Disease Management

PAPER NO: 606/23/M10

DURATION: 3 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATES

1. Answer any five (5) questions.
2. The questions carry 20 marks.
3. Do not write anything on the question paper.

This paper consists of 3 printed pages.

PAPER NO: 606/23/M10 – INFECTIOUS DISEASE MANAGEMENT

QUESTION 1

- a) List any five (5) personal hygiene practices that must be adhered to in a healthcare setting. (5 marks)
- b) Discuss the significance of disposing of unwanted materials properly. (10 marks)
- c) Briefly explain the importance of using wet clothes and diluted detergents in maintaining hygiene. (5 marks)

QUESTION 2

- a) Explain the mechanism by which antimicrobial agents act against bacteria. Any five (5) mechanisms. (10 marks)
- b) Discuss the mechanisms that can be used by microorganisms to resist action of antimicrobial drugs. Explain any five (5). (10 marks)

QUESTION 3

- a) List any five (5) examples of infectious diseases. (5 marks)
- b) Explain the key differences between gram negative and gram positive bacteria structure. (10 marks)
- c) List any five (5) ways in which disease can be transmitted from one host to another. (5 marks)

QUESTION 4

Describe the modes of transmission, prevention and treatment for the following infectious diseases:

- a) Respiratory tract infections (5 marks)
- b) Cholera (5 marks)
- c) Typhoid (5 marks)
- d) Urinary tract infection (5 marks)

PAPER NO: 606/23/M10 – INFECTIOUS DISEASE MANAGEMENT

QUESTION 5

- a) Explain the following methods of sterilisation mentioning how they achieve sterility of an object:
- i) Dry heat (5 marks)
 - ii) Moist heat (5 marks)
 - iii) Radiation (5 marks)
- b) State any five (5) sources of microbial contamination in pharmaceutical manufacturing. (5 marks)

QUESTION 6

- a) Describe the following host defence systems:
- i) Physical barriers (3 marks)
 - ii) Phagocytosis (3 marks)
 - iii) Interferons (3 marks)
 - iv) Complement (3 marks)
- b) State any five (5) sexually transmitted diseases. (5 marks)
- c) State any three (3) common side effects associated with use of antimicrobial agents. (3 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

MODULE: Management

PAPER NO: 606/23/M06

DURATION: 3 hours

JUNE 2026 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

- 1. Answer any five (5) questions.**
- 2. Each question carries 20 marks.**

This paper consists of 2 printed page.

QUESTION 1

Discuss the advantages and disadvantages of task allocation in an organisation
(20 marks)

QUESTION 2

- a) Describe the management of a workforce in a pharmaceutical setting.
(5 marks)
- b) Define the term 'target' in the context of pharmaceutical projects and explain how targets are set in the pharmaceutical industry.
(15 marks)

QUESTION 3

In a scenario where a pharmacy is undergoing changes, explain how to identify the required workforce and allocate tasks effectively to maintain service levels.
(20 marks)

QUESTION 4

Outline the different types of resources required by a pharmaceutical technician and supervisor in a day to day running of a retail pharmacy.
(20 marks)

QUESTION 5

Discuss the concept of organisational culture, highlighting the characteristics of positive organisational culture and how it impacts employee performance and customer satisfaction.
(20 marks)

QUESTION 6

Give an overview of the process of resource allocation in a retail pharmacy, include typical examples of resources relevant to pharmacy day to day operations.
(20 marks)

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NATIONAL DIPLOMA

IN

PHARMACEUTICAL TECHNOLOGY

**SUBJECT: Health Policies and Supply
Chain Management**

PAPER NO: 606/18/S25

DURATION: 3 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATES

1. Answer any five (5) questions.
2. Each question carries 20 marks.

This paper consists of 3 printed pages.