



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION**  
**DEPARTMENT OF TECHNICAL AND ENGINEERING EDUCATION AND TRAINING**  
**PTE 6182 ADVANCED DESIGN AND MANUFACTURING**

**Main Examination**

November 2024

This examination paper consists of 2 pages

**Time Allowed:** 3 Hours  
**Total Marks:** 100  
**Examiner's Name:** Mr T. Muzari  
**External Examiner:** Dr. C. Kahanji

**INSTRUCTION AND INFORMATION TO THE CANDIDATE**

1. Answer **Question 1(compulsory)** and any other three.
2. Each question is worth 25marks.
3. Use of calculators is permissible.

**MARK ALLOCATION**

QUESTION	MARKS
1	25
2	25
3	25
4	25
5	25
<b>Total marks attainable by the candidate</b>	<b>100</b>

### **Question 1**

- a) Explain the following related terms and processes with reference to design and manufacturing concepts:
- i. Concept generation [5]
  - ii. Design attributes [5]
  - iii. Design development [5]
  - iv. Manufacturing planning [5]
  - v. Exploration of ideas [5]

### **Question 2**

- a) Using relevant examples describe the generic product development process. [15]
- b) Identify some of the details and decisions that are included within the scope of process planning when designing products. [10]

### **Question 3**

- a) Explain the importance of environmentally conscious manufacturing in contemporary times. [6]
- b) Identify and explain three automation systems and their suitability to a particular production. [9]
- c) Discuss the inclusion of industrial robotics for a productive manufacturing process. [10]

### **Question 4**

- a) Distinguish design for life cycle and design for product cost. [5]
- b) Discuss the role of integrative development methodologies in design and manufacturing. [10]
- c) Examine the contribution of design thinking in product design and manufacturing. [10]

### **Question 5**

- a) Describe the engineering design process. [10]
- b) Explain the relationship between manufacturing support systems and product design. [10]
- c) Discuss the modalities of improving systems performance in manufacturing processes. [5]

**END OF EXAMINATION PAPER**