



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION**

**DEPARTMENT OF TECHNICAL AND ENGINEERING EDUCATION AND TRAINING**

**PRODUCTION MANAGEMENT**

**PTE6256**

**SECOND SEMESTER EXAMINATION PAPER**

**May 2019**

This examination paper consists of 6 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: None

Examiner's Name: **Eng E Murena**

**INSTRUCTIONS AND INFORMATION TO CANDIDATE**

1. Answer any four (4) questions.
2. Each question carries 25 marks.
3. Use of calculators is permissible.

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## Question 1

- a) Explain, with examples, the following term:-
  - i. Production management. **[5Marks]**
- b) Explain in detail the 4 roles and 4 responsibilities of a Production Manager within an organization. **[10Marks]**
- c) Productivity as the amount of output that is produced from a given amount of labour input. Discuss five (5) factors that affect productivity in an organization. **[10Marks]**

## Question 2

- a) Explain, with examples, the following terms:
  - i. Aggregate planning. **[3Marks]**
  - ii. Capacity planning. **[2Marks]**
- b) Moving from the current status of manufacturing to manufacturing in 2020, list and discuss the five challenges in manufacturing. **[10Marks]**
- c) There are five phases of the product development. Discuss the activities carried out in each phase with regards to different departments in an organization. **[10Marks]**

## Question 3

- a) As a method of manufacturing, what are the five components that distinguish CIM from other manufacturing methodologies . **[5Marks]**
- b) List and explain the Five (5) CIM Components or Subsystems. **[10Marks]**
- c) A good plant layout consists of the best arrangement of the buildings, men, machines, and materials for manufacturing a product. Discuss the requirements of a good plant layout. **[10Marks]**

## Question 4

- a) Plant layouts are classified into four major categories. Compare product layout and functional layout. **[9Marks]**
- b) Explain, with examples, the following terms:-
  - i. Master scheduling. **[4Marks]**
  - ii. Demand forecasting. **[4Marks]**
  - iii. Productivity. **[4Marks]**
  - iv. Value analysis. **[4Marks]**

### Question 5

- a) Explain with an appropriate example, how a materials requirement planning (MRP) system works. **[8Marks]**
- b) Enterprise resource planning promises one database, one application, one user interface for the entire enterprise. Discuss the following
  - i. Evolution of ERP. **[6Marks]**
  - ii. Major features of ERP system. **[6Marks]**
  - iii. Five benefits implementing the ERP. **[5Marks]**

### Question 6

- a) Explain the concept of an Automation Pyramid using a clearly annotated diagram. **[6Marks]**
- b) Lean consists of proven tools and techniques that focus on minimizing wasteful activity and adding value to the end product to meet customer needs. Describe five principles of lean operating systems. **[10Marks]**
- c) Using a product of your choice, examine:
  - i. The content and, **[3Marks]**
  - ii. Purpose of the design process. **[6Marks]**

.....**End of paper**.....

**QUESTION FIVE**

A Continuous and aligned ( longitudinal direction) glass Fibre-reinforced composite consists of 40 vol% of glass fibres having a modulus of elasticity of 69 GPa and 60 vol% of a polyester resin that, when hardened, displays modulus of 3,4 GPa .

- (a) Compute the modulus of elasticity of this composite in the longitude direction. [5]
- (b) If the cross –section area is 250 mm<sup>2</sup> and stress of 50 MPa is applied in this longitudinal direction, compute the magnitude of the load carried by each of the Fibre and matrix phases. [7]
- (c) Determine the strain that is sustained by each phase when the stress in part (b) is applied . [8]
- (d) Compute the elastic modulus of the composite material , described above, but assuming that the stress is applied perpendicular (in transverse direction) to the direction of Fibre alignment [5]

**QUESTION SIX**

- (a) Identify and describe Typical of Composite/ Hybrid Material classification (any 3 in each instance) based on :
  - (i) The type of matrix material. [9]
  - (ii) The geometry of reinforcement. [9]
- (b) Explain any six (6) types of composite materials reinforcement. [7]

.....**End of the Examination**.....