

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

SEMESTER FINAL EXAMINATION

WINTER SEMESTER: 2022-2023

IPE-4101 Introduction to Industrial and Production Engineering

TIME: 3 HRS 00 MIN

FULL MARKS: 150

There are 6 (Six) questions. Answer all of them. Marks in the Margin indicate full marks.

01. (a) Define the term "Maintenance" and hence explain the different managing steps that need to be followed for an effective maintenance program. (4+7) (CO3, PO1)
(b) Classify the different types of Materials Handling Equipment and hence explain the working principle of (i) AGV Pallet Truck (ii) Cart on track Conveyor. (4+5+5) (CO3, PO1)
02. (a) Explain with necessary diagram the different components of a traditional NC systems and CNC systems. (15) (CO1, PO1)
(b) What is CIM? Explain the different CIM components with needs. (10) (CO1, PO1)
03. (a) Explain in details the Deming's Philosophy for the improvement of product and service quality of an Industry. (10) (CO2, PO1)
(b) Write down the different tools of Total Quality Management (TQM) and hence write a short note on (i) Pareto diagram (ii) Control charts (3+6+6) (CO2, PO1)
04. (a) Theoretically, any given production plant has an optimum output level. Suppose a certain production plant has annual fixed costs $FC = \$2,000,000$. Variable cost VC is functionally related to annual output Q in a manner that can be described by the function $VC = \$12 + \$0.005Q$. Total annual cost is given by $TC = FC + VC \times Q$. The unit sales price for one production unit $P = \$250$. (i) Determine the value of Q that minimizes unit cost UC , where $UC = TC/Q$; and compute the annual profit earned by the plant at this quantity. (ii) Determine the value of Q that maximizes the annual profit earned by the plant; and compute the annual profit earned by the plant at this quantity. (17) (CO3, PO2)
(b) How the production rate can be calculated for (i) Batch Production and (ii) Mass Production. (8) (CO3, PO2)
05. (a) Explain the goal of Supply Chain Management and hence write down the core function and importance of supply Chain. (8) (CO1, PO1)
(b) Explain in details the history line of evolution of manufacturing and industrial sector. (10), (CO1, PO1)
(c) List the different types of supply chains enablers and drives that provide a useful framework of supply chain capabilities. (7) (CO1, PO1)
06. (a) List the different types of plant layout and hence write down the differences between line layout and functional layout. (5+9), (CO2, PO1)
(b) Explain the term product quantity, production variety and hence find out the relationship with product quality, production variety with plant layout. (5+6), (CO2, PO1)