Ex/PG/ME/T/1210A/2019

MASTER OF ENGINEERING IN MECHANICAL ENGINEERING

EXAMINATION,2019

(2nd Semester)

INTRODUCTION TO CONCURRENT ENGINEERING

Time: Three hours **Full Marks: 100**

(50 marks for each part)

Use a separate answer script for each Part

PART-I

Answer question no.*4* and ***any two*** from the rest

1.a) "Traditionally, design and manufacturing activities have taken place sequentially rather than concurrently"-Discuss. 10

b) Explain the role of ergonomics in engineering design 10

2.a)Discuss different phases of design in 'Morphology of Design"(according to Morris Asimow) 10

b) Describe, any two, failure reduction design techniques 05

c) Discuss the steps in building reliability into a design 05

3.a) A design team looking for new versions of a company's forklift trucks focused on the problem area of using such trucks in warehouses for the stacking and removal of palletted goods. How syntectics thinking can be used in the approach to such a problem? 05

b) Consider a process plant working 40 hours per week. In a 46 week year (allowing for plant shutdown for holidays etc.) total possible working time is 1840 hours. During the year the plant has 20 breakdowns which gave a total downtime of 30 hours. Calculate the reliability statistics. 05

c) Differentiate between 'Design Analysis' and 'Design Synthesis'. Illustrate the process of Design Synthesis. 05

d) Write down the formulation of a design optimization problem and explain it further with an example. 05

4. Write short notes (Any Two): 10

a) Fail-safe design

b) DFM (Design for Manufacturing) guidelines.

c) Modular Design

d) Design for Assembly

PART-II

Answer question no.***8*** and ***any two*** from the rest

5.a) "Traditionally, design and manufacturing activities have taken place sequentially rather than concurrently " discuss. 10

b) Explain with suitable examples the concepts of Lean Production and Agile Manufacturing. 10

6.a) Determine the hourly rate for a work centre from the following data:

Direct labour rate: Rs.200/- per hr. ; Applicable labour factory O/H:40%;

Capital investment in the m/c: Rs. 50 lacs; Service life=8yrs; Salvage Value=0;

Applicable M/C factory O/H: 40%; Rate of return=10%; C R F=0.1875.

The work centre is operated 8hrs. shift/day for 250 days/yr. 10

b) A batch of 50 pcs is to be manufactured in a factory for a particular customer. Raw materials and tooling are supplied by the customer. The total time for processing the parts is 100 hrs. Direct labour cost=Rs.90/- per hr. The factory

O/H rate is 120% and the corporate O/H rate is150%. Compute cost of the job. 10

7 a) Describe briefly the Electroless coating Process stating its advantages and disadvantages. 10

b) Classification of costs as either fixed or variable is not always convenient for the accounts and finance people'—Discuss 10

8) Write short notes on (any two): 2X5=10

a) Design for manufacturability. b) Design for Quality.

c) Organisational changes in DFM. d) Parts classification and coding in GT.

e) MRP & MRP II