Ex/PG/ME/T/1210A/2018

MASTER OF ENGINEERING IN MECHANICAL ENGINEERING

EXAMINATION,2018

(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) Discuss the concepts of 'Modular Design' and DFA (Designing for Assembly)for increasing product effectiveness. (10)

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

b) Briefly explain the 'Taguchi approach to design' (05)

c) Classify different design methods which are intended to help simulate creative thinking. How brainstorming can be applied to generate ideas for solving an old problem: 'Provide a means of securing containers (the large goods containers transported by lorries) that is tamper-proof but easy to open'. (05)

3.a)Discuss the steps in building reliability into a design (05)

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

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

d) 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)

4. Write short notes (Any Two): (10)

a) Fault Tree Analysis (FTA) --a failure reduction design technique.

b) DFM (Design for Manufacturing) guidelines.

c) Fail-safe design

d) Role of Ergonomics in Engineering Design.

PART-II

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

5.a) Explain the traditional concept of design and manufacturing activities. How the concept is different from a modern product development approach? (10)

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

(10)

6.a) 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 is 150%. Compute cost of the job. (08)

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

Direct labor rate: Rs.250/- per hr. ; Applicable labour factory O/H:45%;

Capital investment in the m/c: Rs. 60 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. (12)

7. a) Classification of costs as either fixed or variable is not always convenient for the accounts and finance people'—Discuss (06)

b) What are the broad areas of application of Electroless Nickel coatings? How do you evaluate corrosion resistance of a typical electroless Ni coating? (07)

c) Explain Group Technology(GT) stating its benefits. (07)

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

a) Just-In-Time Production Systems. b) Problem Solving Tools. c) Design for Quality.

d) Simultaneous Engineering.