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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*(A constituent unit of MAHE, Manipal)*

## II SEMESTER M.TECH. (AUTOMOBILE ENGINEERING)

## END SEM EXAMINATIONS- APR 2019

SUBJECT: DESIGN FOR MANUFACTURING ASSEMBLY AND SERVECIABILITY [AAE 5235]

**REVISED CREDIT SYSTEM**
**(04 / 05 /2019)**

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

- Answer **ALL** the questions.
- Missing data may be suitable assumed

**1A.** Define the objectives of DFMA. Explain the principles of manufacturing and assembly to be followed in DFMA **(05)**

**1B.** What are the essential factors of product design? Explain few with example. **(03)**

**1C.** Explain design for serviceability and maintainability with example. **(02)**

**2A.** Define standardization? How it helps in minimizing the part variety? Explain with example. **(04)**

**2B.** What is the objective of material properties in DFMA? Explain with suitable example the basis for selecting the required property and shape of the material. **(04)**

**2C.** What is a material index and how does it helps in selection of material for a given application? **(02)**

**3A.** What is tolerance? Explain with suitable example the significance of tolerance in design for manufacturing and assembly? What are the different approach of Taguchi for tolerance design? **(04)**

**3B.** Broadly classify various manufacturing processes. Explain few criteria to be followed for the process selection. **(02)**

**3C.** Explain the design consideration for: **(04)**

(i) Sand casting process (ii) Forging process

**4A.** What is the principle of sheet metal forming process? List different sheet metal forming process. What are the design consideration to be followed for sheet metal forming process? List the advantages of sheet metal process over other manufacturing process. **(05)**

**4B.** Explain the design consideration for the following machining process with neat sketch **(05)**

(i) Lathe (ii) Drilling

**5A.** What is the principle of adhesive bonding? List the applications of adhesive bonding. Discuss with neat sketch important FOUR recommended joint designs for adhesive bonding to achieve good quality joints economically. **(05)**

**5B.** Why Design for Assembly? Broadly classify different assembly process. With neat sketch discuss the strength and design guidelines for: **(05)**

(i) Fasteners (ii) Rivets