INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-1

M. Tech I Semester Regular Examinations, Januery 2020
Regulations: IARE-R18
DESIGN FOR MANUFACTURING AND ASSEMBLY
(CAD / CAM)

Time: 3 hours   **Max. Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. a) What is Design for Manufacturing? Explain Briefly.   **[7M]**
    b) Explain how group technology is helpful in DFMA.   **[7M]**

2. a) What are the major stages of engineering design? Discuss with a suitable examples.   **[7M]**
    b) Explain different basic steps of material selection?   **[7M]**

UNIT – II

3. a) Explain specific recommendations for wall thickness, ribs and fillets with sketches.   **[7M]**
    b) What are the design considerations to be followed for die casting?   **[7M]**

4. a) Explain specific recommendations for flash and gate removal, lettering and surface design with   **[7M]**
        sketches.
    b) With Suitable Sketch, Discuss the basic Rules for Form Design of Castings.   **[7M]**

UNIT – III

5. a) Discuss the general design recommendations for forging operation   **[7M]**
    b) Briefly explains the design guidelines for extruded sections with neat sketches.   **[7M]**

6. a) Elaborately explain the various welding processes for joining metals permanently.   **[7M]**
    b) Explain briefly the component design for blanking operation.   **[7M]**

UNIT – IV

7. a) Discuss the Indian system of limits and fits. Draw the figure by showing the position of **[7M]**
        fundamental deviations.
    b) How assembly advantages effect DFMA, DFA and DFA?   **[7M]**

8. a) What is the assembly time of Plummer block in relation to Footstep bearing?   **[7M]**
    b) List the recommendations to be considered for the design of assembly   **[7M]**

UNIT – V

9. a) Explain the process of avoiding jams doing the assembly. **[7M]**
    b) What is effect of part symmetry, part thickness and size on handling time? Explain with suitable examples. **[7M]**

10. a) What are the steps to be followed to apply DFA for automobile industry? **[7M]**
    b) Summarize the factors considered in design for manufacturing, assembly and environment. BT_4 Analyzing **[7M]**

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COURSE OBJECTIVES:
The course should enable the students to:

I	Understanding the basics of Computer Graphics needed for CAD/ CAM applications.
II	Applying the geometrical modeling for computer graphics.
III	Applying data structures in computer graphics.

COURSE OUTCOMES (COs):

CO 1	Identifying primary and secondary components through functional analysis
CO 2	Calculate the design efficiency for their product design
CO 3	Identify the fine finishing operations to obtain dimensional accuracy and surface finish
CO 4	Analyze and derive the gripping, insertion and fixing values through fitting analysis of the product
CO 5	Apply the Design guidelines and assembly techniques to mechanical designs.

COURSE LEARNING OUTCOMES:
Students, who complete the course, will have demonstrated the ability to do the following:

CAME010.01	Identify and understand of basic concepts of DFM and DFA
CAME010.02	Understand and Apply concepts of Generative DFMA
CAME010.03	Understand the Various types of materials, its classification, suitable materials for product design
CAME010.04	Understand the selection of manufacturing sequences and optimal selection
CAME010.05	Identify the reasons for optimal selection of machining parameters.
CAME010.06	Identify the various casting design, machining design, designing of formed components
CAME010.07	Identity various design recommendation for permanent joining such as welding, soldering and brazing
CAME010.08	understand the different design factors for forging, closed dies forging design
CAME010.09	Apply the different Design guidelines for extruded sections
CAME010.10	Understand various design principles for punching, blanking, bending, deep drawing.
CAME010.11	Understand the different conventional approach and Assembly optimization processes
CAME010.12	Create the knowledge on cost consciousness & an awareness of Designers' accountability in product design lifecycle .
CAME010.13	Understand the cost factors that play a part in DFA
CAME010.14	Understand the general design guidelines for manual assembly and development of the systematic DFA methodology
CAME010.15	Using CAD, apply design for manufacturing and assembly techniques to mechanical designs.
CAME010.16	Understand the effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time.

MAPPING OF SEMESTER END EXAMINATIONS TO COURSE LEARNING OUTCOMES:

SEE Question No.			Course Learning Outcomes	Course Outcomes	Blooms Taxonomy Level
1	a	CAME010.01	Identify and understand of basic concepts of DFM and DFA	CO 1	Understand
	b	CAME010.02	Understand and Apply concepts of Generative DFMA	CO 1	Remember
2	a	CAME010.03	Understand the Various types of materials, its classification, suitable materials for product design	CO 1	Understand
	b	CAME010.04	Understand the selection of manufacturing sequences and optimal selection	CO 1	Remember
3	a	CAME010.05	Identify the reasons for optimal selection of machining parameters.	CO 2	Understand
	b	CAME010.06	Identify the various casting design, machining design, designing of formed components	CO 2	Remember
4	a	CAME010.07	Identity various design recommendation for permanent joining such as welding, soldering and brazing	CO 2	Remember
	b	CAME010.08	understand the different design factors for forging, closed dies forging design	CO 2	Understand
5	a	CAME010.9	Apply the different Design guidelines for extruded sections	CO 3	Understand
	b	CAME010.10	Understand various design principles for punching, blanking, bending, deep drawing.	CO 3	Remember
6	a	CAME010.10	Understand various design principles for punching, blanking, bending, deep drawing.	CO 3	Understand
	b	CAME010.11	Understand the different conventional approach and Assembly optimization processes	CO 3	Understand
7	a	CAME010.12	Create the knowledge on cost consciousness & an awareness of Designers' accountability in product design lifecycle .	CO 4	Remember
	b	CAME010.13	Understand the cost factors that play a part in DFA	CO 4	Understand
8	a	CAME010.14	Understand the general design guidelines for manual assembly and development of the systematic DFA methodology	CO 4	Understand
	b	CAME010.14	Understand the general design guidelines for manual assembly and development of the systematic DFA methodology	CO 4	Understand
9	a	CAME010.15	Using CAD, apply design for manufacturing and assembly techniques to mechanical designs.	CO 5	Remember
	b	CAME010.16	Understand the effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time.	CO 5	Understand
10	a	CAME010.16	Understand the effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time.	CO 5	Understand
	b	CAME010.15	Using CAD, apply design for manufacturing and assembly techniques to mechanical designs.	CO 5	Remember

Signature of Course Coordinator   **HOD, ME**