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Code No: AME520



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## MODEL QUESTION PAPER-1

B. Tech VIII Semester Regular Examinations, MAY 2020

Regulations: IARE-R16

**DESIGN FOR MANUFACTURING AND ASSEMBLY**

Time: 3 hours

ME

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 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 sketches. [7M]
- 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 explain 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 fundamental deviations. [7M]
- 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 during 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<sub>4</sub> Analyzing [7M]



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## COURSE OBJECTIVES:

The course should enable the students to:

I	Understand various general design rules for manufacture ability and criteria for material selection.
II	Apply various machining process and tolerance aspects in machining.
III	Analyze the design considerations for casting and welding process.
IV	Apply the conceptual design factors to be considered in forging, extrusion and sheet metal work, design guidelines for manual assembly and development of DFA methodology

## 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:

AME520.01	Identify and understand of basic concepts of DFM and DFA
AME520.02	Understand and Apply concepts of Generative DFMA
AME520.03	Understand the Various types of materials, its classification, suitable materials for product design
AME520.04	Understand the selection of manufacturing sequences and optimal selection
AME520.05	Identify the reasons for optimal selection of machining parameters.
AME520.06	Identify the various casting design, machining design, designing of formed components
AME520.07	Identify various design recommendation for permanent joining such as welding, soldering and brazing
AME520.08	understand the different design factors for forging, closed dies forging design
AME520.09	Apply the different Design guidelines for extruded sections
AME520.10	Understand various design principles for punching, blanking, bending, deep drawing.
AME520.11	Understand the different conventional approach and Assembly optimization processes
AME520.12	Create the knowledge on cost consciousness & an awareness of Designers' accountability in product design lifecycle .
AME520.13	Understand the cost factors that play a part in DFA
AME520.14	Understand the general design guidelines for manual assembly and development of the systematic DFA methodology
AME520.15	Using CAD, apply design for manufacturing and assembly techniques to mechanical designs.
AME520.16	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	AME520.01	Identify and understand of basic concepts of DFM and DFA	CO 1	Understand
	b	AME520.02	Understand and Apply concepts of Generative DFMA	CO 1	Remember
2	a	AME520.03	Understand the Various types of materials, its classification, suitable materials for product design	CO 1	Understand
	b	AME520.04	Understand the selection of manufacturing sequences and optimal selection	CO 1	Remember
3	a	AME520.05	Identify the reasons for optimal selection of machining parameters.	CO 2	Understand
	b	AME520.06	Identify the various casting design, machining design, designing of formed components	CO 2	Remember
4	a	AME520.07	Identify various design recommendation for permanent joining such as welding, soldering and brazing	CO 2	Remember
	b	AME520.08	understand the different design factors for forging, closed dies forging design	CO 2	Understand
5	a	AME520.9	Apply the different Design guidelines for extruded sections	CO 3	Understand
	b	AME520.10	Understand various design principles for punching, blanking, bending, deep drawing.	CO 3	Remember
6	a	AME520.10	Understand various design principles for punching, blanking, bending, deep drawing.	CO 3	Understand
	b	AME520.11	Understand the different conventional approach and Assembly optimization processes	CO 3	Understand
7	a	AME520.12	Create the knowledge on cost consciousness & an awareness of Designers' accountability in product design lifecycle .	CO 4	Remember
	b	AME520.13	Understand the cost factors that play a part in DFA	CO 4	Understand
8	a	AME520.14	Understand the general design guidelines for manual assembly and development of the systematic DFA methodology	CO 4	Understand
	b	AME520.14	Understand the general design guidelines for manual assembly and development of the systematic DFA methodology	CO 4	Understand
9	a	AME520.15	Using CAD, apply design for manufacturing and assembly techniques to mechanical designs.	CO 5	Remember
	b	AME520.16	Understand the effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time.	CO 5	Understand
10	a	AME520.16	Understand the effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time.	CO 5	Understand
	b	AME520.15	Using CAD, apply design for manufacturing and assembly techniques to mechanical designs.	CO 5	Remember

**Signature of Course Coordinator**  
**Mr.AVenuprasad, Assistant Professor**

**HOD, ME**