



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad -500 043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	3D Printing Technology
Course Code	:	AME804
Class	:	VI Semester
Branch	:	MECHANICAL ENGINEERING
Year	:	2018–2019
Course Coordinator	:	Mr. M. Sunil Kumar, Assistant Professor.
Course Faculty	:	Mr. M. Sunil Kumar Assistant Professor.

Objectives:

I	Understand the manufacturing and production concepts
II	Analyze and understand about the automation system.
III	Able to use the automation systems in manufacturing line.
IV	Use different types of 3D printing materials, along with multi nozzle systems to control process parameters

S No	QUESTION	Blooms Taxonomy Level	Course Learning Outcomes
UNIT – I			
INTRODUCTION TO PROTOTYPING			
Part - A (Short Answer Questions)			
1	What are the key aspects of RPT?	Understand	AME804.01
2	Explain the need for Rapid Prototyping	Understand	AME804.02
3	List the classification of RP systems	Understand	AME804.03
4	What are the advantages of Rapid Prototyping	Remember	AME804.02
5	Explain in detail the process chain of Rapid Prototyping	Understand	AME804.01
6	Explain the difference traditional prototyping and rapid prototyping.	Understand	AME804.01
7	Classify the rapid manufacturing processes.	Understand	AME804.02
8	Explain additive process in detail.	Understand	AME804.03
9	Explain subtractive process in rapid prototyping.	Remember	AME804.04
10	Discuss formative process in rapid prototyping.	Understand	AME804.02
11	Explain generative rapid prototyping process in detail.	Understand	AME804.01
12	Explain why rapid prototyping is additive process.	Understand	AME804.02
13	What is Rapid Tool?	Understand	AME804.01
14	How does pattern differ from prototype?	Understand	AME804.02
15	How does digital prototyping differ from virtual prototyping?	Remember	AME804.01
Part - B (Long Answer Questions)			
1	Discuss the evolution of RP systems indicating the history and their growth rate in the industrial sector.	Understand	AME804.02

2	Summarize the key aspect of rapid prototyping. Explain With an example the historical development of rapid prototype technologies	Understand	AME804.01
3	Explain rapid prototyping, Explain the difference between traditional prototyping and rapid prototyping.	Understand	AME804.02
4	Categorize of applications in rapid prototype technology in manufacturing industries and also compare rapid prototype technology with computer numerical control technology.	Remember	AME804.02
4	Explain the classification of rapid manufacturing process, explain merits and demerits.	Understand	AME804.01
5	Discuss the evolution of RP systems indicating the history and their growth rate in the industrial sector	Understand	AME804.02
6	Explain in detail the process chain of Rapid Prototyping	Understand	AME804.01
7	Compare 'Direct ' and 'Indirect tooling' with classic examples	Understand	AME804.02
8	Explain, with suitable example, how rapid prototyping and tooling are the good examples as part of computer integrated Manufacturing.	Understand	AME804.01
9	Describe the steps involved in rapid prototyping process chain	Remember	AME804.02
10	Explain the Generic RP process with neat sketch.	Understand	AME804.01
11	Differentiate Subtractive Prototyping process and Additive Prototyping process	Remember	AME804.02
UNIT-II CAD MODELLING AND DATA PROCESSING FOR RP			
1	Explain cad modeling process, how cad modeling is done.	Understand	AME804.04
2	What are steps involved in modeling, what are steps involved in Cad modeling.	Understand	AME804.05
3	Explain plain data interfacing formats	Understand	AME804.05
4	Explain repair procedures.	Remember	AME804.06
5	Discuss about part orientation and support generation.	Understand	AME804.07
6	Explain support structure design.	Understand	AME804.06
7	Explain model slicing algorithm	Understand	AME804.05
8	Discuss about contour data organization.	Understand	AME804.06
9	Summarize direct slicing in detail.	Remember	AME804.07
10	Explain differences between direct and adaptive slicing	Understand	AME804.08
11	Summarize about adaptive slicing process	Understand	AME804.05
12	Explain tool path generation.	Understand	AME804.06
13	Explain data interfacing format, IGES, STL conversion.	Understand	AME804.04
14	Discuss about validity checks in conversion procedures.	Understand	AME804.05
15	Explain the procedures to be followed in repair a conversion.	Remember	AME804.06
Part - B (Long Answer Questions)			
1	Explain Importance of part orientation in RP process in detail with neat sketch.	Understand	AME804.06
2	Explain procedure of tool path generation from the slicing file with flowchart	Understand	AME804.05
3	Discuss on STL files and Define slicing relevant to CAD	Understand	AME804.06
4	Explain in detail the structure of .STL file format and Enlighten the importance of .STL file format in RP.	Remember	AME804.07
5	Give the classification of slicing procedure. Explain slicing of tessellated cad model in detail.	Understand	AME804.08
6	Compare the shape-based and the product data-based exchange standards. Which has the potential to support industrial automation? Why?	Understand	AME804.05
7	Give the classification of slicing procedure. Explain slicing of tessellated cad model in detail.	Understand	AME804.06
8	Differentiate between core STL file and fine STL file.	Understand	AME804.04

9	Explain any two translators used in place of STL.	Remember	AME804.05
10	Write short notes on following RP softwares: (i) Magics (ii) Mimics (iii) Velocity 2	Understand	AME804.06
UNIT-III RP PROCESSES			
Part - A (Short Answer Questions)			
1	Compare LOM with SLS with suitable reasons.	Understand	AME804.09
2	Describe the working principle, advantages and disadvantages of SLA process with a neat diagram.	Understand	AME804.10
3	Write the models and specifications of different LOM machines used.	Understand	AME804.08
4	What are different types of materials available for the SLS system? What are their respective applications?	Remember	AME804.10
5	Explain about STL file problems in detail with examples.	Understand	AME804.09
6	Classify direct rapid tooling method.	Understand	AME804.10
7	What are the steps involved in production of inserts using 3D Keltool process	Understand	AME804.09
8	Explain about ceramic tooling process.	Understand	AME804.10
9	Explain the process of RTV epoxy tooling. Write advantages, disadvantages and applications of it.	Remember	AME804.08
10	Compare rapid tooling and conventional tooling.	Understand	AME804.10
11	Write a short notes on rapid tools and DMILS	Understand	AME804.09
12	Explain aluminum filled epoxy tooling with a neat sketch	Understand	AME804.10
13	Compare hard tooling with soft tooling.	Understand	AME804.09
14	What are latest trends in rp material development and rp process development.	Understand	AME804.10
15	Differentiate between direct rapid tooling and indirect rapid tooling.	Remember	AME804.08
Part – B (Long Answer Questions)			
1	Compare LOM with SLS with suitable reasons.	Understand	AME804.09
2	Describe the working principle, advantages and disadvantages of SLA process with a neat diagram.	Understand	AME804.10
4	What are different types of materials available for the SLS system? What are their respective applications?	Remember	AME804.10
5	Explain about STL file problems in detail with examples.	Understand	AME804.09
6	How is application of RP models related to the purpose of prototyping? How does it also relate to the materials used for prototyping?	Understand	AME804.10
7	List the types of industries that RP can be used in. List specific industrial applications.	Understand	AME804.09
8	What are the typical RP applications in design? Briefly describe each of these applications and illustrate them with examples.	Understand	AME804.10
9	What are the typical RP applications in engineering and analysis? Briefly describe each of them and illustrate them with examples	Remember	AME804.08
10	Describe how RP models can be used for pre-surgical operation planning. Use appropriate examples to illustrate your answer.	Understand	AME804.10
11	Why and in what circumstances would RP be considered to assist implant fabrication	Understand	AME804.09
12	Describe two examples of how rapid prototyping and tooling techniques would be preferred over conventional methods in the improvement of patient care.	Understand	AME804.10
13	How would you differentiate between the following types of rapid tooling processes: (a) direct soft tooling, (b) indirect soft tooling, (c) direct hard tooling, and (d) indirect hard tooling.	Understand	AME804.09
14	Explain how a RP pattern can be used for vacuum casting with silicon molding. Use appropriate examples to illustrate your answer.	Understand	AME804.10
15	What are the ways the RP pattern can be used to create the injection mold for plastic parts. Briefly describe the processes.	Remember	AME804.08

16	Compare and contrast the use of RP patterns for (i) casting of die inserts, (ii) sand casting, and (iii) investment casting.	Understand	AME804.10
17	What are the RP systems that are suitable for sand casting? Briefly explain why and how they are suitable for sand casting?	Understand	AME804.09
18	Compare the relative merits of using LOM parts with SLA parts for investment casting.	Understand	AME804.10
19	Explain whether RP technology is more suitable for “high technology” industries like aerospace than it is for consumer products industries like electronic appliances. Give examples to substantiate your answer.	Remember	AME804.09
20	Explain how RP systems can be applied to traditional industries like the jewelry, coin and tableware industries.	Understand	AME804.09
UNIT-IV			
PHOTO POLYMERIZATION			
Part – A (Short Answer Questions)			
1	Explain stereolithographic.	Understand	AME804.13
2	Discuss selective laser sintering.	Understand	AME804.14
3	Explain electron beam melting.	Understand	AME804.15
4	Explain extrusion-based rp systems.	Remember	AME804.09
5	Explain fused deposition modeling.	Understand	AME804.10
6	Explain electron beam melting.	Understand	AME804.08
7	Explain 3D Printing.	Understand	AME804.10
8	Explain sheet lamination.	Remember	AME804.09
9	Explain laminated object manufacturing.	Understand	AME804.10
10	Explain beam deposition.	Understand	AME804.09
11	Explain laser engineered net shaping.	Understand	AME804.10
12	Explain direct metal deposition.	Remember	AME804.08
13	Write any four limitation of laminated object manufacturing.	Remember	AME804.11
Part – B (Long Answer Questions)			
1	Describe a laminated object manufacturing (LOM) process.	Understand	AME804.11
2	Explain Beam Deposition (LENS) rapid prototyping process in detail with neat sketch.	Remember	AME804.11
3	Explain in briefly fused deposition modeling process.	Understand	AME804.11
4	Explain a direct metal deposition (DMD) in rp process.	Understand	AME804.11
5	Comparison between selective laser sintering and 3D printing.	Understand	AME804.11
6	Name three material used in fused deposition modeling and state the advantages of this process.	Understand	AME804.11
7	Explain in briefly fused deposition modeling process. With neat sketches.	Remember	AME804.11
8	List out the technical specification of 3D printing machine.	Understand	AME804.11
9	What are merits and demerits of laminated object manufacturing.	Understand	AME804.11
10	Describe the process of fused deposition modeling and list the factors that affect the part quality	Understand	AME804.11
11	Write the models and specifications of different LOM machines used.	Understand	AME804.11
12	What are the factors that influence the performance of the 3D printing process? Explain in detail.	Understand	AME804.11
13	Explain the path generation in fusion decomposition modeling (FDM)	Remember	AME804.11
14	Explain laser generation process with neat sketch & also its applications?	Understand	AME804.11
15	List out the applications, advantages and disadvantages of laminated object manufacturing (LOM)?	Understand	AME804.11
UNIT-V			
Errors in RP Processes:			
Part - A (Short Answer Questions)			
1	Explain errors in RP processes.	Understand	AME804.11
2	Explain pre-processing, in detail	Understand	AME804.11
3	Explain post processing errors.	Understand	AME804.11
4	Discuss part building errors in SLA.	Remember	AME804.11

5	Explain part building errors in SLS.	Understand	AME804.11
6	Explain how Magics and Mimics software's help to build a product in Rapid Prototyping process	Understand	AME804.11
7	Write a short note on 3D expert software.	Understand	AME804.11
8	Describe about Missing Facets or Gaps?	Understand	AME804.11
9	What are the consequences of building a valid and invalid tessellated model.	Remember	AME804.11
10	How can the problem of overlapping facets be solved?	Understand	AME804.11
Part - B (Long Answer Questions)			
1	Explain the different errors occurs in RP processes	Understand	AME804.11
2	Explain post-processor in detail. With a neat sketch	Understand	AME804.12
3	Name some other translators used in place of STL.	Understand	AME804.12
4	Explain pre-processing in detail. With a neat sketch	Remember	AME804.11
5	Discuss post-processing errors in detail.	Understand	AME804.11
6	Explain Part building errors in SLA in detail.	Understand	AME804.13
7	Explain Part building errors in SLA in detail. With a block diagram	Understand	AME804.13
8	Explain the error associated with STL file. Describe the steps involved in solving 'missing facets' problem.	Understand	AME804.14
9	Which type of part building errors in SLS.	Remember	AME804.11
10	List out the different errors occur in rp processes.	Understand	AME804.12

Prepared By:

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