INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad-500043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Title	**RAPID PROTOTYPE TECHNOLOGIES**				
Course Code	**BCCB08**				
Programme	M.Tech				
Semester	I				
Course Type	Core				
Regulation	**IARE - R18**				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	3	0	3	-	-
Chief Coordinator	Dr. G V R Seshagiri Rao, Professor, ME				
Course Faculty	Dr. G V R Seshagiri Rao, Professor.ME				

COURSE OBJECTIVES:

The course should enable the students to:	
I	Describe product development, conceptual design and classify rapid prototyping systems; explain stereo lithography process and applications
II	Identify The process photopolymers, photo polymerization, layering technology, laser and laser scanning
III	Applying of measurement and scaling technique for prototype manufacturing.

COURSE OUTCOMES (COs):

CO1	Describe product development, conceptual design and classify rapid prototyping systems; explain stereo lithography process and applications.
CO2	Identify The process photopolymers, photo polymerization, layering technology, laser and laser scanning
CO3	Applying of measurement and scaling technique for prototype manufacturing.
CO4	Identify the Rapid Prototyping Data Formats.
CO5	Application for powder based rapid prototyping systems.

COURSE LEARNING OUTCOMES:

BCCB08.01	Identify and understand of basic concepts of Rapid prototyping technologies
BCCB08.02	Understand and Apply concepts of Rapid prototyping
BCCB08.03	Classify the rapid prototyping systems
BCCB08.04	Understand the different Models and specifications
BCCB08.05	Understand the selection of manufacturing method
BCCB08.06	Identify the Layering Technology, Applications.
BCCB08.07	Understand the different models and specifications
BCCB08.08	Classify the Rapid Tooling systems
BCCB08.09	Understand the Powder Based Rapid Prototyping Systems
BCCB08.10	Identify the Rapid Prototyping Data Formats
BCCB08.11	Understand the Rapid Prototyping Software's
BCCB08.12	Identify the Newly Proposed Formats
BCCB08.13	Application for powder based rapid prototyping systems
BCCB08.14	Application in Design and Engineering
BCCB08.15	Design and Production of Medical Devices, Forensic Science and Anthropology

UNIT-I				
INTRODUCTION TO RAPID PROTOTYPING				
PART - A (SHORT ANSWER QUESTIONS)				
S No	**Question**	**Blooms Taxonomy Level**	**Course Outcomes (COs)**	**Course Learning Outcomes (CLOs)**
1	Why rapid prototyping is important in industries.	Remember	CO 1	BCCB08.01
2	How rapid prototyping systems are classified. Give the example for each classification.	Understand	CO 1	BCCB08.01
3	Explain the key aspects of rapid prototype technologies.	Understand	CO 1	BCCB08.01
4	What meant by rapid prototype. What are the roles of prototype in development process?	Understand	CO 1	BCCB08.01
5	Explain in detail the common information work flow indicating the main stage of rapid prototyping system work flow.	Understand	CO 1	BCCB08.02
6	Describe the steps involved in rapid process chain.	Remember	CO 1	BCCB08.02
7	Briefly classify the rapid prototyping systems	Remember	CO 1	BCCB08.02
8	List out the advantages of rapid prototyping process	Remember	CO 1	BCCB08.02
9	"Establish a statement that rapid prototyping is limited to some application" Justify your statement.	Remember	CO 1	BCCB08.03
10	Explain the limitations of rapid prototyping.	Remember	CO 1	BCCB08.03
11	Establish a statement how rapid prototyping is used in automation.	Understand	CO 1	BCCB08.03
12	Explain rapid prototyping and classification of rapid prototyping system.	Remember	CO 1	BCCB08.03
13	What is rapid prototyping? Give its advantages and limitations.	Remember	CO 1	BCCB08.04
14	What are the materials used in rapid prototyping?	Remember	CO 1	BCCB08.04
15	Classify rapid prototyping process	Remember	CO 1	BCCB08.04
16	Discuss the evolution of RP systems indicating the history and their growth rate in the industrial sector	Understand	CO 1	BCCB08.04
17	List out applications of rapid prototyping	Understand	CO 1	BCCB08.05
18	What are the steps involved in rapid prototyping process	Understand	CO 1	BCCB08.05
19	What is the role of RP in product development	Remember	CO 1	BCCB08.05
20	Explain the need for rapid prototyping	Remember	CO 1	BCCB08.05
PART - B (Long Answer Questions)				
1	Explain the history of rapid prototyping systems and its fundamental development.	Apply	CO 1	BCCB08.01
2	Explain the need of rapid prototyping	Understand	CO 1	BCCB08.01
3	List out the classification of rapid prototype systems.	Understand	CO 1	BCCB08.02
4	Explain in detail the process chain rapid prototyping.	Apply	CO 1	BCCB08.02

5	Discuss limitations of rapid prototyping explain in detail.	Understand	CO 1	BCCB08.03
6	Write short notes on advantages of rapid prototyping.	Remember	CO 1	BCCB08.04
7	Classify rapid prototyping and give its basic principle.	Understand	CO 1	BCCB08.04
8	Explain rapid tooling wheel.	Understand	CO 1	BCCB08.04
9	Discuss the steps followed in rapid prototyping process	Remember	CO 1	BCCB08.05
10	Describe the role of RP in product development.	Understand	CO 1	BCCB08.05
11	How would you define prototype in the context of modern product development?	Remember	CO 1	BCCB08.05
12	What are the main roles and functions for prototypes?	Understand	CO 1	BCCB08.05
13	What is the method used in powder based rapid prototyping systems?	Understand	CO 1	BCCB08.04
14	In what form of material can rapid prototyping systems be classified as solid based?	Remember	CO 1	BCCB08.04
15	Name three rapid prototyping systems that are liquid based and Explain.	Understand	CO 1	BCCB08.05
16	What are the three types of automated fabricators? Describe them and give two examples each.	Remember	CO 1	BCCB08.05
17	Explain briefly about fundamental automated processes.	Understand	CO 1	BCCB08.05
18	Write short notes on “Process chain”	Remember	CO 1	BCCB08.05
19	What are the parameters used in the SLA process	Understand	CO 1	BCCB08.05
20	What are the three aspects of interest in describing a prototype? Describe them clearly.	Remember	CO 1	BCCB08.05
PART - C (ANALYTICAL QUESTIONS)				
1	Enumerate the requirements of new product development strategies. Explain the critical factor affecting the process	Remember	CO 1	BCCB08.03
2	Explain the various demands on CAD system used in rapid prototyping	Understand	CO 1	BCCB08.03
3	Discuss the evolution of rapid prototype systems indicting the history and growth rate in industrial sector.	Understand	CO 1	BCCB08.04
4	What are the three phases of rapid prototyping? Contrasting these with those of geometric modelling, what similarities can be drawn	Understand	CO 1	BCCB08.03
5	Describe the advantages of rapid Prototyping in terms of its beneficiaries such as the product designers, tool designer, manufacturing engineer, marketers and consumers.	Remember	CO 1	BCCB08.05
6	Describe the steps involved in a general rapid prototyping process chain and Distinguish cleaning, post curing and finishing which are the various tasks of post processing.	Understand	CO 1	BCCB08.05
7	What are the three types of automated fabricators? Describe them and give two examples each.	Understand	CO 1	BCCB08.05
8	Summarize the key aspect of rapid prototyping. Explain With an example the historical development of rapid prototype technology.	Remember	CO 1	BCCB08.03
9	Categorize of applications in rapid prototype technology in manufacturing industries	Understand	CO 1	BCCB08.03
10	Compare rapid prototype technology with computer numerical control technology.	Understand	CO 1	BCCB08.05
UNIT-II				
TYPES OF PROTOTYPING SYSTEMS				
PART – A (SHORT ANSWER QUESTIONS)				
1	Define the fundamental principle of stereo lithography process.	Remember	CO 2	BCCB08.06
2	Explain alternating direction implicit method.	Remember	CO 2	BCCB08.06
3	Define fused deposition modeling.	Understand	CO 2	BCCB08.06
4	Compare solid based rapid prototyping and liquid based rapid prototyping.	Remember	CO 2	BCCB08.07
5	Differentiate between stereo lithography and solid ground curing.	Remember	CO 2	BCCB08.07
6	Define laminated object manufacturing and specification.	Remember	CO 2	BCCB08.07
7	Explain the advantages of liquid based stereo lithography.	Understand	CO 2	BCCB08.07
8	Explain merits of fused deposition modeling.	Remember	CO 2	BCCB08.07
9	List out the application of fused deposition modeling.	Remember	CO 2	BCCB08.07

10	Explain laminated object manufacturing and its applications.	Remember	CO 2	BCCB08.08
11	With neat sketches explain solid ground curing process	Understand	CO 2	BCCB08.08
12	What are the disadvantages and applications of SGC system?	Remember	CO 2	BCCB08.08
13	Explain in detail about laminated object manufacturing and its applications.	Remember	CO 2	BCCB08.09
14	With an example explain path generation in FDM process.	Understand	CO 2	BCCB08.10
15	What are the applications of FDM models? Give an example.	Remember	CO 2	BCCB08.10
16	List the advantages and limitations of FDM.	Remember	CO 2	BCCB08.10
17	List the advantages and limitations of FDM.	Remember	CO 2	BCCB08.10
18	What are the materials used in SLS system.	Understand	CO 2	BCCB08.10
19	Differentiate SLA and SLS in rapid prototyping	Remember	CO 2	BCCB08.10
20	What are the advantages of solid ground curing process	Remember	CO 2	BCCB08.10
	Part - B (Long Answer Questions)			
1	Compare and contrast the liquid-based stereo lithography systems and the solid ground curing systems.	Understand	CO 2	BCCB08.06
2	Explain in details the working principle of solid ground curing models with its advantages and disadvantages.	Understand	CO 2	BCCB08.06
3	Explain merits and demerits of Laminated Object Manufacturing.	Understand	CO 2	BCCB08.06
4	Explain with the help of simple line diagram explain the construction details of extrusion head in FDM process.	Apply	CO 2	BCCB08.07
5	Describe Fused deposition modeling process with a neat sketch.	Understand	CO 2	BCCB08.07
6	Explain the working principle and details of process parameters of an FDM machine	Apply	CO 2	BCCB08.07
7	Explain in detail about laminated object manufacturing and its applications.	Understand	CO 2	BCCB08.07
8	With neat sketch explain the process of selective laser sintering process and its advantages, disadvantages and applications.	Understand	CO 2	BCCB08.07
9	Describe laminated object manufacturing process.	Apply	CO 2	BCCB08.07
10	What are the materials suitable for FDM process?	Remember	CO 2	BCCB08.08
11	Discuss the machine details of SGC.	Understand	CO 2	BCCB08.08
12	Distinguish the following process: FDM, LOM,	Understand	CO 2	BCCB08.08
13	Distinguish the following process :SGC and SLS.	Understand	CO 2	BCCB08.09
14	Explain how SLS process can be used to produce direct and in-direct prototypes.	Remember	CO 2	BCCB08.10
15	What are the advantages of liquid-based stereo lithography systems	Understand	CO 2	BCCB08.10
16	What are the advantages of solid ground curing systems?	Remember	CO 2	BCCB08.10
17	Differentiate SLA and SLS in rapid prototyping	Understand	CO 2	BCCB08.10
18	Describe the principle of FDM with its advantages, disadvantages and applications	Understand	CO 2	BCCB08.10
19	Explain the effect of process parameters on qualities of final product.	Remember	CO 2	BCCB08.10
20	Discuss the principle of liquid-based stereo lithography systems	Understand	CO 2	BCCB08.10
	PART - C (ANALYTICAL QUESTIONS)			
1	Specify and explain the different process, parameters of SLA technique, the different material which may used in manufacturing of products in SLA technique	Remember	CO 2	BCCB08.06
2	Explain with a neat sketch, principle of operation of Selective Laser Sintering Process.	Remember	CO 2	BCCB08.06
3	Compose the principles behind stereo litho sintering process. Briefly explain the materials used in stereo litho sintering.	Understand	CO 2	BCCB08.06
4	Narrate Laminated Object manufacturing on principle in works; models depict merits and demerits with a neat sketch.	Understand	CO 2	BCCB08.07
5	Explain in details the working principle of solid ground curing models with its advantages and disadvantages.	Understand	CO 2	BCCB08.07

6	What are the features of LOM process? Describe in detail the process flow of LOM process	Remember	CO 2	BCCB08.07
7	What are the advantages and limitations of solid based system?	Understand	CO 2	BCCB08.07
8	What are the advantages and limitations of liquid based system?	Remember	CO 2	BCCB08.07
9	Differentiate SLA and SLS in rapid prototyping.	Understand	CO 2	BCCB08.07
10	List out the practical applications of Laminated Object Manufacturing.	Understand	CO 2	BCCB08.07
UNIT-III				
POWDER BASED RAPID PROTOTYPING				
PART – A (SHORT ANSWER QUESTION)				
S No	**Question**	**Blooms Taxonomy level**	**Course Outcomes (COs)**	**Course Learning Outcomes (CLOs)**
1	Explain the selective laser sintering. Process.	Remember	CO 3	BCCB08.11
2	Explain the three dimensional printing.	Understand	CO 3	BCCB08.11
3	Discuss the advantages and disadvantages of selective laser sintering.	Understand	CO 3	BCCB08.11
4	Write the applications of 3DP.	Remember	CO 3	BCCB08.12
5	Explain the powder based rapid prototyping.	Understand	CO 3	BCCB08.12
6	What is rapid tool and list out its advantages?	Understand	CO 3	BCCB08.12
7	Differentiate soft tooling and hard tooling.	Remember	CO 3	BCCB08.12
8	What is investment casting?	Remember	CO 3	BCCB08.12
9	Write short note on vaccum casting.	Understand	CO 3	BCCB08.13
10	What are the applications of FDM models? Give an example.	Remember	CO 3	BCCB08.13
11	What is the need of rapid prototyping while conventional toolings are existing?	Understand	CO 3	BCCB08.13
12	List the various rapid prototype concept modelers	Understand	CO 3	BCCB08.13
13	Explain how SLS process can be used to produce direct an in-direct prototypes.	Remember	CO 3	BCCB08.13
14	Write short notes on: Object Quadra system.	Understand	CO 3	BCCB08.14
15	Write short notes on: Thermal jet printer.	Remember	CO 3	BCCB08.14
16	What is rapid tooling and explain the applications of RPT i manufacturing and tooling	Remember	CO 3	BCCB08.14
17	Explain the working principle of three dimensional printin along with its advantages	Remember	CO 3	BCCB08.14
18	Explain in detail about process details and machine details o 3-D printing	Remember	CO 3	BCCB08.15
19	Write advantages and disadvantages of Model maker.	Remember	CO 3	BCCB08.15
20	Write advantages and disadvantages of Multi jet modeling	Remember	CO 3	BCCB08.15
Part - B (Long Answer Questions)				
1	Explain the critical factors that influence the performance and functions of Selective Laser Sintering.	Understand	CO 3	BCCB08.11
2	Discuss the advantages and disadvantages of powder based rapid prototyping system and compare with liquid based and solid based rapid prototyping systems	Understand	CO 3	BCCB08.11
3	Discuss the merits and demerits of selective laser sintering process.	Remember	CO 3	BCCB08.12
4	Discuss the principle of three dimensional printing process using a case study.	Understand	CO 3	BCCB08.13
5	Discuss the principle of selective laser sintering process using a case study	Understand	CO 3	BCCB08.13
6	What is rapid tooling and explain about evaporative pattern casting process?	Apply	CO 3	BCCB08.13
7	Explain about evaporative pattern with a neat sketch.	Understand	CO 3	BCCB08.14
8	What is rapid tooling and explain the application of rapid prototype tool in manufacturing and tooling?	Remember	CO 3	BCCB08.14

9	What is rapid tooling and explain about shell investment casting process with its advantages and disadvantages.	Apply	CO 3	BCCB08.14
10	What are concept modelers? Explain the applications of RP components from concept modeling	Understand	CO 3	BCCB08.14
11	Explain about the Sander's model maker and Object Quadra system	Remember	CO 3	BCCB08.14
12	With neat sketch explain the model maker operation.	Understand	CO 3	BCCB08.14
13	Discuss about multi jet modeling and its uses.	Understand	CO 3	BCCB08.14
14	Explain the critical factors that influence the performance and functions of 3-Dimentional printing.	Remember	CO 3	BCCB08.15
15	Discuss the advantages and disadvantages of liquid based and solid based rapid prototyping systems	Understand	CO 3	BCCB08.15
16	Describe the process flow of stratasys Fused Deposition Modeling.	Understand	CO 3	BCCB08.15
17	Write short notes on Spray Metal Deposition	Remember	CO 3	BCCB08.15
18	Write short notes RTV Epoxy Tools	Understand	CO 3	BCCB08.15
19	Explain about Spin Casting and Die casting	Understand	CO 3	BCCB08.15
20	Differentiate the spin casting and Die casting	Understand	CO 3	BCCB08.15
PART - C (ANALYTICAL QUESTIONS)				
1	Describe briefly about the concept modeling. Explain any three geometric modelling techniques.	Understand	CO 3	BCCB08.13
2	With a neat sketch the following concept of Modelling technique Sander's model maker.	Understand	CO 3	BCCB08.13
3	Explain briefly with a neat sketch the following concept of modelling techniqus3D printer.	Remember	CO 3	BCCB08.14
4	What are the critical factors that influence the performance and functions of Selective Laser Sintering and 3-Dimentional printing.	Understand	CO 3	BCCB08.14
5	Explain the powder based rapid prototyping systems	Understand	CO 3	BCCB08.15
6	What are the application of merits and demerits of powder based rapid prototyping systems?	Understand	CO 3	BCCB08.15
7	Explain the application of rapid prototyping component fron concept modelling.	Remember	CO 3	BCCB08.15
8	What is the Direct Rapid Tooling? Explain any two tools	Understand	CO 3	BCCB08.15
9	Explain the Direct Metal Tooling using 3DP.	Understand	CO 3	BCCB08.15
10	Discuss in detail about the direct rapid tooling and indirect rapid tooling.	Remember	CO 3	BCCB08.15
UNIT-IV				
RAPID PROTOTYPING DATA FORMAT				
PART – A (SHORT ANSWER QUESTIONS)				
S No	**Question**	**Blooms Taxonomy level**	**Course Outcomes (COs)**	**Course Learning Outcomes (CLOs)**
1	Discuss about STL format file.	Remember	CO 4	BCCB08.11
2	What are the features of various rapid prototyping softwares?	Remember	CO 4	BCCB08.11
3	What are the consequences of building valid and invalid tessellated models?	Understand	CO 4	BCCB08.11
4	Describe the concept of occurring errors is in SH files.	Remember	CO 4	BCCB08.11
5	What is the concept of file exchange errors?	Remember	CO 4	BCCB08.11
6	What is the data format in rapid prototyping?	Understand	CO 4	BCCB08.12
7	What are the softwares used in rapid prototyping?	Remember	CO 4	BCCB08.12
8	What is the software's for RP?	Understand	CO 4	BCCB08.12
9	What is the collaboration tools used in RP software?	Remember	CO 4	BCCB08.12
10	What are the STL File Problems?	Understand	CO 4	BCCB08.12
11	What are STL containers? And What is standard library function?	Understand	CO 4	BCCB08.12
12	Write short note on STL file Repair.	Remember	CO 4	BCCB08.12
13	What are part building errors?	Remember	CO 4	BCCB08.12

14	Define slicing relevant to CAD.	Remember	CO 4	BCCB08.12
15	Discuss different features of the software's for rapid prototype.	Understand	CO 4	BCCB08.12
16	What are the differences between building valid and invalid tessellated models?	Remember	CO 4	BCCB08.12
17	What is Precision model?	Understand	CO 4	BCCB08.12
18	What is Economical model?	Understand	CO 4	BCCB08.12
19	Explain any One STL file problem	Remember	CO 4	BCCB08.12
20	Name the STL file formats.	Remember	CO 4	BCCB08.12
Part - B (Long Answer Questions)				
1	Explain the STL format. Discuss the Generic and dedicated solution with example.	Understand	CO 4	BCCB08.11
2	Explain the procedure of modelling, STL file creation and layering steps before printing 3D model in RP machine for the following types of models (i) Economical model. (ii) Precision model	Remember	CO 4	BCCB08.11
3	Differentiate soft tooling and hard tooling and also Compare direct tooling and indirect tooling.	Understand	CO 4	BCCB08.11
4	Explain the futures of RP software and summarize about solid view, view expert, 3D view and STL view in detail.	Remember	CO 4	BCCB08.12
5	Write short on following. (i) Influence of building orientation. (ii) File exchange errors. (iii) Errors in STL files. (iv) Part building errors.	Understand	CO 4	BCCB08.12
6	Explain the procedure of modeling, STL file creation	Understand	CO 4	BCCB08.11
7	Differentiate between soft tooling and hard tooling. Compare and contrast direct tooling and indirect tooling.	Remember	CO 4	BCCB08.11
8	Explain Arc spray metal tooling with a neat sketch	Understand	CO 4	BCCB08.11
9	Explain the futures of RP software.	Understand	CO 4	BCCB08.12
10	Enumerate the features of various rapid prototyping software's.	Remember	CO 4	BCCB08.11
11	Explain the consequences of building valid and invalid tessellated models.	Understand	CO 4	BCCB08.11
12	Explain the concept occurring errors in SH files.	Understand	CO 4	BCCB08.11
13	Describe briefly about the concept of file exchange errors	Remember	CO 4	BCCB08.12
14	Explain briefly about the data format in rapid prototyping.	Understand	CO 4	BCCB08.11
15	Explain briefly about the softwares in rapid prototyping.	Understand	CO 4	BCCB08.11
16	Explain about newly proposed formats and other translators	Understand	CO 4	BCCB08.11
17	Explain the futures of solid view, view expert in detail 3D view and STL view in detail.	Remember	CO 4	BCCB08.12
18	Explain the futures of 3D view and STL view in detail.	Understand	CO 4	BCCB08.11
19	Write short notes on Precision Model	Understand	CO 4	BCCB08.11
20	Explain various layering steps before 3D printing in RP machine for the Economical model?	Understand	CO 4	BCCB08.11
PART - C (ANALYTICAL QUESTIONS)				
1	Summarize with case study rapid prototyping tooling and conventional tooling.	Remember	CO 4	BCCB08.11
2	Explain the procedure of modelling with flow chart.	Understand	CO 4	BCCB08.11
3	Explain the futures of RP software	Apply	CO 4	BCCB08.11
4	Explain the STL format in detail with a case study and example.	Understand	CO 4	BCCB08.12
5	Explain in contrast "rapid prototyping tooling is required or not" to conventional machining	Understand	CO 4	BCCB08.11
6	Explain about solid view in detail.	Understand	CO 4	BCCB08.11
7	Explain about view expert in detail	Apply	CO 4	BCCB08.11
8	Explain about 3D View in detail	Understand	CO 4	BCCB08.12
9	Discuss about STL file creation and layering steps before printing 3D model in RP machine for the following types of models	Apply	CO 4	BCCB08.11

10	Compare the Rapid prototyping tooling with Conventional machining.	Remember	CO 4	BCCB08.11

UNIT-V

RAPID PROTOTYPING APPLICATIONS

PART – A (SHORT ANSWER QUESTIONS)

S No	Question	Blooms Taxonomy level	Course Outcomes (COs)	Course Learning Outcomes (CLOs)
1	What are the applications of rapid prototyping in aerospace industry.	Remember	CO 5	BCCB08.13
2	Which rapid prototyping processes are best suited for production of ceramic part. Why.	Understand	CO 5	BCCB08.13
3	How does aerospace technology make use of rapid tooling application?	Remember	CO 5	BCCB08.13
4	Summarize the applications of rapid prototyping in various industries.	Understand	CO 5	BCCB08.13
5	Summarize the applications of rapid protyping in automotive sector.	Remember	CO 5	BCCB08.13
6	List out the applications of rapid prototyping in aerospace industry.	Understand	CO 5	BCCB08.13
7	Generalize the statement “material relationship affects the rapid prototyping”.	Remember	CO 5	BCCB08.23
8	Explain the application of analysis and planning in rapid prototyping.	Remember	CO 5	BCCB08.13
9	How the rapid prototyping is useful in the arts and architecture.	Understand	CO 5	BCCB08.13
10	Write the applications of customized implants and prosthesis.	Remember	CO 5	BCCB08.13
11	List the types of industries that RP can be used in.	Remember	CO 5	BCCB08.13
12	List out specific industrial applications of Rapid prototyping.	Understand	CO 5	BCCB08.13
13	What are the RP systems that are suitable for sand casting?	Remember	CO 5	BCCB08.13
14	What is sand casting? give two examples	Understand	CO 5	BCCB08.23
15	What is direct soft tooling?	Remember	CO 5	BCCB08.13
16	What is indirect soft tooling?	Remember	CO 5	BCCB08.13
17	What is direct hard tooling?	Understand	CO 5	BCCB08.13
18	What is indirect hard tooling?	Remember	CO 5	BCCB08.13
19	What are the typical RP applications in engineering and analysis?	Understand	CO 5	BCCB08.13
20	What are the typical RP applications in design?	Remember	CO 5	BCCB08.13

Part - B (Long Answer Questions)

1	Explain the applications of rapid prototyping. Summarize the application in coin making, coin industry, GIS application.	Understand	CO 5	BCCB08.13
2	Categorize the applications of rapid prototyping in the areas of customized implants and prosthesis, visualization of biomolecules.	Understand	CO 5	BCCB08.13
3	Discuss with a case study in automobile application. Describe how reverse engineering will be applied to rapid prototyping techniques.	Understand	CO 5	BCCB08.13
4	Categorize how the material relationship will contribute in rapid prototype technique. Specify the applications in aerospace industry.	Understand	CO 5	BCCB08.13
5	Explain the applications of rapid prototyping. summarize the applications in engineering, analysis, aerospace industry, medical and bioengineering.	Understand	CO 5	BCCB08.14
6	Categorize the applications of rapid prototyping in the areas of planning and simulation of complex surgery, customized implants, design and production of medical devices.	Understand	CO 5	BCCB08.14

7	Discuss with a case study in medical application. Describe how reverse engineering will be applied to rapid prototypin techniques.	Understand	CO 5	BCCB08.14
8	Categorize how the material relationship will contribute in rapid prototype technique specify the applications in forensic science and anthropology	Understand	CO 5	BCCB08.14
9	Discuss with a cases study how design of medical devices are done by the rapid prototyping.	Understand	CO 5	BCCB08.14
10	Explain how forensic science and anthropology uses rapid prototyping technique.	Understand	CO 5	BCCB08.14
11	Discuss with a cases study how production of medical devices are done by the rapid prototyping.	Understand	CO 5	BCCB08.14
12	Compare and contrast the use of RP patterns for sand casting.	Understand	CO 5	BCCB08.15
13	Compare the relative merits of using LOM parts with SLA parts for investment casting.	Understand	CO 5	BCCB08.15
14	What are the typical RP applications in design? Briefly describe each of these applications and illustrate them with examples.	Remember	CO 5	BCCB08.15
15	What are the finishing processes that are used for RP model and explain why they are necessary?	Understand	CO 5	BCCB08.15
16	How is application of RP models related to t purpose of prototyping?	Understand	CO 5	BCCB08.15
17	Explain with a suitable example the application of rapid prototyping in aerospace industry.	Remember	CO 5	BCCB08.15
18	How does Rapid prototyping models related to the materials used for prototyping.	Understand	CO 5	BCCB08.15
19	Differentiate between the direct soft tooling and indirect so tooling.	Understand	CO 5	BCCB08.15
20	Differentiate between the direct hard tooling and indirect hard tooling.	Understand	CO 5	BCCB08.15
	PART - C (ANALYTICAL QUESTIONS)			
1	Summarize why the rapid prototyping is essentially applied the aerospace and automotive industry.	Understand	CO 5	BCCB08.15
2	Explain in contrast how the rapid prototyping application is differs from conventional manufacturing.	Understand	CO 5	BCCB08.15
3	Summarize the statement “rapid prototyping uses the effective use of material, production ease of manufacturing and tooling”.	Understand	CO 5	BCCB08.15
4	Discuss with a cases study how forensic and anthropology a done by the rapid prototyping.	Remember	CO 5	BCCB08.15
5	Categorize how the material relationship will contribute in rapid prototype technique Specify the applications in medica and bio-engineering.	Understand	CO 5	BCCB08.15
6	Explain how RP systems can be applied to traditional industries like the jewelry, coin and tableware industries.	Understand	CO 5	BCCB08.15
7	Explain whether RP technology is more suitable for “high technology” industries like aerospace than it is for consume products like electronic appliances.	Understand	CO 5	BCCB08.15
8	Compare and contrast the use of RP patterns for casting of die inserts.	Understand	CO 5	BCCB08.15
9	Compare and contrast the use of RP patterns for investment casting.	Understand	CO 5	BCCB08.15
10	Explain how a RP pattern can be used for vacuum casting with silicon molding.	Understand	CO 5	BCCB08.15

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