

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Second Semester

Product Design and Development

PD4291 - Designing with Advanced Materials

Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Illustrate how computer-aided reverse engineering enhances traditional reverse engineering methods.	UN	1	2
2.	Distinguish between surface model reconstruction and solid model reconstruction.	UN	1	2
3.	How does phase formation affect the mechanical properties of an alloy?	RE	2	2
4.	Define creep and highlight its significance in high-temperature applications.	RE	2	2
5.	List two common methods used to determine the composition of materials.	RE	3	2
6.	Outline the implications of incorrect material specifications.	UN	3	2
7.	What is meant by system compatibility in data systems?	RE	4	2
8.	What does data conformity mean, and why is it essential for ensuring quality assurance?	RE	4	2
9.	Compare copyrights and patents in terms of the legal protection they provide.	UN	5	2
10.	What are the potential legal risks associated with reverse engineering?	RE	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Describe how modern technologies like 3D scanning have transformed reverse engineering practices.	UN	1	13
	Or			
	b Explain how prototyping enhances product development using reverse engineering techniques.	UN	1	13
12.	a Summarize different methods for measuring hardness in metals and their relevance to material performance.	UN	2	13
	Or			
	b Interpret the importance of part failure analysis in improving product reliability and safety.	UN	2	13
13.	a Elaborate the application of microstructure analysis in the failure analysis of materials and discuss its impact on identifying the root causes of material failures.	AP	3	13
	Or			
	b Discuss how manufacturing process verification is applied to ensure product quality and its significance in maintaining industry standards.	AP	3	13

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| 14. | a Discuss how Weibull analysis is used to predict product lifetime and assess reliability, and discuss its importance in engineering and quality control. | AP | 4 | 13 |
| | Or | | | |
| | b Discuss how statistical analysis is applied in data-driven decision-making and its impact on improving business strategies and outcomes. | AP | 4 | 13 |
| 15. | a Examine how reverse engineering is applied in the medical device industry and its importance in improving product design and functionality. | AN | 5 | 13 |
| | Or | | | |
| | b Discover how ethical considerations influence the application of reverse engineering in competitive industries like automotive and aerospace. | AN | 5 | 13 |

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a Analyze the methods of stress rupture testing and discuss their significance for high-temperature alloys used in aerospace applications.	AN	2	15
	Or			
	b Analyze the steps involved in data analysis and evaluate their significance in transforming raw data into actionable insights.	AN	4	15