Code No: 157FA **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, July/August - 2023

SURFACE ENGINEERING

(Common to CE, ME)

Time: 3 Hours **Max.Marks:75**

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What do you mean by surface modification?	[2]
b)	Why surface analysis is so important?	[3]
c)	Mention the applications of hard facing.	[2]
d)	Clearly discuss the advantages of anodizing.	[3]
e)	What is the difference between nitriding and plasma nitriding?	[2]
f)	How does plasma thermal spray work?	[3]
g)	What do you mean by hardening?	[2]
h)	What is the purpose of tempering?	[3]
i)	How design principles play important role in surface engineering?	[2]
j)	Why design guidelines will be followed in surface preparation.	[3]

PART – B

(50 Marks)

2.a)	Mention various surface modification techniques. Explain any one of them.	
b)	Briefly explain about thermal oxidation method for the surface modification.	[5+5]
	OR	
3.a)	Discuss mechanical properties of the surface.	
b)	Discuss the history of surface modification techniques.	[5+5]
4.a)	How coatings are classified? Briefly explain organic coatings.	
b)	Explain Chemical vapor deposition method with a neat sketch.	[5+5]
	OR	
5.a)	Discuss the various properties of coatings.	
b)	How hot dipping process will be done? Mention its advantages.	[5+5]
6.a)	Explain in detail about different types of carburizing methods?	
b)	Explain boronising process with the help of neat sketch.	[5+5]
	OR	
7.a)	Describe the process of thermal spraying with the help of neat sketch.	
b)	Enumerate the advantages and limitations of plasma spraying.	[5+5]

8.a) Discuss the advantages and limitations of laser hardening.
b) How laser cladding differs from other lasers treatments? [5+5]

OR

9.a) Distinguish between hardening and tempering.
b) Explain the process of medium temperature tempering. [5+5]

10. Explain the general design principles for surface engineering. [10]

OR

11. Explain surface engineering solution to a specific problem with an example. [10]

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