Code No: 157EP

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, January/February - 2023
ENGINEERING MATERIALS
(Common to EEE, CSE)

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 is the role of martensite in dual phase steel?	[2]
b)	What does TRIP stand for in steel? Give its applications.	[3]
c)	Name a few examples for super alloys applicable for high temperature applications.	[2]
d)	Distinguish between low and high temperature thermo mechanical treatment.	[3]
e)	What do you mean by extrinsic semiconductor?	[2]
f)	Mention the properties of piezoelectric materials.	[3]
g)	What is the significance of 18/8 stainless steel?	[2]
h)	Distinguish between austenitic and martensitic stainless steel.	[3]
i)	What are the types of biomaterials?	[2]
j)	Why titanium and its alloys are currently used as bio materials?	[3]

PART – B

(50 Marks)

2.a)	Give the composition, properties and applications of HSS steels?	
b)	Write short notes on dual phase steels.	[5+5]
	OR	
3.a)	Explain the structure and properties of TRIP steels.	
b)	List the types and their typical applications of maraging steels?	[5+5]
4.a)	Explain Topologically Close Packed (TCP) phase present in nickel based super alloys.	
b)	Discuss the properties and applications of Fe based super alloys.	[5+5]
	OR	
5.a)	Discuss the main applications for single crystal super alloys.	
b)	Explain the effect of thermo-mechanical treatment on the microstructure and mechanical properties of a nickel based super alloys.	[5+5]

6.a) Differentiate between ferroelectric and piezoelectric materials.
b) Explain the properties of superconducting materials. [5+5]

OR

7.a) Explain about superconductivity materials which will be used at higher critical temperatures.
b) Give the typical applications of pyro-electric materials. [5+5]

8.a) Mention different grades of stainless steels. Briefly explain about martensitic stainless steel.
b) Explain the properties and applications of austenitic stainless steel. [5+5]

OR

9.a) Discuss the advantages and limitations of ferritic stainless steel.
b) Give the applications of stainless steels. [5+5]

10.a) What is biocompatibility and why is it so important?
b) Explain the engineering applications of biomaterials. [5+5]

OR

11.a) Discuss various important bio metallic alloys.
b) Mention various metallic materials used for biomedical applications. [5+5]

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