SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY :: PUTTUR
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QUESTION BANK

Code: Materials Engineering (19ME0303) **Course & Branch: B. Tech - ME**
: I-B. Tech &II-Sem **Regulation: R19**

		UNIT - I	
1		What are the Mechanical and Technological Properties of Engineering Materials?	**(10M)**
2		Explain the effect of grain boundaries on the properties of alloys, also determine the grain size.	**(10M)**
3	(a)	What is Hume Rothery' s rules? Discuss in detail	**(5M)**
	(b)	Explain crystal imperfections	**(5M)**
4		What are the various types of solid solutions? Explain with examples.	**(10M)**
5		What is the Necessity of alloying?	**(10M)**
6		Draw a neat sketch of HCP and Simple cubic crystal structure and calculate its packing factor, coordinate number	**(10M)**
7		What is Material science and metallurgy? Explain the Types of Bonds in solids with neat sketches	**(10M)**
8	(a)	Draw a neat sketch of FCC crystal structure and calculate its packing factor, coordinate number	**(5M)**
	(b)	Draw a neat sketch of BCC crystal structure and calculate its packing factor, coordinate number	**(5M)**
9		What are the various types of solid solutions? Explain with neat sketch.	**(10M)**
10	(a)	Give a brief note on intermediate alloy phases	**(5M)**
	(b)	Explain the Electron compound?	**(5M)**

		UNIT - II	
1	(a)	What is Phase? What are different types of phase diagram ?	**(3M)**
	(b)	Define invariant reactions in phase Diagram with an examples.	**(7M)**
2		What are the eutectoid and eutectic reactions in Cu-Ni & Al-Cu binary phase diagram.	**(10M)**
3		Write the peritectic ,eutectic and eutectoid reaction of Fe-Fe3c phase diagram.	**(10M)**

4	(a)	Explain the phase transformation in solid state	**(5M)**
	(b)	Draw the allotropy of iron and their properties.	**(5M)**
5		Draw the Fe-Fe_3 c equilibrium diagram and label all the points, lines and areas.Explain its important features.	**(10M)**
6	(a)	Draw the Eutectoid system diagram	**(3M)**
	(b)	Explain and Draw the Equilibrium cooling and heating of pure metals/alloys system.	**(7M)**
7	(a)	Draw an equilibrium diagram for an isomorphism system	**(5M)**
	(b)	Explain An isomorphism system of your choice to scale and label all the points and its important features	**(5M)**
8		Draw the Eutectoid system diagram and label all points, lines and areas. Explain its important features.	**(10M)**
9		Explain Lever rule with tie line?	**(10M)**
10		Draw and explain the Fe-Fe3c phase diagram invariant reactions?	**(10M)**

UNIT-III

1.		Explain the structure and properties of white cast iron	(10M)
2.		Explain the structure and properties of Copper and its alloys?	(10M)
3.		Explain the structure and properties of Grey cast iron?	(10M)
4.	(a)	What is steel? What are the classifications of the steels?	(5M)
	(b)	Explain the structure and properties of Spheriodal graphite cast iron?	(5M)
5.	(a)	What is Effect of alloying elements on Iron – Iron carbon system?	(5M)
	(b)	Write Classification of Steels	(5M)
6.		Explain the structure and properties of Aluminum and its alloys?	(10M)
7.		Explain the structure and properties of Titanium and its alloys?	(10M)
8.	(a)	Explain the structure and properties of malleable cast iron	(5M)
	(b)	Explain the structure and properties of Ductile cast iron	(5M)
9.		Explain the structure and properties of below steel i) Hadfield manganese steels ii) tool and die steels	(10M)
10.	(a)	Explain briefly on Carbon Steel	(5M)

	(b)	Write a notes on Low alloy Steel	(5M)

UNIT-IV

1.		Write about Annealing, normalizing, Hardening. Draw and explain the structures.	(10M)
2.	(a)	Explain the toughness .How it is measured and explain their types?	(5M)
	(b)	Explain the Hardness . How it is measured and explain their types?	(5M)
3.		Explain the below i) surface - hardening methods ii) Age hardening Treatment	(10M)
4.	(a)	Discus in details about heat treatment process of plastic	(5M)
	(b)	What is cryogenic treatment? How is it done for the alloys?	(5M)
5.		What are TTT diagrams? How they prepared? What is their significance?	(10M)
6.	(a)	What is the purpose of using normalizing, Annealing and Hardening?	(5M)
	(b)	Explain about various Hardening process use for alloys?	(5M)
7.		What is Fracture Mechanism. Explain the mechanical properties of materials and Fracture	(10M)
8.		Explain the below i) Tempering ii) Hardenability	(10M)
9.		Explain mechanical property of strength tests(Tensile, compression, shear)	(10M)
10		What are heat treatment processes? Explain briefly.	(10M)

UNIT-V

1.	(a)	Enumerate the difference between the particle and Reinforced composites.	(5M)
	(b)	What is ceramic material? Explain crystalline ceramics	(5M)
2.	(a)	What are glasses? How they manufacture?	(5M)
	(b)	Discuss about the Glass micro structure and properties.	(5M)
3.		What are the various methods of component manufacture of composites?	(10M)
4.		Why are fiber glass reinforced composites used extensively?	(10M)
5.		What is composite material? How is it classified? Give a short notes.	(10M)

6.		Explain the Ceramic matrix composite. Discuss about their properties.	(10M)
7.		Explain Metal matrix composite. Discuss about their properties.	(10M)
8.		Explain carbon – carbon composites. Discuss about their properties.	(10M)
9.	(a)	What are cermets? what are their properties?	(5M)
	(b)	How the cermets manufactured? Give Examples	(5M)
10		What is the polymer? Explain the polymer matrix composite	(10M)