Code No: 113AQ

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

METALLURGY AND MATERIALS SCIENCE

(Common to ME, MCT, AME)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1 a)	Name different types of bonds in solids.	[2]
b)	What are intermediate alloy phases?	[3]
c)	Define Gibb's phase rule.	[2]
d)	What are electron compounds? Write their properties.	[3]
e)	What is the importance of Normalizing?	[2]
f)	Write about properties of alloy steels.	[3]
g)	Differentiate between cast iron and steel.	[2]
h)	What is brass? Give its properties.	[3]
i)	What are cermets? Give an example.	[2]
j)	Write the applications of composites.	[3]

PART-B

(50 Marks)

2.a) Explain Hume Rothery rules.
b) Explain briefly different methods used to determine grain size. [5+5]

OR

3.a) Classify alloy steels. Explain why alloying is done to metals.
b) Derive Atomic packing factor for FCC crystals. [5+5]

4.a) Write briefly about methods used to construct phase diagrams.
b) Draw and explain a phase diagram showing eutectic reaction. [5+5]

OR

5.a) What is Allotropy? Explain Eutectoid transformation with example.
b) Write about Equilibrium cooling and heating of alloys. [5+5]

6.a) Write about the effect of alloying elements on Fe-Fe_3C phase diagram.
b) Explain tempering process with cooling curve. [5+5]

OR

7.a) Write about the importance and applications of TTT diagrams.
b) What is hardening? Explain different hardening processes. [5+5]

8.a) Write about structure and properties of Grey cast irons.

b) Briefly describe the properties of aluminium and its alloys. [5+5]

OR

9.a) Differentiate between white cast iron and malleable cast iron.

b) Describe properties of Titanium and its alloys. [5+5]

10.a) Classify composites. Enumerate the merits of particle reinforced composites over fiber reinforced composites.

b) Write about the properties and applications of polymers. [5+5]

OR

11.a) Write about the different manufacturing methods of composites.

b) Define and explain cermets. [5+5]

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