Code No: R1621031 **R16** SET - 1

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018
METALLURGY & MATERIALS SCIENCE
(Com to ME & AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Write the important characteristics of metals and alloys?	(3M)
	b)	Sketch Al- Cu phase diagram	(2M)
	c)	Write the applications of malleable cast iron?	(2M)
	d)	What are surface - hardening methods?	(2M)
	e)	List the applications of aluminium?	(2M)
	f)	Name any two examples of cermets?	(3M)

PART –B

2.	a)	What important factors control the type of structure developed in Ionic solids and covalent solids. Explain them.	(7M)
	b)	Explain ASTM representation of grain sizes	(7M)
3.		Draw a neat sketch of Fe-Fe_3C diagram and indicate all points, lines and areas. Explain the various phase transformation reactions in Fe -Fe_3C diagram.	(14M)
4.	a)	Explain structure and properties of grey cast iron.	(7M)
	b)	Write the properties and applications of tool and die steels.	(7M)
5.	a)	Explain the various stages in heat treatment cycle.	(7M)
	b)	Describe cryogenic treatment of alloys?	(7M)
6.		Explain the importance, characteristics, applications of any two non-ferrous metals and alloys.	(14M)
7.	a)	Describe the applications of abrasive materials in detail?	(7M)
	b)	Explain the typical material properties of nanomaterials?	(7M)
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Code No: R1621031 **R16** SET - 2

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018
METALLURGY & MATERIALS SCIENCE
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Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Write the types of bonds in solids?	(2M)
	b)	Write about Eutectoid reaction?	(3M)
	c)	Write the applications of white cast iron?	(2M)
	d)	Define hardening?	(2M)
	e)	List the applications of copper?	(2M)
	f)	What is the role of the matrix in a composite material?	(3M)

PART –B

2.	a)	Explain the necessity of alloying. Why alloys are more preferred over metals, for industrial applications?	(7M)
	b)	What are the types of solid solutions? Explain with example	(7M)
3.	a)	Explain the transformations in the solid state.	(7M)
	b)	Describe the binary phase diagram of Bi-Cd?	(7M)
4.		Explain the properties, compositions and applications of Hadfield manganese steels	(14M)
5		Explain the steps involved in age-hardening process, with the help of an example. Name a few materials that can be age hardening	(14M)
6.		Explain structure and properties of aluminium and its alloys in detail.	(14M)
7.	a)	Describe the properties of abrasive materials?	(5M)
	b)	Write the applications of nano materials.	(9M)
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Code No: R1621031 **R16** SET - 3

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018
METALLURGY & MATERIALS SCIENCE
(Com to ME & AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Write the types of solid solutions?	(3M)
	b)	What is Phase rule?	(2M)
	c)	Write the properties of malleable cast iron?	(2M)
	d)	Define normalizing?	(2M)
	e)	List the applications of titanium?	(2M)
	f)	Write the properties of cermets?	(3M)

PART –B

2.	a)	Explain electron compounds	(7M)
	b)	Describe the effect of grain boundaries on the properties of metal / alloys?	(7M)
3.		Explain the experimental methods of construction of equilibrium diagrams.	(14M)
4.		Describe about structure, properties and applications of plain carbon steels and low alloy steels	(14M)
5.	a)	Draw a neat sketch of T-T-T diagram for eutectoid steel and indicate all regions?	(9M)
	b)	Explain the effect of cooling rate on transformation products.	(5M)
6.		Explain structure and properties of copper and its alloys in detail?	(14M)
7.	a)	Write the properties and applications of crystalline ceramics?	(7M)
	b)	Explain the importance and applications of C-C composites.	(7M)
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Code No: R1621031 **R16** SET - 4

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018
METALLURGY & MATERIALS SCIENCE
(Com to ME & AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Write the mechanism of bond formation?	(2M)
	b)	What are the different types of phases that may exist in a binary phase diagram?	(3M)
	c)	Write the properties of white cast iron?	(2M)
	d)	What is the purpose of annealing?	(2M)
	e)	What characteristics of copper make it resistant to corrosion?	(2M)
	f)	Write the properties of glasses?	(3M)

PART -B

2.	a)	Distinguish between grain and grain boundary. Explain the changes in physical and mechanical properties of metals due to the presence of grains and grain boundaries.	(7M)
	b)	Compare and contrast between intermediate phases and solid solutions?	(7M)
3.	a)	Explain the relationship between equilibrium diagrams and properties of alloys.	(7M)
	b)	Write about Isomorphous alloy systems in detail?	(7M)
4.	a)	Explain structure, properties and applications of spheroidal graphite cast iron.	(9M)
	b)	Write about the applications of alloy cast irons.	(5M)
5.		Why hardening of steels is followed by tempering? Discuss the different stages of tempering and draw the resulting microstructures?	(14M)
6.		Explain structure and properties of titanium and its alloys in detail?	(14M)
7.	a)	Describe the structure and applications of nano materials?	(7M)
	b)	Write about metal matrix composites with regard to physical and mechanical properties and their applications?	(7M)
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