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

II B. Tech I Semester Regular Examinations, October/November - 2017
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)	Define crystallization of metals?	(2M)
	b)	Explain isomorphous alloy system?	(2M)
	c)	Compare malleable and nodular cast iron?	(3M)
	d)	What are ferrite stabilizers?	(2M)
	e)	What are the types of brass?	(3M)
	f)	What are ceramics?	(2M)

PART -B

2.	a)	Explain in detail metallic bonding and its properties	(7M)
	b)	Compare intermediate phases and solid solutions?	(7M)
3.	a)	Draw Cu-Ni phase diagram and label the important reactions and regions?	(7M)
	b)	Explain different types of transformations in solid state? Illustrate with an example	(7M)
4.	a)	Explain the types of cast iron and their applications	(7M)
	b)	Explain in detail Hadfield Manganese steel and its properties	(7M)
5.	a)	Compare annealing and normalizing. When do you use them	(7M)
	b)	Explain in detail about different types of carburizing methods?	(7M)
6.	a)	Write in detail about the properties and applications of copper and its alloys?	(7M)
	b)	Write the properties of alpha titanium alloy? Explain its typical applications	(7M)
7.	a)	Explain the properties and types of refractories	(7M)
	b)	Explain carbon-carbon composite and its manufacturing procedure	(7M)
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Code No: R1621031 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
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)	What is meant by an alloy?	(2M)
	b)	What is allotropy?	(2M)
	c)	What are luder bands?	(3M)
	d)	What are austenite stabilizers?	(2M)
	e)	What is admiralty brass?	(2M)
	f)	What are the types of manufacturing methods for composites	(3M)

PART -B

2.	a)	Explain crystallization of metals?	(7M)
	b)	Explain comparison method of grain size measuring technique?	(7M)
3.	a)	Find the degrees of freedom in a binary system (C=2) at single phase, double phase, and triple phase region at atmospheric pressure conditions using phase rule	(7M)
	b)	Explain metallographic method of construction of phase diagram?	(7M)
4.	a)	Explain in detail the properties and applications of low carbon steel?	(7M)
	b)	Write the properties of tool steel?	(7M)
5.	a)	Explain age hardening treatment?	(7M)
	b)	Explain carbonitriding? What are its applications	(7M)
6.	a)	Explain the properties and applications of aluminum and its alloys?	(7M)
	b)	Explain the properties of alpha-beta titanium alloys?	(7M)
7.	a)	What are cermets? Explain with examples.	(7M)
	b)	Write the classification of composites? Also indicate their typical applications	(7M)
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Code No: R1621031 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
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 necessity of alloying?	(3M)
	b)	Write a eutectoid reaction?	(2M)
	c)	What is a dual phase steel?	(2M)
	d)	Define hardenability?	(2M)
	e)	Explain dezincification?	(3M)
	f)	What are the types of glasses?	(2M)

PART -B

2.	a)	Explain electron compounds?	(7M)
	b)	How does grain size affect the mechanical properties? Explain	(7M)
3.	a)	Write eutectic, peritectic, eutectoid and peritectoid reactions?	(7M)
	b)	Explain thermal analysis method of construction of phase diagram?	(7M)
4.	a)	Explain in detail the properties and applications of medium carbon steel?	(7M)
	b)	Explain the production of gray cast iron? Give their applications.	(7M)
5.	a)	How do you find the hardenability? Explain	(7M)
	b)	Explain cryogenic treatment? What are its advantages	(7M)
6.	a)	Write the properties and classification of aluminum alloys?	(7M)
	b)	Write the properties of beta titanium alloys?	(7M)
7.	a)	What are advanced ceramics? Explain.	(7M)
	b)	Explain the manufacture of fiber reinforced composites?	(7M)
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Code No: R1621031 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
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)	Define metallic bonding?	(2M)
	b)	Define equilibrium diagram?	(2M)
	c)	Explain the properties of white cast iron?	(3M)
	d)	Draw TTT diagram for eutectoid steel	(3M)
	e)	What is season cracking? Explain its effect	(2M)
	f)	What are refractories?	(2M)

PART -B

2.	a)	Discuss the necessity of alloying in steel	(7M)
	b)	What are Hume-Rothery rules? Explain	(7M)
3.	a)	Draw Fe-Fe_3C diagram? Explain the important phases	(7M)
	b)	Label the regions and mention important reactions and critical temperature lines of Fe-Fe_3C diagram?	(7M)
4.	a)	Explain the production of malleable cast iron	(7M)
	b)	Write the classification of steel?	(7M)
5.	a)	Write the effect of alloying elements on Fe-Fe_3C system?	(7M)
	b)	Explain hardening and tempering process	(7M)
6.	a)	Write the classification of copper alloys? Describe the importance of brass.	(7M)
	b)	Explain the corrosion resistance of Al and its alloys	(7M)
7.	a)	Write the classification of ceramics? Explain with examples.	(7M)
	b)	Explain the properties and applications of metal matrix composites (MMC)?	(7M)
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