Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: ME210

Course Name: METALLURGYAND MATERIALS ENGINEERING (MC)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three questions, each carries 10 marks. Marks

1	a)	Draw the following SC, BCC, FCC and HCP structure, Find out the effective number of atoms and co-ordination number for the above.	(10)
2	a)	Explain about different imperfection in crystal.	(7)
	b)	Describe the plastic deformation of metals.	(3)
3	a)	Discuss the working principle, features and applications of SEM.	(7)
	b)	Write short note on TEM.	(3)
4	a)	List the mechanism of diffusion in solids and explain any two of them with neat sketch.	(5)
	b)	Explain the solidification of solid in a metal mould.	(5)

PART B

Answer any three questions, each carries 10 marks.

5	a)	Draw and explain time-temperature transformation diagram with different cooling curves.	(6)
	b)	What are the factors affecting hardenability.	(4)
6	a)	What is a phase diagram? Explain the invariant reactions seen in a phase diagram	(10)
7	a)	Explain briefly the theory of tempering. Why steel is tempered and how it is done?	(10)
8	a)	Write in detail about properties and application of any two copper alloys.	(6)
	b)	Differentiate between grey cast iron and white cast iron.	(4)

PART C

Answer any four questions, each carries 10 marks.

9	a)	With a neat sketch explain the procedure for fatigue testing and draw the S-N curve.	(10)
10	a)	Explain the factors leading to crack propagation.	(5)
	b)	Explain super plasticity with examples.	(5)
11	a)	Brief upon the following	(10)

a) Brittle fracture
b) Creep
c) Residual stress
d) Fatigue limit

12 a) How composite materials are important in aerospace industry? What properties make them suitable for the above? (10)

13 a) Write short notes on (6)
a) Smart materials
b) Biomaterials

b) What is mean by glass ceramics? (4)

14 a) What is ductile to brittle transmission? Discuss the factors affecting this phenomenon. (6)

b) What are metal matrix composites? List the advantages. (4)

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