Reg.No. _____

Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 14ME3007 **Semester : Ist M.Tech**
Duration : 3hrs

Sub. Name : Engineering Materials and Applications **Max. marks : 100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)
Approved data sheets are permitted

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	It was happened that when a ship travelled from one place to an another place ,it got fractured in to two pieces in the middle of the sea. State the technical reason and theory behind this incident.	3	12
	b.	Define the fracture toughness of a material and describe the two impact fracture testing techniques in detail.	3	8
		(OR)		
2.	a.	A specimen of a 4340 steel alloy with a plane strain fracture toughness of 54.8 MPa √m is exposed to a stress of 1030 MPa. Will this specimen experience fracture if it is known that the largest surface crack is 0.5 mm long? Explain in detail the theory behind . Assume that the parameter *Y* has a value of 1.0.	3	12
	b.	With help of a graph and suitable example explain the Ductile-to-brittle transition of materials .	3	8
3.	a.	List out the application of patented steel and write the production method of patented steel .	2	7
	b.	Write the heat treatment cycle followed for producing maraging steel ,mention its properties and applications.	2	7
	c.	Explain the stages of creep with suitable diagrams and examples .	2	6
		(OR)		
4.	a.	With help of a block diagram explain the sequence of brittle fracture process in detail and write the difference between brittle fracture and ductile fracture.	3	12
	b.	Show the various modes of crack surface failures with help of sketches and explain in detail.	3	8
5.	a.	What is metallic glasses ? Write the preparation of metallic glasses, properties and characteristics.	1	12
	b.	How does the fracture occur in fatigue loading of a material? Discuss the important features of a fatigue failure .	3	8
		(OR)		
6.	a.	Show the relation between the specific volume and temperature characteristics of a metallic glass with help of a graph ,describe the formation of an amorphous alloy and brief the preparation techniques involved.	2	12
	b.	Draw the transformation curve of a shape memory alloy and describe its effects in detail .Also name few shape memory alloys.	3	8
7.	a.	Analyze and describe the influence of enthalpy, entropy and energy when a	1	10

		rubber is stretched and contracted with an example.		
	b.	Explain the structure of rubber with suitable illustration.	1	5
	c.	Write the use of Larson–Miller parameter and give the related equation	2	5
		(OR)		
8.	a.	How the diamonds are formed on the earth? List out the various types of diamonds and explain how the quality is characterized and quantified .	2	10
	b.	Mention the various structures , types of bonds and the properties of ceramic materials.	1	5
	c.	Differentiate the carbon, graphite ,diamond and write the application of each.	2	5
		Compulsory:		
9.	a.	Derive an equation of critical resolved shear stress and explain the resolved shear stress with help of a sketch .	3	10
	b.	Show the structure of perfect real crystals and explain how the shear stress affecting the structure .	1	5
	c.	Distinguish between the slip and twinning with suitable examples.	2	5

ALL THE BEST