

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 : 16NT2005**  
**Sub. Name : MATERIALS SCIENCE II**

**Semester : 2016-17 ODD**  
**Duration : 3hrs**  
**Max. marks : 100**

### ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	_____ is a measure of resistance to plastic deformation.	CO1	1
	b.	Which type of powder pressing is utilized when high densities without appreciable grain growth are desired?	CO1	1
	c.	What is the use of gating system in sand casting?	CO1	2
	d.	Write short notes on welding.	CO1	2
	e.	What are the different metal fabrication techniques? With suitable sketch explain in detail the different casting operations used in metal fabrication.	CO1	14
(OR)				
2.	a.	The rate of cooling for a quenching treatment depends on the ratio of _____ to the mass of the specimen.	CO2	1
	b.	In which type of casting technique, the pattern is made from a wax or plastic?	CO1	1
	c.	Explain why do metals have high conductivity?	CO2	2
	d.	Which type of powder pressing procedure need not be followed by a firing process? Why?	CO1	2
	e.	Explain the following heat treatment processes i) annealing, ii) quenching and iii) precipitation hardening.	CO2	14
3.	a.	A body that has been formed and dried but not fired is termed _____.	CO1	1
	b.	_____ is the forming process used for clay based composition.	CO1	1
	c.	Briefly discuss the electrical conduction in ionic ceramics.	CO2	2
	d.	Write short notes on slip casting.	CO1	2
	e.	What are ceramic materials? Discuss in detail about the clay products and refractories.	CO1	14
(OR)				
4.	a.	_____ forms the major composition in soda lime glass.	CO1	1
	b.	_____ refractories are commonly used in the arched roofs of steel- and glass-making furnaces.	CO1	1
	c.	Briefly explain why glass-ceramics may not be transparent.	CO1	2
	d.	Mention the factors that affects the degree of vitrification.	CO1	2
	e.	Explain in detail, the different particulate forming processes in ceramic fabrication techniques.	CO1	14
7.	a.	Briefly discuss the Mathiessens rule of resistivity.	CO2	3
	b.	Write short notes on condensation polymerization.	CO1	3

	c.	Compare and contrast thermoplastics and thermosetting plastics. Give examples.	CO1	7
	d.	Draw the heat Vs temperature plot for a crystalline polymer and amorphous polymer. Explain the difference between them.	CO2	7
(OR)				
6.	a.	Which type of rubbers are examples of thermosetting polymers?	CO1	1
	b.	Crystallization rate of polymer decreases with the increase in _____.	CO1	1
	c.	List the different molding techniques employed to mold polymers.	CO1	2
	d.	Does the melting point of polymers depend on its molecular weight? If yes, how and why?	CO1	2
	e.	With a neat sketch, explain in detail the stress-strain behavior of brittle polymer, plastic polymer and elastomer.	CO1	14
7.	a.	In transverse loading of a fiber reinforced composite materials, _____ carry less of the load.	CO1	1
	b.	_____ is a very efficient wood composite structure.	CO1	1
	c.	What is a composite? Give one example for natural and synthetic composite.	CO1	2
	d.	Define ferroelectricity. Give examples for ferro electric materials.	CO2	2
	e.	Mention the classification of composites. Discuss any two in detail.	CO1	14
(OR)				
8.	a.	Differentiate electronic and ionic conduction.	CO2	3
	b.	Mention the classification of materials based on their conductivity.	CO2	3
	c.	A continuous and aligned glass fiber-reinforced composite consists of 40 vol% of glass fibers having a modulus of elasticity of 69 GPa and 60 vol% of polyester resin that, when hardened, displays a modulus of 3.4 GPa. Compute the modulus of elasticity of this composite, when the stress is applied perpendicular to the direction of fiber alignment.	CO1	3
	d.	With suitable sketch, differentiate fiber reinforced composites based on the alignment of fibers.	CO1	7
	e.	Differentiate pyroelectric and ferroelectric materials and give examples.	CO2	4
<b><u>Compulsory:</u></b>				
9.	a.	What is meant by Tyndal scattering?	CO3	2
	b.	What is thermal shock resistance? How can it be improved?	CO2	2
	c.	Define thermal conductivity. Briefly discuss the conduction mechanism in metals.	CO2	4
	d.	Discuss in detail, the optical properties of metals and non-metals.	CO3	12

ALL THE BEST