Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Engineering Materials **Semester: VI**
Program: B.Tech APE UP **Time: 03 hrs.**
Course Code: GSEG 393 **Max. Marks: 100**

Instructions: (i)Write complete statements for 'true/ false' and 'fill in the blanks' in your answer sheet.
(ii) Attempt all 'true/false' and 'fill in the blanks' only at a single place in proper sequence.
(iii) Attempt all parts of any question at a single place.
(iv) Do not attempt any question twice.

SECTION A: 20 Marks

S. No.		Marks	CO
Q 1	Write True or False. a. Al_2O_3 is a ceramic. b. Glasses are crystalline silicates containing oxides. c. Molybdenum is refractory metal. d. Low carbon steels contain more than 0.6 wt % of carbon. e. Cast alloys are very ductile.	**5**	**CO1**
Q 2	Fill in the blanks: a. Muntz metal is an alloy of _____. b. Crystal structure of Martensite is _____. c. Nitriding is carried out in presence of _____. d. _____ is a natural composite. e. Burger's vector is _____ to dislocation line in edge dislocation.	**5**	**CO1**
Q 3	Describe pitting corrosion.	**5**	**CO3**
Q 4	Classify ceramic materials. List some applications of refractory ceramics.	**5**	**CO3**
	SECTION B: 40 marks		
Q 5	Differentiate between nitriding and carbonitriding.	**8**	**CO2**
Q 6	Rhodium has an FCC crystal structure. If the angle of diffraction from (211) plane occurs at 36.12 degree (first order reflection) when monochromatic X-ray having a wavelength of .0711 nm is used compute interplanar spacing and atomic radius of atom. Atomic weight of the atom is 102.91 g/mol.	**8**	**CO2**
Q 7	Compare advantages and disadvantages of using polymers and metals as matrix material.	**8**	**CO3**
Q 8	Write monomer unit for polyvinyl chloride. Give its properties and uses.	**8**	**CO1**
Q 9	List four properties and common applications of copper alloys. Name two common alloys of copper. **OR**	**8**	**CO1**

	List four properties of aluminium alloys. Differentiate between designations of cast and wrought aluminium alloys.		
SECTION-C: 40 marks (Attempt either 11 A or 11 B)			
Q 10	Discuss normalizing and annealing process and sketch temperature ranges for both. Sketch completely labelled TTT curve.	**10** **10**	**CO2**
Q 11	A. (i) Define hardenability and discuss Jominy end quech test. (ii) Using the concept of phase change, construct neat and completely labelled phase diagram for isomosphous system containing elements A and B. (iii) Sketch completely labelled ideal and real cooling curves for pure metals. **OR** B. (i) Under what necessary cooling conditons martensite can be formed? Discuss the cooling process. (ii) Sketch neat and completely labelled phase diagram for system containing two elements A and B completely soluble in liquid state but have zero solubility after solidification. (iii) Sketch completely labelled true and engineering stress vs strain curve for any ductile metal/alloy.	**10** **4** **6** **10** **4** **6**	**CO3**