Name:

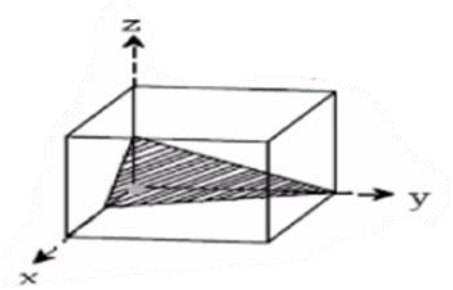
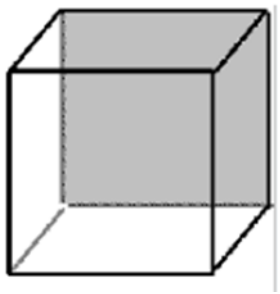
Enrolment No:

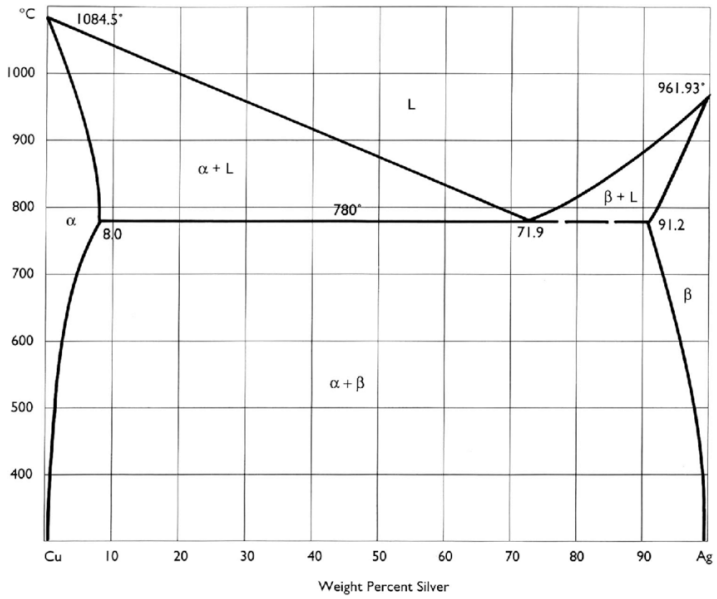
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Supplementary Examination, DEC 2023

Programme Name : B. Tech (ADE) Semester : III
Course Name: Automotive Materials and Manufacturing Processes Time : 03 hrs.
Course Code : MECH 2039 Max. Marks : 100
Nos. of page(s) : 2
Instructions: Attempt all questions. One question from section B and C have an internal Choice. Assume any missing data if required.

SECTION A

S. No.		Marks	CO
Q1	Identify the Miller Indices of the following planes.  	4	CO1
Q2	Define heat treatment process and mentioned its purposes.	4	CO1
Q3	Explain non-traditional machining process.	4	CO2
Q4	Identify the purposes of Normalizing.	4	CO3
Q5	Classify composite material based on reinforcement phase.	4	CO4
	SECTION B		
Q6	(a) Differentiate between eutectic, eutectoid and peritectic invariant reactions. (b) Mention the effects of grain size on mechanical properties. (c) Differentiate orthogonal and oblique Cutting	4 3 4	CO1
Q7	(i) Discuss annealing, normalizing and quenching processes. (ii) Discuss cyaniding and nitriding processes.	6 4	CO3
Q8	Develop microstructure evolution for a Cu-Ni all alloy at 75% Ni with their composition and relative amount of phase present.	10	CO2
Q9	A. Describe the expression of transverse elastic modulus of fiber reinforced composites. Or	10 5	CO2

	B. (a) Explain abrasive jet machining with a suitable diagram, and (b) Explain the mechanics of abrasive jet machining.	**5**	
	SECTION-C		
Q10	**A.** Analyze the phase diagram of Cu-Ag system answer the following questions: (i) Write the solubility limit and temperature of eutectic composition. (ii) Write the invariant reaction with phase composition. (iii) Sketch and explain the microstructure evolution of 40% Cu-50% Ag alloy.  **B.** Compare eutectic, hypo eutectic and hyper eutectic alloy composition.	2 2 10 6	**CO4**
Q11	**A.** (i) Identify the Non-Traditional machining process according to the energy sources used. (ii) Choose a non-traditional machining process suitable for hard and brittle materials and explain the working principle with its advantages and limitations. Or **B.** (i) Write a note on materials used in chassis and body components of the Vehicle. (ii) Explain ceramic matrix composites and identify their applications in automobiles. (iii) Explain the utility of thermoplastics in automotive sector.	8 12 6 8 6	**CO3**