BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: B.TECH.   SEMESTER: V
BRANCH: PE (CHEM. ENGG.)   SESSION: MO/2022

SUBJECT: CL309R1 MATERIALS SCIENCE AND ENGINEERING

TIME: 2 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

				CO	BL
Q1	(a)	Illustrate the advantages and limitations of wide/narrow molecular weight distribution of polymers in respect to mechanical properties? Find out Mw for PMMA whose degree of polymerization is 10500 and PDI is 1.2.	[3]	CO2	Illustrate(4)
Q1	(b)	Write down the thermodynamic conditions for solubility of a polymer in a solvent? Why do we see some polymers never soluble in any solvent? Explain this with suitable examples.	[2]	CO4	Write(6)
Q2	(a)	Explain the fact that we see various grades of PE showing variation in density and crystallinity.	[2]	CO2	Explain(1)
Q2	(b)	What are the factors affecting glass transition point of polymers? Interpret the trend in glass transition point for the following polymers as mentioned here: PC(147°C), PMMA (105°C), PE(-120°C) and POM(-85°C)	[3]	CO4	Interpret(2)
Q3	(a)	Explain the mishap of Titanic Ship in the light of Metallurgical aspects	[2]	CO4	Synthesis (5)
Q3	(b)	Explain point defects in ceramics differ from those in metals? List the constituents present in 1040AISI Steel?	[3]	CO2	Explain (2)
Q4	(a)	Calculate the AFP of BCC structure	[2]	CO4	Analysis (4)
Q4	(b)	Describe the lever rule in phase diagram. Indicate the weight fraction present in terms of concentration for solid and liquid phase	[3]	CO2	Demonstrate (2)
Q5	(a)	Calculate the angle between [102] and [211] plane for cubic system.	[2]	CO3	Analysis(4)
Q5	(b)	Describe cored vs Equilibrium structured composition of Ni in the cooling of 35wt% Cu Ni alloy from melt. Convert [102] cubic to hexagonal directions.	[3]	CO1	Knowledge(1)

:::::: 29/09/2022 ::::::M