K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2023	
Exam Seat No.:	
Academic Year:2022-2023	Semester: II
Name of Programme: B.Tech	Pattern:2022
Name of Course: Applied Chemistry	Course Code:FYE221005
Max. Marks:60	Duration:2.30

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.
1. This question paper contains _____page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question

Question No. 1 Attempt following Question

1	What is reference electrode? Give construction working, reactions of calomel electrode with labelled diagram.	(6)	CO1

Question No. 2 Attempt following Question

2	What is power alcohol? Give, advantages and disadvantages of power alcohol.	(6)	CO4

Question No. 3 Attempt following Question

3.a)	Define atomic packing factor (APF). Deduce the atomic radius and APF for simple cubic crystal structure.	(6)	CO2
	OR		
3.b)	Give coordination number of simple cubic and body centred cubic crystal. Distinguish between crystalline and amorphous solid.	(6)	CO2
3.c)	What are polymer composites? Give functions of matrix phase. Discuss different types of polymer composites with their applications.	(6)	CO2
	OR		
3.d)	What are structural requirement for biodegradable polymers? Give structure, properties and applications of PHBV.	(6)	CO2
3.e)	Define alloys. Explain fusion method of synthesis of alloys with neat labelled diagram.	(4)	CO1

OR

3.f)	Give properties and applications of nanomaterials	(4)	CO1

Question No. 4 Attempt following Question

4.a)	What is hardness of water? Give units to express the hardness of water and compare between carbonate and non-carbonate hardness.	(6)	CO3

OR

4.b)	Explain Mohrs method for determination of chloride content with procedure, reactions and formulae. Name the indicator used in this method.	(6)	CO3
4.c)	Explain ion exchange method for water softening with procedure, diagram and reactions involved in water softening and regeneration.	(6)	CO4

OR

4.d)	Explain reverse osmosis process for purification of water with diagram, process and advantages.	(6)	CO4
4.e)	100 ml of water sample when titrated in Mohrs method requires 8.6 ml of 0.02 N $AgNO_3$ for brick red end point. Calculate the amount of chloride ions present in water sample	(4)	CO4

OR

4.f)	A water sample of 100 ml requires 12 ml 0.02 M EDTA during titration. 100 ml of the same water sample after boiling and filtration requires 9 ml of the same EDTA for end point in titration. Calculate total and permanent hardness of water sample.	(4)	CO4

Question No. 5 Attempt following Question

5.a)	What is dry corrosion? Explain mechanism of dry corrosion due to oxygen gas with reactions, diagram and steps involved in it.	(6)	CO3

OR

5.b)	What is Pilling Bed-worth Ratio? Give its significance. Explain the different types of metal oxide films formed in atmospheric corrosion.	(6)	CO3
5.c)	What is wet corrosion? Explain the mechanism of wet corrosion if the metal is in contact with acidic medium with neat labelled diagram.	(6)	CO5

OR

5.d)	Explain any six factor affecting the rate and extent of corrosion.	(6)	CO5
5.e)	What is the cathodic protection? Explain any one method of it.	(4)	CO3

OR

5.f)	What is powder coating? Explain the electrostatic spraying on metallic surfaces.	(4)	CO3