



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

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:II
Class:FY	Program:B.Tech
Branch Code:FYE	Pattern:2022
Name of Course:Applied Chemistry	Course Code:FYE221005
Max. Marks:60	Duration:2.30 Hrs.

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 02 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 a) What is a primary battery? Describe the construction and operation of a dry cell, with a labelled diagram and a reaction. Provide one application of a dry cell (6) CO1

Question No. 2 Attempt following Question

- 2 a) Define biodiesel. Give two advantages and limitation of biodiesel (3) CO4
- 2 b) Sample of coal containing 11% H₂ when allowed to undergo combustion in Bomb Calorimeter, the following data were obtained. Weight of coal burnt = 1.85 gm, weight of water taken = 2170 gm, water equivalent of bomb calorimeter = 265 gm, rise in temperature = 6.2°C. Calculate GCV and NCV of the coal (3) CO4

Question No. 3 Attempt following Question

- 3 a) Calculate the number of atoms per unit cell, atomic radius and APF for face centered cubic crystal structure with neat diagram (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) Define conducting Polymer. Explain its types. Illustrate p-doped and n-doped ICP with doping reaction (6) CO2

OR

- 3 d) What are polymer composites? State the functions of reinforcement phase. Explain the different types of polymer composites with their applications (6) CO2

- 3 e) How nanomaterials are classified based on dimensions? Explain with examples (4) CO1

OR

- 3 f) Explain in detail composition, properties and applications of brass alloy (4) CO1

Question No. 4 Attempt following Question

- 4 a) What are zeolites? Explain zeolite process for softening of water. Give regeneration reactions and advantages of the process. (6) CO3

OR

- 4 b) Describe boiler corrosion with its causes, reactions and preventive measures (6) CO3

- 4 c) Describe ion exchange method with procedure, diagram, water softening and regeneration reactions (6) CO4

OR

- 4 d) Define Gas response and response time. Explain the working of a metal oxide-based gas sensor with applications for gas sensors (6) CO4

- 4 e) 80 ml of water requires 7.8 ml, 0.02 M disodium EDTA for end point in titration. 80 ml of the same water sample after boiling and filtration takes 6.1 ml of the disodium EDTA for end point in titration. Calculate Total and permanent hardness of water sample (4) CO4

OR

- 4 f) 100 ml of water sample when titrated in Mohr's method requires 8.6 ml of 0.025 N AgNO_3 for brick red end point. Calculate the amount of chloride ions present in water sample (4) CO4

Question No. 5 Attempt following Question

- 5 a) What is direct Corrosion? Explain mechanism of direct corrosion due to oxygen (6) CO3

OR

- 5 b) What is electroplating? Explain the process with diagram, reactions and applications (6) CO3

- 5 c) If the iron metal is in contact with Acidic medium, predict the type of corrosion and explain it (6) CO3

OR

- 5 d) Segregate the factor affecting on corrosion based on metal and environment and then explain it 1. Temperature 2. Nature of ions present in solution 3. Position of metal present in galvanic series 4. Relative are of anode to cathode [5.pH](#) of solution (6) CO3

- 5 e) What is Galvanizing? Explain the process of Galvanizing with diagram and applications (4) CO5

OR

- 5 f) Explain Galvanic Protection? Explain Sacrificial anode method of corrosion control (4) CO5

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