



**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:III          |
| Class:SY                             | Program:B.Tech        |
| Branch Code:CHE                      | Pattern:2022          |
| Name of Course:Engineering Materials | Course Code:CHE222004 |
| 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 \_\_\_\_\_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**

- 1a) Explain method for welding with suitable diagram. (6) CO1

**Question No. 2 Attempt following Question**

- 2a) A hollow cylinder 2m long has an outside diameter of 50 mm and inside diameter of 30 mm. If cylinder is carrying a load of 25 KN. Find the stress in cylinder. Also find the deformation of the cylinder, if the values of modulus of elasticity of cylinder is  $100 \times 10^3 \text{ N/mm}^2$ . (6) CO2

**Question No. 3 Attempt following Question**

- 3a) What is Pilling-Bedworth rule in corrosion? (5) CO3

**OR**

- 3b) Describe carbon steel, classification and their types in detail. (5) CO3

- 3c) Describe Cast Iron their types in detail. (5) CO3

**OR**

- 3d) Explain in detail Electrochemical series. (5) CO3

- 3e) Describe Iron-Iron Carbide Diagram in detail and different reactions involved in it. (6) CO3

**OR**

- 3f) Draw and explain equilibrium diagram in detail for Brass. (6) CO3

**Question No. 4 Attempt following Question**

4a) Describe in details Buckyballs. (5) CO4

**OR**

4b) Write in detail about the application of nanomaterials in the chemical industry. (5) CO4

4c) Write in detail about fullerenes. (5) CO4

**OR**

4d) Describe various methods for synthesis of nano materials. (5) CO4

4e) Describe in detail Synthesis and Characterisation of carbon nano tubes. (6) CO4

**OR**

4f) Write about the Sol-Gel method of characterisation. (6) CO4

**Question No. 5 Attempt following Question**

5a) Describe the difference between Electron and light microscope. (5) CO5

**OR**

5b) Describe in details about the interaction of electrons with specimen. (5) CO5

5c) Write in detail about backscattered electrons. (5) CO5

**OR**

5d) Write down the advantages of SEM. (5) CO5

5e) Describe Scanning tunnelling microscopy in detail with suitable diagram. (6) CO5

**OR**

5f) Describe Scanning electron microscope in detail with suitable diagram. (6) CO5

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