# University of Mumbai

## Examination First Half 2022

### Examinations Commencing from May 2022 to June 2022

Program: Chemical Engineering

Curriculum Scheme: Rev 2019

Examination: TE Semester: V

Course Code: CHDO5012 Course Name: Advanced Material Sciences (Department Elective-1)

Time: 2 hours 30 minutes Max. Marks: 80

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| Q1. | **Choose the correct option for following questions. All the Questions are compulsory and carry equal marks** |
|---|---|
| 1. | Which of the following can be used for hard coating applications? |
| Option A: | High-chromium stainless steel |
| Option B: | Heat-treated stainless steel |
| Option C: | Hardened brass |
| Option D: | Aluminum |
| | |
| 2. | Which of the following is a high temperature alloy resistant to? |
| Option A: | Tensile compression |
| Option B: | Tensile elongation |
| Option C: | Creep |
| Option D: | Fatigue |
| | |
| 3. | Physical vapor deposition is not effective to improve _____ |
| Option A: | Wear resistance |
| Option B: | Corrosion resistance |
| Option C: | Oxidation resistance |
| Option D: | Coefficient of friction |
| | |
| 4. | Lyotropic liquid crystal polymers form domains in _____ |
| Option A: | Gas phase |
| Option B: | Solution |
| Option C: | Molten phase |
| Option D: | Solid phase |
| | |
| 5. | _____ is the field in which the nano particles are used with silica coated iron oxide. |
| Option A: | Magnetic applications |
| Option B: | Electronics |
| Option C: | Medical diagnosis |
| Option D: | Structural and mechanical materials |
| | |
| 6. | Coating the nano crystals with ceramics is carried out that leads to _____ |
| Option A: | Corrosion |
| Option B: | Corrosion resistance |
| Option C: | Wear and tear |
| Option D: | Softness |
| | |

| | |
|---|---|
| 7. | Which of the following can be used for lubrication? |
| Option A: | Graphite |
| Option B: | Diamond |
| Option C: | Brass |
| Option D: | Bronze |
| | |
| 8. | By which method the CNT can be prepared? |
| Option A: | arc discharge method |
| Option B: | plasma torch method |
| Option C: | chemical vapour deposition method |
| Option D: | all of above |
| | |
| 9. | Carbon nano tubes are also called as _____ |
| Option A: | Bucky tubes |
| Option B: | Bulky tubes |
| Option C: | Bulk tubes |
| Option D: | Buck balls |
| | |
| 10. | Thin film coating by physical vapor deposition (PVD) is amenable to _____. |
| Option A: | Only elemental metals |
| Option B: | Only pure metals or metallic alloys |
| Option C: | Only pure metals, alloys and intermetallic compounds |
| Option D: | Pure metals, alloys, semi-conductors, intermetallic + non-metallic compounds, composites |

| **Q2. (20 Marks)** | **Solve any Two Questions out of Three** | **10 marks each** |
|---|---|---|
| A | Explain ferroelectric and mechanical behaviour of ceramics. | |
| B | Discuss biomedical applications of polymers. | |
| C | What is nanosensor and nanoshell? Explain in detail. | |

| **Q3. (20 Marks)** | **Solve any Two Questions out of Three** | **10 marks each** |
|---|---|---|
| A | Discuss various heating treatments of stainless steel in detail. | |
| B | Explain liquid crystal polymers. | |
| C | List out and explain different high temperature alloys. | |

| **Q4. (20 Marks)** | **Solve any Two Questions out of Three** | **10 marks each** |
|---|---|---|
| A | Explain Slip casting process for processing of ceramics. | |
| B | Explain application of Carbon Nano Tubes. | |
| C | Explain advantages of metal composites over metal. | |