

**B.E. Metallurgical and Material Engineering Third Year  
Second Semester Examination-2024**

**Subject: SURFACE ENGINEERING & COATING TECHNOLOGY(HONS.)**

**Time: 3hrs.**

**Full Marks: 100**

**Instruction: Attend all the CO is mandatory**

**CO I (Answer any three questions from CO I)**

1. What are the classifications of engineering materials? Give two examples of each type of engineering material. What are the differences between ionic bonding and covalent bonding? 5+5=10
2. Explain the crystal system in crystalline materials. What is the importance and necessity of surface engineering? 7+3=10
3. What are the different types of chemical degradation that occur in engineering materials? Explain any one of them with a suitable example. How this type of corrosion can be prevented? How relative humidity and temperature can affect corrosion? 1+2+3+5=10
4. How material can be affected by galvanic corrosion, explain. Give three examples where crevice corrosion can occur. Explain the pitting corrosion. 5+3+2=10

**CO II (Answer any three questions from CO II)**

5. How the coating process can be characterized? Explain the properties and applications of the Ni and Zn coating. Define the cladding process. What are the applications of cladding? 1+4+1+4=10
6. What are the advantages of using flame spray coating? What are the applications of HVOF coating? 5+5=10
7. Define the vapor deposition process. What are the different types of vapor deposition processes and what are the differences between them? 1+1+8=10
8. Explain the mechanism of cold spray coating. What are the advantages and disadvantages of using cold spray coating? 5+5=10

**CO III (Answer any two questions from CO III)**

9. How the surface can be protected by the ion implantation process? What are the applications of the ion implantation process? 5+5=10
10. How the surface can be modified by using a laser beam? What are the applications of laser surface treatment? 5+5=10
11. Classify the laser surface treatment and explain them. 1+9=10

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**CO IV (Answer any two questions from CO IV)**

12. Define tribology with some examples. What are the tribological applications? 1+4+5=10

13. How the tribological problem can be minimized? What are the applications of surface engineering? 5+5=10

14. What are the advantages of surface coating? What are the principles of green tribology? 5+5=10