

Total No. of Questions : 8]

SEAT No. :

P349

[Total No. of Pages : 2

[6003]-430

T.E. (Mechanical)

SURFACE ENGINEERING

(2019 Pattern) (Semester - II) (Elective - II) (302052 (B))

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Neat diagrams must be drawn, wherever necessary.

- Q1)** a) What is the difference between diffusivity and diffusion coefficient? [6]
b) State Fick's law. What are major points for formula of this law? [6]
c) Explain process of Nitriding? Compare it with Carbonitriding? [6]

OR

- Q2)** a) Write short note on Laser Hardening. [6]
b) Why Plasma Nitriding is useful for aeronautical component? [6]
c) Why surface heat treatment is required? List surface heat treatment methods. Explain drip fed carburizing process in detail. [6]

- Q3)** a) Describe sol-gel coating technology and list application of it? [5]
b) Differentiate Electrolysis coating and Electroless coating. [6]
c) Classify Metallic and Non-Metallic Coatings in detail. [6]

OR

- Q4)** a) How nitrides, silicides, and carbides help in corrosion resistance coating? Explain with example of steel or Stainless steel? [7]
b) What do you mean by "Electroless Coating"? Write advantages, limitations and applications of the following: [10]
i) Electroless Copper Plating.
ii) Electroless Nickel Plating.
iii) Electroless Gold Plating.

P.T.O.

- Q5)** a) Highlight need of coatings for aerospace and aircrafts. List few applications of it? [6]
b) Define the following processes. [6]
i) Noble Coatings.
ii) Sacrificial Coatings, list application of these process?
c) List steps in : surface preparation in organic coatings? How it helps for better coating results? [6]

OR

- Q6)** a) Differentiate in metal, inorganic and organic coatings with respect to Application, effectiveness, cost, and time. [6]
b) Explain process of cladding; List application of it. [6]
c) Briefly describe any two processes of the following? [6]
i) Need of priming coat.
ii) Coatings for high temperature.
iii) Hard-facing and its applications.

- Q7)** a) List the different types of Coating Defects. Mention the causes and remedies of any two. [6]
b) Write a short note on Film Thickness Measurements. [6]
c) Explain in brief the measurement of porosity of surface coating? [5]

OR

- Q8)** a) List process of measurement of coating thickness? Why thickness measurement is essential in coating process? [6]
b) What is crawling, wrinkling? How this defect arises, mention steps to remove these defects? [5]
c) Briefly describe any two processes of the following. [6]
i) Measurement of residual stress and stability.
ii) Destructive Film Thickness Measurements.
iii) Atomic force microscopy.

