

Total No. of Questions : 8]

SEAT No. :

PA-1538

[Total No. of Pages : 3

[5926]-158

T.E. (Mechanical)

SURFACE ENGINEERING

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Attempt Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.
- 2) Figures to the right side indicate full Marks.
- 3) Assume suitable data, if necessary.
- 4) Neat diagrams must be drawn wherever necessary.

Q1) a) What is importance and scope of Plasma Nitriding? Explain with suitable application? [6]

b) How carburizing atmosphere is important in carburizing? Which surface properties affected because of atmosphere? [6]

c) Explain Briefly : [6]

i) Carbonitriding

ii) Flame Hardening

OR

Q2) a) With neat sketch and related process parameters differentiate between Carburizing Nitriding? [6]

b) How do we quantify the rate of diffusion? State Fick's first law of diffusion. [6]

c) Explain Briefly : [6]

i) Nitrocarburising

ii) Laser Hardening.

P.T.O.

- Q3)** a) Explain with application process of dielectric coatings of Si-C alloy films. [5]
- b) What is coating for corrosion resistance? List various methods of corrosion resistance methods. Describe compound coating method. [6]
- c) Describe Sol-gel coating. List its advantages and limitations? Also mention Sol-gel applications. [6]

OR

- Q4)** a) Discuss with suitable example need of surface modification processes. [5]
- b) Write short note on laser surface alloying. [6]
- c) What is coating for wear resistance? List various methods of wear resistance methods. Describe carbon nitride thin films. [6]
- Q5)** a) What is metal, inorganic, and organic coating? Explain with suitable example its significance. [6]
- b) Explain : [6]
- i) Electro deposition Coating
- ii) Antidust Coating
- c) Explain the Coatings for high temperature. List suitable application. [6]

OR

- Q6)** a) Differentiate between Organic coating and Inorganic Coating. Give Examples of Organic coating and Inorganic Coating. [6]
- b) Explain : [6]
- i) Metal Cladding
- ii) Hot dipping
- c) Briefly describe applications of Coatings for aerospace and aircrafts with reference to properties required. [6]

- Q7)** a) Describe requirement and use of Spectroscopic analysis of modified surfaces. With related application. [6]
- b) Briefly describe any two defects of the following : [6]
- i) Flooding
  - ii) blistering
  - iii) orange peel
- c) Describe Working of Atomic force microscopy. [5]

OR

- Q8)** a) Explain Coating failure. What are the causes of Coating failure? [6]
- b) With suitable example explain porosity and adhesion of surface coating. [5]
- c) Briefly describe any two processes of the following : [6]
- i) Analysis of surface roughness
  - ii) Measurement of residual stress
  - iii) Measurement of coating thickness

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