

Total No. of Questions : 8]

SEAT No. :

PE2631

[Total No. of Pages : 2

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**T.E. (Mechanical Engineering)
SURFACE ENGINEERING**

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of Logarithmic tables, slide rule, electronic pocket calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

Q1) a) Define Diffusion. Explain diffusion process with example. State applications of diffusion process. **[9]**

b) Explain drip feed carburizing process in detail. List the advantages and limitations of this process. **[8]**

OR

Q2) a) Explain the principles behind flame hardening and its applications in different industries. **[7]**

b) Draw neat labeled sketch of the following surface hardening processes and mention medium used, temperature range, case depth and time required for each process. **[10]**

i) Solid Carburizing Process

ii) Liquid Carbonitriding Process

Q3) a) Why coating is required to increase corrosion resistance of components? List various types of corrosion resistance coating methods. **[8]**

b) Write a short note on : **[10]**

i) Laser Surface Alloying Process

ii) Chemical Conversion Coatings

OR

P.T.O.

- Q4)** a) Explain the dielectric coatings of Si-C alloy films and their role in wear resistance. [8]
b) Discuss Electroless Copper, Gold and Nickel coating. How they differ from electrolytic coating process. [10]

- Q5)** a) Explain cold spray coating process. State the advantages, limitations and application. [7]
b) What do you mean by Anodic and Cathodic type of coating? Explain following processes in detail. [10]
i) Electrodeposition Process
ii) Hot Dipping Process

OR

- Q6)** a) Explain the spraying process for applying inorganic coatings and its advantages in surface protection. [7]
b) Explain the purpose and characteristics of the following organic coating systems. [10]
i) Prime Coating
ii) Hard-Facings

- Q7)** a) Differentiate between Overspray and Dry Spray coating defects. [8]
b) What are general causes of coating defects? Write causes and remedies for the following coating defects. [10]
i) Bubbling
ii) Pin-Holing
iii) Blistering
iv) Cratering

OR

- Q8)** a) State Non-Destructive film thickness measurement processes. How Film Thickness is measured using eddy currents? [9]
b) What are the requirement and use of spectroscopic analysis of modified surfaces? List applications of it. [9]

