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SEAT No. _____

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SARDAR PATEL UNIVERSITY

M.Sc. 1st Semester (Surface Coating Technology) Examination (CBCS)

Monday, April 9th 2018

Time: 10:00 am to 1:00 pm

Course No.: PS01CSCT23

Subject: Surface Chemistry & Surface Engineering

Total Marks: 70

N.B. (1) Marks allotted to the question are on its RHS

(2) Illustrate your answers wherever necessary with the help of neat sketches & chemical equations.

Q.1 Choose the correct option

- (1) When the angle of contact between solid and liquid is 90°, then _____. (1)
 - A. Cohesive forces = Adhesive forces
 - B. Cohesive forces < Adhesive forces
 - C. Cohesive forces > Adhesive forces
 - D. Cohesive forces >> Adhesive forces
- (2) A surfactant which hydrates in water, primarily by hydrogen bonding through its oxygen content is called _____. (1)
 - A. anionic surfactant
 - B. cationic surfactant
 - C. nonionic surfactant
 - D. amphoteric surfactant
- (3) If dispersion of surfactant in water is immiscible, what will be its HLB? (1)
 - A. 1 - 4
 - B. 8 - 10
 - C. 11 - 12
 - D. 13 - 14
- (4) Surface tension of liquid is independent of _____. (1)
 - A. temperature of the liquid
 - B. area of the liquid surface
 - C. nature of the liquid
 - D. impurities present in the liquid
- (5) Adhesion strength of thermally sprayed coating is affected by (1)
 - A. Porosities
 - B. Unmelts
 - C. Oxidation of material being coated
 - D. All of the above
- (6) The process which require sound proof chamber for coating is (1)
 - A. Chemical vapor deposition
 - B. Electro-plating
 - C. Detonation Gun process
 - D. Plasma coating
- (7) Process in which the material being coated is converted to ion before depositing (1)
 - A. Physical Vapor coating
 - B. Electro-plating
 - C. High Velocity Oxy-fuel
 - D. Diamond like carbon coating
- (8) Sputtering process of evaporating atom from target surface is used in (1)
 - A. Thermally sprayed coating
 - B. Electro-plating
 - C. Physical vapor deposition
 - D. Cold gas dynamic spray method

Q.2 Answer Any seven of the following

(14)

- 1 What is Surface tension? List the methods used to measure surface tension.
- 2 Explain why a drop or a bubble assumes spherical shape
- 3 Explain critical solid surface tension.
- 4 Define Cloud Point & Krafft Point.
- 5 What is HLB value and why it is important?
- 6 Classify thermally sprayed coatings.
- 7 Define the following terms: (i) Surface Engineering and (ii) Plasma
- 8 Explain any two processes used for surface preparation.
- 9 Discuss different types of defects observed in thermally sprayed coatings.

CP.T.O.

Q.3(a) Derive equation for work of adhesion if solid surface is completely smooth and if complete adhesion is attained. (6)

(b) Write a note on surface tension measurement by drop weight method. (6)

OR

(b) What is critical micelle concentration (CMC)? Explain different factors affect CMC of surfactant. (6)

Q.4(a) What are emulsions and how they are formed? Differentiate between O/W & W/O types of emulsions? (6)

(b) Write note on Fluoro Surfactant and Silicone Surfactant. (6)

OR

(b) Explain in detail about Electrical Double Layer theory? (6)

Q.5(a) Explain High Velocity oxy-fuel method of coating with the help of neat sketch stating its advantages and limitations. (6)

(b) Describe any three standard test procedures for testing thermally sprayed coatings. (6)

OR

(b) Describe the process of Plasma coating with the help of neat sketch stating its advantages and limitations. (6)

Q.6(a) Explain the principle of Chemical Vapour Deposition for coating with the help of neat and labeled diagram. (6)

(b) Differentiate between thermally sprayed coating and cold gas dynamic spray. (6)

OR

(b) Describe the process of electro-plating with the help of neat sketch stating its advantages and limitations. (6)

