

BAST-101

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ODD SEMESTER EXAMINATION 2019-20

B.Tech. (SEMESTER-I)

Engineering Chemistry

Time- 3:00 Hrs.

Max marks: 100

Total no. of printed pages: 2

NOTE: All questions are compulsory.**Q1.** Attempt any **FOUR** parts of the following: 4X5=20

- (A) First ionization energy of Al is lower than that of Mg. Explain.
- (B) Explain why KCl-NaCl-H₂O should be regarded as a three-component system, whereas KCl-NaBr-H₂O should be regarded as a four-component system.
- (C) What are the implications of using hard water in boilers?
- (D) What is the effect of the following factors on the rate of corrosion:
- Temperature and humidity
 - pH
 - Presence of suspended particles in atmosphere?
- (E) What is saponification number? State its significance.
- (F) What do you understand by shielding and deshielding in NMR? Define chemical shift.

Q2. Attempt any **FOUR** parts of the following 4X5=20

- (A) How are the two anomalous properties of water, namely, (a) ice floating in water and (b) increase in the density when ice is heated from 0°C to 4°C explained by hydrogen bonding?
- (B) Name one solid lubricant and explain its lubricating action.
- (C) Explain why: (i) Teflon-coated utensils are used for cooking (ii) Bakelite cannot be remolded.
- (D) Distinguish between priming and foaming. How can their occurrence be prevented?
- (E) Distinguish between dry and wet corrosion.
- (F) State Gibbs Phase rule. What are the limitations and applications of the phase rule?

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Q3. Attempt any TWO parts of the following 2X10=20

- (A) What are ion exchange resins? Give examples of cation and anion exchange resin. Discuss the ion exchange process for softening of hard water.
- (B) A 100 mL sample of water required 13.5 mL of 0.02M EDTA solution for titration using Eriochrome black-T as indicator. Another 100 mL of water from the same source was boiled and precipitate removed by filtration. The filtrate required 6.0 mL of 0.02M EDTA solution. Calculate the total hardness, permanent hardness and temporary hardness of water sample.
- (C) What are corrosion inhibitors? Explain how corrosion is controlled by using anodic and cathodic inhibitors.

Q4. Attempt any TWO parts of the following 2X10=20

- (A) Describe the method of preparation, properties and uses of (a) Nylon-6,6 and (b) PMMA
- (B) What is vulcanization of rubber? How does it improve the properties of natural rubber? State the properties of vulcanized rubber.
- (C) Write informative notes on:
 - (i) Importance of fingerprint region in IR spectroscopy
 - (ii) Applications of UV-visible spectroscopy

Q5. Attempt any TWO parts of the following 2X10=20

- (A) Define Lubrication. Explain the different mechanisms of lubrication.
- (B) What is Viscosity index? An oil of unknown viscosity-index has a Saybolt universal viscosity of 60 seconds at 210° F and of 600 seconds at 100° F. The high viscosity index standard (i.e Pennsylvanian) oil has Saybolt viscosity of 60 seconds at 210° F and 500 seconds at 100° F. The low viscosity-index standard (i.e., Gulf oil has a Saybolt universal viscosity 60 seconds at 210° F and 800 seconds at 100° F. Calculate the viscosity index of unknown oil.
- (C) Discuss the application of phase rule to the sulphur system. Draw a labeled diagram.