SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech **Semester:-** 1st

Paper Name: - Engineering Chemistry **Paper Code:-** TBS 103

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न **तीन अंक** का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

(i) Correct Bond length increasing order is,

a) $O_2^- < F_2 < N_2 < C_2$

b) $N_2 < F_2 < O_2^- < C_2$

c) $N_2 < C_2 < O_2^- < F_2$

d) $F_2 < C_2 < O_2^- < N_2$

ii) No of Pi electrons , magnetic character, unpaired electrons and magnetic moment in F_2

a) 2, Paramagnetic,2 and 2.5

b) 1, Diamagnetic, 0 and $\sqrt{8}$

c) 2, Paramagnetic,2 and 2.8

d) 2, Diamagnetic,1 and $\sqrt{3}$

iii) Degree of hardness caused by 50 ppm $CaCl_2$ is

a) 45.0 mg/L permanent

b) 43.2 mg/L permanent

c) 50.7 mg/L temporary

d) 12.3 mg/L permanent

iv) Correct relation is,

a) Animal lubricant ↔ castor oil

b) Graphite ↔ 450 degree centigrade

c) Soda lubricant ↔ water repellent

d) MoS_2 and BN ↔ semisolid lubricant

v) Semiconductors used as electrically supportable materials, most likely because they have
   a) whole
   b) electrons
   c) p-n junction
   d) strength

Section - B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. 5x7=35
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Write the percentage composition of Portland cement.
ii. Explain electrochemical theory of corrosion and different types of corrosion.
iii. Give the structure of monomers of all listed polymers.
Nylon 6, Nylon 66, Buna-S, Buna-N, PAN, Bakelite, Polyethene.
iv. Give five difference between Addition and Condensation Polymers/ Polymerisation.
v. What are lubricants? How its uses can increase industry efficiency? What the properties of a good lubricant.
vi. Draw MO diagram and calculate bond order of O_2^+, F_2^{++}, N_2^{--}
vii. Calculate total hardness of a water sample containing 15 mg $CaCO_3$, 25 mg $MgCl_2$, 30 mg $MgSO_4$ and 50 mg $CaHCO_3$. Express hardness value in degree Clark and degree French.

Section - C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. 2x10=20
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Draw phase diagram of water system as according to phase rule based on curve and area.
ii) What are liquid crystals? Classify them on the basis of properties owned by respective mesogens.
iii) Explain Zeolite and Ion exchange method for softening hard water with detail of softening and regeneration

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