Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 49907 | Roll No. | 1 | 2 | 4 | 0 | 4 | 3 | 2 | 2 | 6 | 6 |

B. Tech. Examination, 2024-25

(Even Semester)

ENGINEERING CHEMISTRY

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

(a) . Why N_2 is more stable than N_2^+?

(b). Why graphite is used as lubricant?

(c) Write the monomer of Nylon-6, 6 and Dacron.

(d) Define hardness of water.

(e) Write any two applications of nanotechnology.

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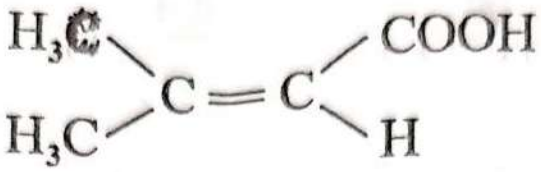
(f) Designate the compound whether it has E or Z configuration :



(g) In which atmosphere, the fullerene is prepared by vapourizing graphite rod?

(h) Write any two principles of green chemistry.

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Define liquid crystals. Distinguish between nematic and smectic liquid crystals.

(b) What are zeolites? How is hard water softened by zeolite process?

(c) "Optical activity of a molecule is linked with the presence of asymmetric carbon atom". Justify this with the example of tartaric acid.

(d) Define condensation polymerisation with suitable example.

SECTION–C

Note :– Attempt all questions. Attempt any two parts from each questions. $8 \times 5 = 40$

3. (a) With the help of molecular orbital diagram, explain the formation of N_2 molecule.

   (b) Define carbon nanotube. Discuss its applications.

   (c) Define rate of reaction, differentiate between order and molecularity of a reaction.

4. (a) What are the rules assigning E or Z configuration to give geometric isomers? Assign configuration to trans-2-~~butane~~ butene

   (b) Define "Green Chemistry". Discuss the need of green chemistry in the present context.

   (c) What is conducting polymerisation? Explain with suitable example.

5. (a) Write preparation and applications of following:

   (i) Bakelite

   (ii) Nylon-6

(b) What is an absorption spectra? Explain various types of electronic transitions that can occur in a molecule.

(c) Explain Bathochromic and hypsochromic shift.

6. (a) What is cause of hardness of water? Differentiate between temporary and permanent hardness.

(b) A water sample contains 408 mg of $CaSO_4$ per litre. Calculate the hardness in terms of $CaCO_3$ equivalent. [Ca = 40; S = 32; O = 16]

(c) What is Biofuel? Discuss its importance in terms of biogas.

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