

[A-99]

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SARDAR PATEL UNIVERSITY
M.Sc. 4th Semester (Surface Coating Technology) (CBCS) Examination

Monday, April 27th, 2015

Time: 02:30 pm to 5:30 pm

Course No.: PS04ESCT02

Subject: Environmental Management

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 answer from the followings:

[08]

Q.1.1 Green Chemistry is a tool for _____

- a. Benign Chemistry b. Sustainability c. Green Engineering d. Clean Chemistry

Q.1.2 Which of the following is NOT the principle of green chemistry?

- a. Maximizing atom economy b. Increasing by-products
c. Designing degradable chemical products d. Using catalysts

Q.1.3 Which of the following statements concerning atom economy are correct?

- a. It indicates how well a reaction converts the reactant atoms to the desired product.
b. It indicates how fast reaction takes place.
c. It indicates how much byproduct gets in reaction.
d. None of the above

Q.1.4 In the case where carbon dioxide is used as a carbon-source building block, if the CO₂ were made from burning fossil fuels it would be considered as _____

- a. depleting b. renewable c. both a & b d. none of these

Q.1.5 Consider the following reaction, $C_6H_{12}O_6(aq) \rightarrow 2C_2H_5OH(aq) + 2CO_2(g)$. If CO₂(g) is considered as the side product, the atom economy of the reaction is _____.

- a. 25.56% b. 48.89% c. 51.11% d. 72.21%

Q.1.6 Acid rain caused due to _____.

- a. Ozone and dust b. CO₂ and CO c. SO₃ and CO d. SO₂ and NO₂

Q.1.7 The presence of which of the following gases in air checks the UV light from sunlight:

- a. SO₂ b. CO₂ c. NO d. O₃

Q.1.8 Which of the following reaction consider as 100 % atom economical?

- a. Addition b. Substitution c. Elimination d. None of these

Q.2 Answer Any Seven of the following short questions:

[14]

1. Define Green Chemistry. Write its benefit.
2. Provide an example of a chemical reaction and calculate its atom economy. How it is different from % yield?
3. What is sustainability?
4. What is a renewable and depleting feedstock? Give its example.
5. Explain how waste reduction, waste reuse and waste recycle are the preferred option for solid waste management?
6. Explain the term BOD and COD.
7. Define Environment Management System.
8. Write about benefit of ISO 14001 certification.
9. Name only the different atmospheric pollutants and their sources.

Q.3 a Write a note on Green Solvent. [06]

Q.3 b Write a note on principles of Green Chemistry. [06]

OR

Q.3 b Describe in detail about the tools of green chemistry. [06]

Q.4 a Write a note on 'Evaluating feedstock and starting materials' with respect to green chemistry concept. [06]

Q.4 b Explain the different general types of chemical transformation and rank in order of most atom economical. [06]

OR

Q.4 b Explain in detail real-time, in-process analysis beneficial to green chemistry. [06]

Q.5 a Provide an example of a solvent that is currently used in Paint industry and identify which, if any, environmental concern there exists. [06]

Q.5 b Discuss in detail how waste minimization can be done by Paint manufacturer? [06]

OR

Q.5 b Write a note on component of an Environment Management System. [06]

Q.6 a Write a note on solid waste management methods to reduce waste. [06]

Q.6 b Write a note on Effluent Treatment Process. [06]

OR

Q.6 b What are the different methods to control particulate matter emission from gas stream? Explain. [06]

X