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CY 181201

**BINA CHOWDHURY CENTRAL LIBRARY
(GIMT & GIPS)**

Azara, Hafkhowapara,

Guwahati - 781017

Roll No. of candidate

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2019

B.Tech. 2nd Semester End-Term Examination

CHEMISTRY - 201

(New Regulation)

(W.e.f. 2017-18) & New Syllabus

(Group B) (W.e.f. 2018-19)

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer Question No. 1 and any *four* from the rest.

Q. No. 2 to 7 carries 15 marks

1. Answer the following

(10 × 1 = 10)

- (i) Styrene-acrylonitrile is an example of:
- (a) Co-polymer
 - (b) Homo polymer
 - (c) Linear polymer
 - (d) Amorphous polymer

[Turn over

- (ii) In Atomic Absorption Spectroscopy, which of the following is the generally used as radiation source?
- (a) Tungsten lamp
 - (b) Xenon mercury arc lamp
 - (c) Hydrogen or deuterium lamp
 - (d) Hollow cathode lamp
- (iii) An example of one-dimensional nanomaterial is:
- (a) Carbon nanotube
 - (b) Graphene
 - (c) Fullerene
 - (d) Colloid
- (iv) The energy of which of the following is not quantised?
- (a) An electron in an atom
 - (b) A free particle
 - (c) A particle in a three dimensional box
 - (d) An electron in a molecule
- (v) In lithium ion battery, which of the following is applicable?
- (a) Li is used as anode
 - (b) Li is used as cathode
 - (c) Li salts are used as electrolytes
 - (d) None of the above

- (vi) Which of the following types of corrosion may not be classified as "dry corrosion"?
- (a) Oxidation corrosion
 - (b) Corrosion by SO_2
 - (c) Electrochemical corrosion
 - (d) Liquid metal corrosion
- (vii) Which of the following is infra-red (IR) active?
- (a) O_2
 - (b) HCl
 - (c) N_2
 - (d) H_2
- (viii) Out of the following points which is not applicable for a liquid crystal.
- (a) It should have a rod-like molecular structure
 - (b) The molecules of a liquid crystal should have sufficient long-range molecular interaction
 - (c) The liquid crystal molecules should have a rigid, isotropic structure
 - (d) The liquid crystal molecules should be easily polarisable
- (ix) Which of the following nuclei is useful in NMR spectroscopy?
- (a) ^1H
 - (b) ^2He
 - (c) ^{12}C
 - (d) ^{16}O

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- (x) Storing of carbon dioxide (CO_2) underground in rock formation is able to retain large amounts of CO_2 over a long period of time. The process is known as:
- (a) Geological sequestration
 - (b) Terrestrial sequestration
 - (c) Ocean sequestration
 - (d) None of the above
2. (a) What is the significance of ψ^2 ? What are the significance of radial and angular wave functions of Hydrogen atom? (1 + 4)
- (b) Write the chemical reactions to show the preparation of any three of the following: (3)
- (i) Cellulose nitrate
 - (ii) Natural rubber
 - (iii) Bakelite
 - (iv) Teflon
- (c) What do you mean by carbon footprint? Explain primary and secondary footprint with suitable examples. (1 + 3)
- (d) Explain how a metal can be protected from corrosion. (3)
3. (a) Explain one technique for each of the following approaches for the synthesis of nanostructures:
- (i) Top-down approach
 - (ii) Bottom-up approach (2 + 2)

- (b) Discuss the significance of viscosity average molecular weight in processing of polymers. Describe molecular weight distribution curve. (3 + 2)
- (c) What are secondary cells? Write cell reactions for charging and discharging of lead storage cell. (2 + 4)
4. (a) Why does corrosion take place in metals? Explain with the help of a diagram about
(i) hydrogen evolution and (2 + 2 + 2)
(ii) oxygen absorption types of corrosion.
- (b) Draw the molecular orbital diagram of O_2 . Arrange the molecules O_2 , O_2^- and O_2^+ in the increasing order of their bond strength and bond order. (2 + 3)
- (c) Discuss the factors affecting rate of corrosion. (4)
5. (a) Describe the principle of the Gas chromatography. Name a few carrier gases and detectors used in Gas chromatography. (2 + 3)
- (b) Justify- "Carbon sequestration can assist significantly in maintaining the natural carbon cycle. (3)
- (c) What are liquid crystals and how are they classified? Mention any two applications of liquid crystals. (2 + 3 + 2)
6. (a) Explain the salient features of molecular orbital theory which is useful in the description of electronic structure and bonding in molecules. (5)
- (b) Explain the statement – 'Green chemistry is sustainable chemistry'. (3)

- (c) Explain the basic principles of any one of the following: (3)
- (i) Flame photometry
 - (ii) Atomic absorption spectroscopy (AAS)
 - (iii) uv-vis spectroscopy
- (d) What is nanowire? Write a short note about the medicinal applications of nanomaterials. (1 + 3)
7. (a) Discuss the various applications of UV or mass spectroscopy. (4)
- (b) Discuss five among the 12 principles of Green chemistry. (5)
- (c) Write short notes on any *two* of the following: (2 × 3 = 6)
- (i) Biodegradation in biopolymers.
 - (ii) Waterline corrosion
 - (iii) Fuel cell
 - (iv) Conductive polymers.

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