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## CY 181101

Roll No. of candidate

BINA CHOWDHURY CL (GIMT & GIV) Azara, Hatkhowapara, Guwahati -781017

2019

B.Tech. 1st Semester End-Term Examination

CHEMISTRY - 101

(New Regulation) (W.e.f 2017-2018) (Group - A)

(New Syllabus)(W.e.f 2018-2019)

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.

Questions No.2 to 7 carries 15 marks each.

1.

 $(10 \times 1 = 10)$ 

- (i) What is the significance of  $\psi^2$ ?
- (ii) What is the chemical formula of most common Bucky ball?
- (iii) Define  $R_{\ell}$  value.
- (iv) How does polydispersity index (PDI) explain the polydispersity or monodispersity of a polymer.

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- (v) Name any two solid lubricants.
- (vi) Where the electrochemical corrosion takes place?
- (vii) Which constituent of cement causes its initial setting?
- (viii) Name two green solvents.
- (ix) What type of excitation can take place in  $CH_3COCH_3$  at 280nm and 190nm in uvspectroscopy.
- (x) Give two examples of biopolymer.
- 2. (a) Write schrodinger wave equation for hydrogen atom and explain the different terms involved in it. (3)
  - (b) Draw the radial probability distribution curves of electron at different radial distance  $\gamma$  from the nucleus for n = 1, l = 0 and n = 2, l = 0 orbitals. (4)
  - (c) Draw the molecular orbital diagram of CO molecule and calculate the bond order. (4)
  - (d) The bond order of  $N_2^+$  ion is less than that of  $N_2$  whereas the bond order of  $O_2^+$  is greater than that of  $O_2$ . Explain with the help of molecular orbital theory. (4)
- 3. (a) Explain addition and condensation polymerisation with suitable examples and state the differences between these polymerisation. (6)
  - (b) Give reasons
    - (i) PVC is soft and flexible
- (ii) Natural rubber need vulcanization. (4)
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	(c)	Give two examples of commercially prepared conducting polymer. How conductivity of a polymer can be increased by doping method?  (2+3=5)
4.	(a)	What are different types of carbon nano-tubes? Write down the important characteristics and applications of carbon nano-tubes. (5)
	(b)	Write down the applications of nanomaterials in the field of
		(i) medicineBINA CHOWDHURY CENTRAL LIBRARY (GIMT & GIPS) (ii) Catalysis. Azara, Hatkhowapara, Guwahati -781017 (5)
	(c)	State Beer-Lambert law. Explain the following terms in respect of UV-vis spectroscopy with example. (i) Chromophore (ii) Auxochrome (2+3=5)
5.	(a)	Write down the major applications of the following (any two)
		(i) Infrared spectroscopy
		(ii) NMR spectroscopy
		(iii) Mass spectroscopy. (4)
	(b)	What are alternative solvents? Write a note on the following:
		(i) Properties of Ionic liquids.
		(ii) Advantage of supercritical $CO_2$ fluid. (6)
	(c)	What do you mean by
		(i) Carbon footpring.
CY	18110	(ii) Carbon sequestration. (2) 1 3   Turn over

- (d) How the solid waste effect the public health of an urban area? (3)
- 6. (a) What is corrosion? Explain rusting of iron with the help of electrochemical theory of corrosion. (2+4=6)
  - (b) Describe two methods for protection of a metal from corrosion. (5)
  - (c) What is Galvenic series? How does it differ from electrochemical series. (4)
- 7. (a) Give the average chemical composition of portland cement. Explain the setting and hardening of portland cement with chemical reactions involved in it. (2+5=7)
  - (b) Write characteristic of a good lubricating oil.

    Name the additive used to improve the following desired quality of lubricating oil. (5)
    - (i) to prevent rusting
    - (ii) to improve viscosity index
    - (iii) to prevent oxidation
  - (c) What are the refractories? Give two essential properties of a good refractory material. (3)