

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 02

B.Tech
PAC1A101

1st Semester Back Examination 2018-19
APPLIED CHEMISTRY

**BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH,
CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, FAT, IEE, IT, MANUFAC,
MANUTECH, MECH, METTA, MINERAL, MINING, MME, PE, PLASTIC, PT, TEXTILE**

Time : 3 Hours

Max Marks : 100

Q.CODE : E747

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.
(atomic mass: H = 1.0078u; F = 17.9984u, Cl = 35.9989u).

Part- I

Q1 Short Answer Type Questions (Answer All-10)

(2 x 10)

- Two energy level are separated in wavenumber by 300 cm^{-1} . Convert this energy in to joule.
- Acetone absorb at 279 nm in hexane where as values λ_{max} of it in water is 264.5 nm . Explain.
- What do you mean by linear operator? Write down the essential conditions for linear operator.
- Calculate reduced mass of HF molecule.
- Define eutectic point. What is the value for Bi-Cd alloy?
- Define 1D nanomaterials with one example of it.
- What is chromizing?
- What do you mean by term passivity?
- What do you mean by calorific value of fuel?
- Why fusion curve of ice has negative slope?

Part- II

Q2 Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)

(6 x 10)

- What do you mean by Eigen value and Eigen function? Prove that Schrödinger equation is an Eigen value problem.
- Draw phase diagram of water system. Discuss the curves and triple point of system.
- What do you mean by auxochrome and chromophore? Discuss various type of shift in UV spectroscopy.
- The Vibrational spectrum of HCl gas exhibits an absorption band centered $2,885 \text{ cm}^{-1}$. Calculate the force constant of the bond of HCl molecule
- Describe the use of nanomaterials in photovoltaic solar cells.
- What do you mean by catalytic cracking? Discuss moving-bed catalytic cracking.
- A coal sample has following composition by weight: C = 90%; O = 3.0%; S = 0.5%; N = 0.5% and ash = 2.5% Net calorific value of coal was found to be 8490.5 kcal/kg . Calculate percentage of hydrogen, and HCV and GCV of coal.
- Discuss preparation and use of producer gas and water gas
- Discuss mechanism of wet corrosion in term of evolving of hydrogen gas.
- How can you prepare power alcohol? Discuss advantages and disadvantages.
- Calculate moment of inertia and rotational constant of HF molecule having bond distance 92 pm .
- Describe the top-down approaches for synthesis of nanomaterials.

Part-III

Long Answer Type Questions (Answer Any Two out of Four)

- Q3** State and explain Beer – Lambert’s law? Explain various type of electronic transition occurs in UV Spectroscopy with example. **(16)**
- Q4** Set up and solve the Schrödinger wave equation for a particle in an infinite one – Dimensional box With potential box with zero inside the box . Normalized the wave function. **(16)**
- Q5** What are various fraction obtained during distillation of petroleum ? Mention the use of each fraction. **(16)**
- Q6** Give an account of any eight factors that influence the rate of corrosion .Explain in details. **(16)**