DCI-003-2016006

Seat No. _____

B. Sc. (Sem. VI) (CBCS) Examination

July - 2022

Chemistry : C-601

(Inorganic Chemistry & Industrial Chemistry)

(New Course)

Faculty Code : 003

Subject Code : 2016006

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory and carry equal marks.

(2) Figure given at the right side indicate marks of question/subquestion.

1 (a) Answer the following questions : **4**

(1) Define multiplication operator.

(2) What is normalized wave equation for particle moving in rectangular box ?

(3) How operator ∇ is detonated in Cartesian co-ordinates?

(4) Define Linear operator.

(b) Answer any one : **2**

(1) Normalize the wave function $\psi = N \cdot e^{-r/a_0}$.

(2) Explain internal nodal points of the wave function for a particle moving in one dimensional box.

(c) Answer any one : **3**

(1) Discuss the term 'Hemiltonian Operator'.

(2) Write short note on : Polyenes as one dimensional box.

(d) Answer any one : **5**

(1) Give Schrodinger equation in polar co-ordinates and derive R, θ and ϕ equations by variable separation.

(2) Derive the wave equation and energy equation for a particle moving in three dimensional box.

2 (a) Answer the following questions : **4**

(1) Define Magnetic pole.

(2) What is Molar magnetic susceptibility ?

(3) What is gram susceptibility ?

(4) Define Magnetic permeability.

(b) Answer any one : **2**

(1) Explain characteristics about diamagnetic compound.

(2) Give characteristics of paramagnetic compound.

(c) Answer any one : **3**

(1) Discuss effects of temperature on Magnetic substances.

(2) Explain ferromagnetic and antiferromagnetic compounds.

(d) Answer any one : **5**

(1) Derive equation for total angular magnetic momentum and diamagnetic momentum.

(2) Explain Gouy method.

3 (a) Answer the following questions : **4**

(1) Define acid value.

(2) What is indicated by Iodine value for oil ?

(3) Give the hybridization found in $Co_2(CO)_8$.

(4) For Neutral molecules, terminal CO groups absorb in which range ?

(b) Answer any one : **2**

(1) Explain determination of saponification value.

(2) Give any two preparation methods of metal carbonyl.

(c) Answer any one : **3**

(1) Discuss metal nitrosyls complex containing NO^+ group.

(2) Explain manufacturing of cotton seed oil by solvent extraction method.

(d) Answer any one : **5**

(1) Write short note on : Hydrogenation of oil.

(2) Discuss structure of $Mn_2(Co)_{10}$.

4 (a) Answer the following questions : **4**

(1) What is Photochemical smog ?

(2) Give three important components of an environment.

(3) What is CFC ?

(4) Define COD.

(b) Answer any one : **2**

(1) Explain Ozone depletion.

(2) Write short note on Acid rain.

(c) Answer any one : **3**

(1) What is thermal pollution ? Explain it.

(2) Explain Green House effect.

(d) Answer any one : **5**

(1) Give detail about 'Water Pollution'

(2) Discuss about segments of Atmosphere.

5 (a) Answer the following questions : **4**

(1) Give composition of liquid soap.

(2) Which is the constituent present in Rosin?

(3) What is Superfatting agent ? Name it.

(4) Define Hard and Soft soap.

(b) Answer any one : **2**

(1) Give Oxo process for Anionic detergents.

(2) Give detail about Transparent soap.

(c) Answer any one : **3**

(1) Explain Alfol method for Anionic detergents.

(2) Describe recovery of Glycerine from spent lye.

(d) Answer any one : **5**

(1) Discuss classification of surface active agents.

(2) Explain manufacturing of soap by continuous process and give raw material used in soap.