BBF-003-1016006　　Seat No. _____

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

July - 2021

Chemistry : C - 601

(Inorganic & Industrial Chemisty) (New Course)

Faculty Code : 003
Subject Code : 1016006

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

Instructions : (1) Answer any five questions out of ten.
　　　　　　　 (2) Each question carries 14 marks.
　　　　　　　 (3) Right side number shows full marks of subquestions.

1　(a)　Answer the following :　　　　　　　　　　　　**4**
　　　(1)　Define – Multi electron system.
　　　(2)　Give the formula to calculate Microstate.
　　　(3)　What is s–s coupling ?
　　　(4)　Give the ground state spectral term for d^5 system.
　(b)　Answer the question.　　　　　　　　　　　　**2**
　　　Explain spectral term and term symbol.
　(c)　Answer the question.　　　　　　　　　　　　**3**
　　　Write about L–S coupling.
　(d)　Answer the questions.　　　　　　　　　　　　**5**
　　　Calculate the microstates for d^2 case.

2　(a)　Answer the following :　　　　　　　　　　　　**4**
　　　(1)　What is the formula of spectral term ?
　　　(2)　Define – Microstate.
　　　(3)　What is spin multiplicity ?
　　　(4)　How many microstates are possible for d^1 system ?
　(b)　Answer the question.　　　　　　　　　　　　**2**
　　　Explain l–l coupling.

(c) Answer the question.   3

Explain the Hund's rule to determine ground state spectral term.

(d) Answer the question.   5

Calculate the spectral term for p^2 case and decide ground state spectral term.

3 (a) Answer the following :   4

(1) What is distorted tetragonal structure ?

(2) Define Hole formalism.

(3) What is the splitting of D term ?

(4) Give the diagram showing splitting of d orbitals in tetragonal complexes.

(b) Answer the question.   2

Explain – Spherical charge symmetric and spherical charge asymmetric structure of d orbitals.

(c) Answer the question.   3

Write note on La-Porte selection rule for Absorption spectrum.

(d) Answer the question.   5

Discuss the John-Teller effect.

4 (a) Answer the following :   4

(1) What is Orgel diagram ?

(2) Which theories are useful to explain Absorption spectrum of transition metals ?

(3) What is Hole-formalystic pairs ?

(4) Which transitions are found in $[Ti(H_2O)_6]^{+3}$ spectra ?

(b) Answer the question.   2

Explain $\pi \to \pi^*$ charge transfer transition.

(c) Answer the question.   3

Explain splitting of d orbitals in square planner complexes.

(d) Answer the question.   5

Discuss the Absorption spectrum of $[Cu(H_2O)_6]^{2+}$.

5 (a) Answer the following questions. 4
  (1) Define – Magnetic field.
  (2) If P > 1, substance is paramagnetic. True or False ?
  (3) What is magnetic permeability ?
  (4) Define – Larmor Rotation.

 (b) Answer the question. 2
  Explain the effect of temperature on magnetic properties of substances.

 (c) Answer the question. 3
  Explain the diamagnetism and give equation for diamagnetic momentum.

 (d) Answer the question. 5
  Discuss in detail Gouy-Balance method.

6 (a) Answer the following questions. 4
  (1) Give the formula of Butyric acid.
  (2) What is Iodine value ?
  (3) What is Rancidity ?
  (4) Give the solvent names used in solvent extraction method.

 (b) Answer the question. 2
  What is Acid value and Saponification value ?

 (c) Answer the question. 3
  Explain classification of oils.

 (d) Answer the question. 5
  Write on the properties of oil and fats.

7 (a) Answer the following : 4
  (1) What is environment ?
  (2) Give the segments of environment.
  (3) Define – Exosphere.
  (4) Define – BOD.

 (b) Answer the question. 2
  Write about Acid Rain.

 (c) Answer the question. 3
  Write on photochemical smog.

 (d) Answer the question. 5
  Discuss the steps to prevent Air Pollution.

8 (a) Answer the following : 4
  (1) Define – Pollution.
  (2) Give the full form of CCl_3F.
  (3) Name the main component of stratosphere.
  (4) Define COD.

  (b) Answer the question. 2
  Write about Thermal Pollution.

  (c) Answer the question. 3
  Write on Biosphere.

  (d) Answer the question. 5
  Discuss in detail – Green House Effect.

9 (a) Answer the following : 4
  (1) Which oils are useful to make soft soap ?
  (2) What is Fillers ?
  (3) What is importance of NaCl in soap manufacturing?
  (4) What is detergent ?

  (b) Answer the question. 2
  Compare soap and detergent.

  (c) Answer the question. 3
  Short note - Recovery of glycerine from spent lye.

  (d) Answer the question. 5
  Explain classification of detergents.

10 (a) Answer the following : 4
  (1) What is soap ?
  (2) Which germicidals are useful to make soap ?
  (3) What is amphoteric detergents ?
  (4) Which colouring agents are useful in soap making ?

  (b) Answer the question. 2
  Write on Medicated soap.

  (c) Answer the question. 3
  Short note : Alfol process for detergent synthesis.

  (d) Answer the question. 5
  Discuss the soap manufacturing by continuous method.