V—43—2017

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2017

(CBCS/CGPA Pattern)

CHEMISTRY

Paper IV

(Physical and Inorganic Chemistry)

(MCQ & Theory)

(Friday, 13-10-2017)   **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours*   *Maximum Marks*—40

N.B. :— (*i*)   Attempt *All* questions.

(*ii*)   *All* questions carry equal marks.

(*iii*) Use OMR sheet for Question No. **1**.

(*iv*) Calculator is allowed.

(*v*)   Only one answer sheet should be used for Sections A and B.

MCQ

1.   Select the *correct* answer for each of the following Multiple Choice Questions :

(*i*)   The maximum number of electrons that can be accomodated in a orbit is :

(*a*) n^2 (*b*) $2n$

(*c*) $2n^2$ (*d*) $2n + 1$

(*ii*)   The angular momentum of electron in second orbit is given as :

(*a*) $\dfrac{h}{2\pi}$ (*b*) $\dfrac{h}{\pi}$

(*c*) $\dfrac{h}{4\pi}$ (*d*) $\dfrac{h}{3\pi}$

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(iii) "The molar volume of a liquid at a temperature, when its surface tension is unity", is called as :

    (a) Parachor   (b) Molar volume

    (c) Molar viscosity   (d) Molar surface tension

(iv) Swelling of gel is called as :

    (a) Imbibition   (b) Thixotropy

    (c) Synerisis   (d) Hydration

(v) 'Ink' is an example of :

    (a) Gel   (b) Sol

    (c) Emulsions   (d) Solid foam

(vi) The enzyme which can catalyse the conversion of glucose to ethanol is :

    (a) Invertase   (b) Urease

    (c) Zymase   (d) None of these

(vii) Arsenic oxide (AS_2O_3) in contact process acts as :

    (a) a catalyst   (b) a promoter

    (c) an enzyme   (d) a poison

(viii) Which of the following forces are strongest ?

    (a) Dipole-Dipole forces   (b) Ion-Ion forces

    (c) Ion-Dipole forces   (d) Ion-Induced forces

(ix) A molecule or ion is stable if :

    (a) Na = Nb   (b) Na > Nb

    (c) Na < Nb   (d) None of these

(*x*) Which factors are responsible for the formation of ionic bond ?

    (*a*) Low ionisation energy

    (*b*) High electron affinity

    (*c*) High lattice energy

    (*d*) All of the above

Theory

Section A

(Physical Chemistry)

2. Solve any *two* of the following :

(*a*) Explain :

    (*i*) Hund's rule

    (*ii*) Aufbau principle.

(*b*) Explain the determination of viscosity of liquid by Ostwald's viscometer method.

(*c*) Write notes on :

    (*i*) Electrophoresis

    (*ii*) Electro-osmosis.

(*d*) Explain Homogeneous and Heterogeneous catalysis with examples.

3. Solve any *two* of the following :

(*a*) Derive an expression for the energy of an electron in *n*th Bohr's orbit of H-atom.

(*b*) What are Emulsions ? How are they classified ? Give their methods of preparation.

(*c*) Explain Acid-base catalysis with examples.

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  (*d*) (*i*) Calculate the radius of third Bohr's orbit of H-atom.

    (*ii*) In the determination of surface tension of liquid by drop number method, water gives 35 drops and liquid gives 65 drops for the same volume. The densities of water and liquid are 0.997 and 0.866 g/cm^3. If the surface tension of water is 72 dyne/cm, calculate surface tension of liquid.

Section B

(Inorganic Chemistry)

4. Solve any *two* of the following :

 (*a*) What is ionic bond ? Explain the factors favoring an ionic bond formation.

 (*b*) Explain different types of van der Waals forces responsible for van der Waals bonding.

 (*c*) (*i*) Give the importance of hydrogen bonding in sustaining life.

   (*ii*) Write the limitations of VSEPR theory.

 (*d*) Explain the sp^3d type of hybridization with suitable example.