Seat No.	

B.Sc.(Part-III) (Semester-VI) (CBCS) Examination, March - 2023

ENGLISH (Compulsory) (Paper - IV)
English for Communication
Sub. Code : 81667

Day and Date : Tuesday, 06 - 06 - 2023   **Total Marks : 40**

Time : 10.30 a.m. to 12.30 p.m.

Instructions : 1) **All questions are compulsory.**

2) **Figures to the right indicate full marks.**

Q1) *A)* **Choose the appropriate answer and complete the following sentences:** **[3]**

    i)   Buffalo bill charges the Indians_____buck a head to enter.

       a)   5

       b)   12

       c)   20

       d)   7

    ii)   The earth and _____continue to rise up.

       a)   Tree

       b)   Stone

       c)   Women

       d)   Grass

    iii)   _____asks Govind Singh to go to the x-ray institute.

       a)   The general manager

       b)   The accountant

       c)   An ex-compounder

       d)   His wife

B) **Answer the following questions in one word\phrase\sentence each:**

[3]

    i)   What did Barr.P.G.Patil think when he saw the Blackburns?

    ii)   Where was Lachmi at the beginning of the story?

    iii)   What could Granny's piercing eyes reach straight?

Q2) *A)* **Answer the following questions in three to four sentences each (2 out of 3)** **[4]**

    i)   Where did Barrister P.G.Patil visit during his educational tour?

    ii)   What kind of mad things does Govind Singh do after he receives the letter?

    iii)   How was the absence of Granny felt by the poetess?

B) **Write a short note on the following in about 7-8 sentences. (Any One)** **[4]**

    i)   The absence of Granny in the bouse

    ii)   Sir Mohan Lal

C) Do as directed: **[2]**

    i)   Antonym of "Efficient".

    ii)   Synonym of "Solicitude".

Q3) *A)* Build up a short piece of Group Discussion on the following topics making use of expressions and interactions used in Group Discussion.

[8]

    i)   Stay at home, stay safe.

<div align="center">OR</div>

    ii)   Indian Television channels expose us to Indian ways of life

B) You are planning a family trip to your favourite place.Make notes of what you must do to get most out of this trip. Use the 'mind mapping' technique for this purpose. **[8]**

Q4) *A)* You happen to be the editor of and English newspaper published from Maharashtra. You are expected to write an editorial on death of a famous film/sports personality. **[8]**

<div align="center">OR</div>

B) As a guest editor you are supposed to write an editorial on the floods in Maharashtra to an English newspaper published from state. Develop an outline of the editorial.

<div align="center">▶◀ ▶◀ ▶◀</div>

Seat
No.

B.Sc. (Part - III) (Semester - VI) (CBCS) Examination, March - 2023

CHEMISTRY (Paper - XIII)
Inorganic Chemistry
Sub. Code : 81674

Day and Date : Thursday, 01 - 06 - 2023　　　　**Total Marks : 40**
Time : 10.30 a.m. to 12.30 p.m.

Instructions : 1) **All questions are compulsory.**
　　　　　　 2) **Figures to the right indicate full marks.**
　　　　　　 3) **Neat diagrams should be drawn wherever necessary.**

Q1) **A) Answer the following in one sentence :**　　　　　　　　**[4]**

　　a)　Define labile complex.

　　b)　What is the atomic number of un-nil-unium?

　　c)　Give the temperature range of zone of reduction.

　　d)　Calcium is stored in which of muscle cell.

B) Select the most correct alternative and rewrite the sentences　　**[4]**

　　a)　According to Taube, complexes which undergo rapid substitution of ligands within 1 minute at 25 °C is called _____.
　　　　i)　stable
　　　　ii)　unstable
　　　　iii)　labile
　　　　iv)　inert

　　b)　Artificial transmutation is noted in 1919 by _____
　　　　i)　E.O. Lawrence　　　　ii)　Chadwick
　　　　iii)　Madam Curie　　　　iv)　Earnest Lord Rutherford

    c)   The general configuration for actinides is _____.

        i) $4f^x 5d^1 6s^2$

        ii) $4f^x 5d^0 6s^2$

        iii) $3d^{1-10} 4s^2$

        iv) $5f^x 6d^1 7s^2$

    d) Ca^{++}ions play an important role in the _____ contraction.

        i)   muscle

        ii)   nerves

        iii)   legs

        iv)   feet

Q2) **Attempt any two of the following :**   **[20]**

    a)   Explain factors affecting stability of metal complexes w.r.t to metal ion.

    b)   Describe ion exchange method for separation of lanthanide and give its advantages.

    c)   Explain working, chemical reactions involved in different zones of blast furnace.

Q3) **Attempt any three of the following :**   **[12]**

    a)   Explain Job's method ratio method for determination of stability constant.

    b)   Give a list of names, atomic numbers and symbols of actinide elements.

    c)   Neutron capture followed by β-decay.

    d)   Give a general account of use of U,Th and Pu in atomic energy.

    e)   Explain the biological role of Ca^{2+}ions.

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Seat
No.

B.Sc. (Part-III) (Semester-VI) (CBCS) Examination, March - 2023
CHEMISTRY
Organic Chemistry (Paper-XIV)
Sub. Code : 81675

Day and Date : Friday, 02-06-2023　　　　　　　　　　**Total Marks : 40**
Time : 10.30 a.m. to 12.30 p.m.

Instructions :　　**1)**　**All questions are compulsory.**
　　　　　　　　　2)　**Figures to the right indicate full marks.**
　　　　　　　　　3)　**Draw neat diagrams & give equations wherever necessary.**
　　　　　　　　　4)　**Chemical equations are to be written wherever necessary.**

Q1) A)　Answer in one sentence.　　　　　　　　　　　　　　**[4]**

　　a)　Phenobarbitone belongs to which type of drug?

　　b)　What will be the product obtained by reduction of $CH_3-C\equiv C-CH_3$ with excess Nickel catalyst?

　　c)　Which compound is acting as plant growth regulator?

　　d)　In which reaction phosphorus ylide is used as a reagent?

　B)　Select most correct alternative among those given below and rewrite the sentences.　　　　　　　　　　　　　　**[4]**

　　a)　_____ decrease psychomotor activity without causing sedation.

　　　　i)　Tranquilizers　　　　　　ii)　Hypertensive drugs

　　　　iii)　Sedatives　　　　　　　iv)　Anticonvulsants

　　b)　Conjugated diene reacts with which among the following to form a cyclohexene?

　　　　i)　Phenol　　　　　　　　ii)　Hexane

　　　　iii)　Tribromo phenol　　　　iv)　Dienophile

P.T.O.

c) Ozonolysis of an alkene gives only acetaldehyde as the main product. The alkene is _____

   i) $CH_3-CH=CH_2$ ii) $CH_3-CH=CH-CH_3$

   iii) $(CH_3)_2CH=CH_2$ iv) $CH_2=CH_2$

d) How many π bonds present in Acetylene?

   i)   2   ii)   4

   iii)   1   iv)   3

Q2) Attempt any two of the following: **[20]**

a) What are the qualities of Ideal drugs? Give the synthesis of following drugs.

   i)   Benzocaine

   ii)   Paludrine

b) How will you establish the structure of Nicotine on the basis of analytical evidence?

c) i)   Give the method of preparation of SeO_2 and its two applications.

   ii)   What is meant by retrosynthesis? Define the following terms.

       1)   Disconnection

       2)   Synthon

       3)   Synthetic equivalent

       4)   FGI

Q3) Attempt any three of following: **[12]**

a) Addition of HBr to propene with mechanism.

b) Wittig reaction.

c) Synthesis of Citral.

d) Explain the retrosynthetic pathway with respect to Cinnamaldehyde.

e) Hydrogenation reaction in Alkyne.

SPECTROSCOPIC VALUES

A] Woodward and fieser rules for Dienes and Enones

Nature of Dienes	λmax
Acyclic and Heteroannular dienes	214 nm
Homoannular dienes	253nm
Addition of each substituents	
-R(alkl, including part of carbocyclic ring)	+ 5 nm
-OR (alkoxy)	+ 6 nm
-Cl, -Br	+ 5 nm
-OCOR (acyloxy)	--
-CH=CH- additional conjugation	+ 30 nm
If one double bond is exocclic to one ring	+ 5 nm
If exocyclic to two rings simultaneously	+10 nm

B] Rules for α, β unsaturated aldehydes and ketones:

Ketones —C=C—C=O (B α)

	λmax
Acyclic or 6-ring cyclic	215 nm
5- ring cyclic	202 nm

Aldehydes —C=C—C=O (H)

	207 nm

Acid/Ester —CH—O—C—R (‖O)

	197 nm

Extended Conjugation —C=C–C=C–C=O

One extra double bond in conjugation	+ 30 nm
Homodiene component	+ 39 nm

Addition for :	α	β	γ	δ
-R alkyl(including part of carbocyclic ring	10	12	18	18
-OR (Alkoxy)	35	30	17	31
-OH (Hydroxy)	35	30	30	50
-SR (Thioether)	--	33	--	--
-Cl (Chloro)	15	12	12	12
-Br (Bromo)	25	30	25	25
-OCOR- (acyloxy)	06	06	06	06
-NH₂, -NHR, -NR₂ (Amino)	--	95	--	--

If one double bond is exocyclic to one ring	+ 5 nm
If exocyclic to two rings simultaneously	+ 10 nm

CHEMICAL SHIFTS OF PROTONS δ in ppm

Proton	δppm	Proton	δppm
H$_3$C——R	0.9	—C–CH$_2$–C	1.4
H$_3$C—C=C	1.7	—C–CH$_2$–C–OR $\overset{\|}{O}$	2.2
H$_3$C—C=O $\overset{\|}{R}$	2-2.7	—C–CH$_2$–C=C	2.3
H$_3$C——S—	2.1	—C–CH$_2$–S—	2.5
H$_3$C——Ar	2.3	—C–CH$_2$–N— $\overset{\|}{}$	2.5
H$_3$C—N—R $\overset{\|}{}$	2.3	—C–CH$_2$—Ar	2.7
H$_3$C—C—Ar $\overset{\|}{O}$	2.6	—C–CH$_2$—OR	3.4
H$_3$C—N—Ar $\overset{\|}{}$	3.0	—C–CH$_2$—I	3.2
H$_3$C—O—R	3.3	—C–CH$_2$—Br	3.5
H$_3$C—O—C—R $\overset{\|}{O}$	3.7	—C–CH$_2$—Cl	3.6
H$_3$C—O–Ar	3.8	—C–CH$_2$—OH	3.6
Ar——H	7.3	—C–CH—C	1.5
R—C–H $\overset{\|}{O}$	9.0-10.0	—C–CH–C–R $\overset{\|}{O}$	2.5
R—C–OH $\overset{\|}{O}$	10.5-12	—C–CH—N— $\overset{\|}{}$	2.8
R—OH	0.5-4.5	—C–CH–Ar	3.0
Ar—OH	4.5	—C–CH–S—	3.2
—C–CH–C–Ar $\overset{\|}{O}$	3.3		
—C–CH–O–R	3.7		
—C–CH–O–H	3.9		
—CH–O–C–R $\overset{\|}{O}$	4.8		

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Seat
No.

B. Sc. (Part - III) (Semester - VI) (CBCS) Examination, March - 2023
CHEMISTRY (Paper - XV)
Physical Chemistry
Sub. Code : 81676

Day and Date : Saturday, 03 - 06 - 2023   Total Marks: 40
Time : 10.30 a.m. to 12.30 p.m.

Instructions: 1)   **All questions are compulsory.**
               2)   **Figures to the right indicate full marks.**
               3)   **Draw neat diagrams wherever necessary.**

Q1) **A)** **Answer the following in one sentence :**   **[4]**
         i)   Define the term component.
         ii)   Write an expression for Gibb's Helmholtz equation.
         iii) Define consecutive reaction.
         iv)   What is distribution coefficient?

   B) **Select the most correct alternative from among those given below.**
                                                              [4]
         i)   The variation of melting point of reaction with pressure is given by
               _____.
               a)   Arrhenius equation   b)   Kirchhoff's equation
               c)   Hess's law   d)   Clapeyron - Clausius equation
         ii)   (111) plane of a crystal is called as _____ plane.
               a)   Cubic   b)   Diagonal
               c)   Cube diagonal   d)   face
         iii) Thermal decomposition of acetaldehyde is an example of
               _____ reaction.
               a)   Reversible   b)   Consecutive
               c)   Chain   d)   Parallel
         iv)   The distribution of solute between two immiscible solvents is called
               _____ of a substance.
               a)   partition   b)   Solvation
               c)   both a and b   d)   none of these

                                                              P.T.O.

Q2) **Attempt any two of the following :** [20]

   a)   What is diffraction of x-ray? Derive Bragg's equation.

   b)   Discuss the application of phase rule to acetic acid-chloroform-water system.

   c)   What are reversible reactions? Derive an expression for rate constant of the reversible reaction of first order.

Q3) **Attempt any three of the following :** [12]

   a)   What is a triple point? Explain with suitable example.

   b)   Write a note on Gibb's Helmholtz equation.

   c)   Explain different types of cubic lattices with suitable diagram.

   d)   State and explain distribution law.

   e)   Explain in brief chain reactions.

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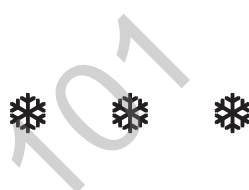
Seat No.

B.Sc. (Part - III) (Semester - VI) (CBCS) Examination, March - 2023
CHEMISTRY (Paper - XVI)
Industrial Chemistry
Sub. Code : 81677

Day and Date : Monday, 05 - 06 - 2023   **Total Marks : 40**
Time : 10.30 a.m. to 12.30 p.m.

Instructions :
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labelled diagrams wherever necessary.

Q1) **A)** **Answer the following questions in one sentence.** **[4]**
   i) Which catalyst is used for the manufacture of Nitric acid?
   ii) Which Polymers soften on heating and harden on cooling?
   iii) For which polymerization tertiary butyl peroxide is used as catalyst?
   iv) Where the Petroleum resources are highest.

  B) **Select the most correct alternative among those given below and rewrite the sentence:** **[4]**
   i) What is the name of chemicals which are used on commercial scale?
     a) Industrial   b) Heavy
     c) Toxic   d) King
   ii) Which chemical compound is used to prepare brine solution?
     a) $NaCl$ b) KOH
     c) KCl d) $NaOH$
   iii) Which of the following present in conducting polymers?
     a) Extended conjugation
     b) Doped impurities
     c) Blending of conducting element
     d) Any of these
   iv) How much is the size of quantum dot in nm?
     a) 5   b) 10
     c) 50   d) 100

P.T.O.

Q2) **Attempt Any Two of the following :** [20]

a) Draw the sketch of multiple effect evaporator and describe in brief how juice is concentrated?

b) What are the advantages of solar energy? How it is used for power generation?

c) What are the various applications of nanomaterials?

Q3) **Attempt Any Three of the following :** [12]

a) Draw the neat labeled diagram of plant used for manufacture of sulphuric acid by contact process?

b) What are the technical conditions to get high yield of ammonia by Haber process?

c) Give the method of synthesis and uses of polythene.

d) Explain in brief ionic polymerization.

e) How fermentation medium is prepared?

▽ ▽ ▽ ▽