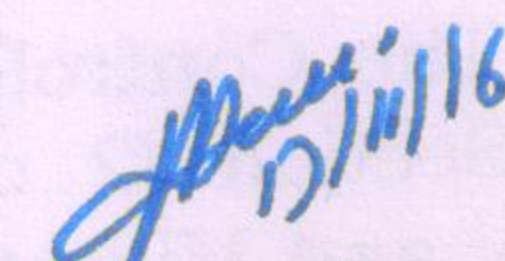


**UNIVERSITY OF MUMBAI**  
**No. UG/166 of 2016-17**

**CIRCULAR:-**

A reference is invited to the Syllabi relating to the B.Sc. degree course, **vide** this office Circular No. UG/128 of 2011, dated 13<sup>th</sup> June, 2011 and the Principals of affiliated Colleges in Science are hereby informed that the recommendation made by the Ad-hoc Board of Studies in Chemistry at its meeting held on 7<sup>th</sup> July, 2016 has been accepted by the Academic Council meeting held on 14<sup>th</sup> July, 2016 **vide** item No. 4.12 and that in accordance therewith, the revised syllabus as per the Choice Based Credit System for F.Y. B.Sc. programme in Chemistry (Sem. I & II), which are available on the University's web site ([www.mu.ac.in](http://www.mu.ac.in)) and that the same has been brought into force with effect from the academic year 2016-17.

  
(Dr.M.A.Khan)  
REGISTRAR

MUMBAI - 400 032

19 November, 2016

To,

The Principals of the affiliated Colleges in Science.

**A.C/4.12/14.07.2016**

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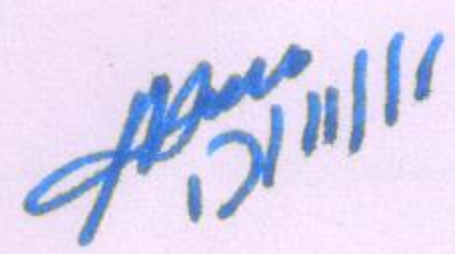
No. UG/166 -A of 2016

MUMBAI-400 032

19 November, 2016

Copy forwarded with Compliments for information to:-

- 1) The Co-ordinator, Faculties of Science,
- 2) The Chairman, Board of Studies in Chemistry,
- 3) The Professor-cum-Director, Institute of Distance & Open Learning (IDOL)
- 4) The Director, Board of College and University Development,
- 5) The Co-Ordinator, University Computerization Centre,
- 6) The Controller of Examinations.

  
(Dr.M.A.Khan)  
REGISTRAR

PTO..

## **CHEMISTRY LAB:**

### **Semester I**

#### **Unit I: Physical Chemistry**

1. To prepare 0.1 N succinic acid and standardize the NaOH of two different concentrations
2. To determine the rate constant for the hydrolysis of ester using HCl as catalyst
3. To determine enthalpy of dissolution of salt (like  $\text{KNO}_3$ )

#### **Unit II: Inorganic Chemistry**

1. Commercial analysis of (any two)
  - a) Mineral acid
  - b) Organic acid
  - c) Salt of weak acid and strong base.
2. Titration using double indicator: analysis of solution of  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$ .
3. Gravimetric analysis
  - a) To determine the percent purity of sample of  $\text{BaSO}_4$  containing  $\text{NH}_4\text{Cl}$
  - b) To determine the percent purity of  $\text{ZnO}$  containing  $\text{ZnCO}_3$ .

#### **Unit III: Organic Chemistry**

1. Purification of any two organic compounds by recrystallization selecting suitable solvent. (Provide 1g.).

Learners are expected to report

  - a) Solvent for recrystallization.
  - b) Mass and the melting points of purified compound.

Learners should calibrate thermometer before determining melting point.
2. Chromatography (Any one)
  - a) Separation of a mixture of two sugars by ascending paper chromatography
  - b) Separation of a mixture of o- and p-nitrophenols by thin layer chromatography (TLC)

### **Semester II Chemistry Lab**

#### **Unit I: Physical Chemistry**

1. To determine the rate constant for the saponification reaction between ethyl acetate and NaOH
2. To determine dissociation constant of weak acid (K<sub>a</sub>) using Henderson's equation and the method of incomplete titration pHmetrically.
3. To verify Beer-Lambert's law, using KMnO<sub>4</sub> solution by colorimetric method.
4. To standardize commercial sample of HCl using borax and to write material safety data of the chemicals involved.

## Unit II: Inorganic Chemistry

### 1. Qualitative analysis: (at least 4 mixtures to be analyzed)

Semi-micro inorganic qualitative analysis of a sample containing two cations and two anions.

Cations (from amongst):

Pb<sup>2+</sup>, Ba<sup>2+</sup>, Ca<sup>2+</sup>, Sr<sup>2+</sup>, Cu<sup>2+</sup>, Cd<sup>2+</sup>, Fe<sup>2+</sup>, Ni<sup>2+</sup>, Mn<sup>2+</sup>, Mg<sup>2+</sup>, Al<sup>3+</sup>, Cr<sup>3+</sup>, K<sup>+</sup>, NH<sub>4</sub><sup>+</sup>

Anions (From amongst):

CO<sub>3</sub><sup>2-</sup>, S<sup>2-</sup>, SO<sub>3</sub><sup>2-</sup>, NO<sub>2</sub><sup>-</sup>, NO<sub>3</sub><sup>-</sup>, Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, SO<sub>4</sub><sup>2-</sup>, PO<sub>4</sub><sup>3-</sup>

(Scheme of analysis should avoid use of sulphide ion in any form for precipitation / separation of cations.)

2. **Redox Titration:** To determine the percentage of copper(II) present in a given sample by titration against a standard aqueous solution of sodium thiosulfate (iodometry titration)

## Unit III: Organic Chemistry

### Characterization of organic compound containing C, H, (O), N, S, X elements.

(minimum 6 compounds)

## Reference Books

### Unit I: Physical Chemistry

1. Khosla B.D., Garg V.C. and Gulati A., Senior Practical Physical Chemistry, R. Chand and Co., New Delhi (2011).
2. Garland C. W., Nibler J.W. and Shoemaker D.P., Experiments in Physical Chemistry, 8th Ed., McGraw-Hill, New York (2003).
3. Halpern A.M. and McBane G.C., Experimental Physical Chemistry, 3rd Ed., W.H. Freeman and Co., New York (2003).
4. Athawale V.D. and Mathur P., Experimental Physical Chemistry, New Age International, New Delhi (2001).

### Unit II: Inorganic Chemistry

Mendham, J., A. I. Vogel's *Quantitative Chemical Analysis* 6<sup>th</sup> Ed., Pearson, 2009.

### Unit III: Organic Chemistry

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5<sup>th</sup> Ed., Pearson (2012)
3. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996

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