

Enclosure to Item No.4.51  
AC 2.4.2004

# UNIVERSITY OF MUMBAI



Syllabus for  
M.Sc. Part – I  
In  
Applied & Industrial Chemistry

(With effect from the academic year 2004-2005)

|           |                                                                                                                                                                                                                                                                                                                                                                                           |  |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Module 04 | 4.2 Diesel and Gas turbine power plant: General layout application of diesel power plant, advantages and disadvantages, component, performance of gas turbine power plant, gas turbine material.                                                                                                                                                                                          |  |
| Module 05 | 5.1 Combined cycle power generation: Coupled cycle – thermodynamics, combined cycle plant-thermodynamics of GT-ST plant operation; Advantages. Base Load plants. Peak load plants. Co-ordination of different types of power plants.                                                                                                                                                      |  |
| Module 06 | Environmental impact of power plant: Social and economical issues of the power plants. Greenhouse effect, Acid precipitation – acid rain and acid snow, dry deposition and acid fog. Thermal pollution, air pollution, Radiation from nuclear power plant effluents.<br>Coal storage. Inplant handling of coal. Ash handling systems. Dust collectors. Flue gas, desulfurization methods. |  |

#### Educational Visit:

Organize at least one visit to power station. Student shall submit a brief technical report of the visit as a part of term work.

#### Theory Examination:

1. Question paper will comprise of total seven question, each of 20 Marks
2. Question one will compulsory and based on maximum part of syllabus.
3. Remaining questions will be mixed in nature. (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3.)
4. Only five question need to be solved.

In question paper weight age of each module will be proportional to number of respective lecture hours as mention in the syllabus.

#### Oral Examination:

Oral examination will be on maximum portion of the syllabus.

- iii. Determination of total dissolved solids in water.
- iv. Determination of sulphate in water by nephelometry.
- v. Determination of dissolved chlorine in water by Mohr's titration.
- vi. Determination of nitrite in water colourimetrically.
- vii. Determination of dissolved oxygen (DO) in water by Winkler's method.
- viii. Determination of Chemical Oxygen Demand (COD) in water.
- ix. Determination of Biological Oxygen Demand (BOD) in water.
- x. Determination of phenols by spectrophotometry using 4-amino-antipyrine.
- xi. Determination of surfactants in water by methylene blue method.
- xii. Determination of phosphate in water by spectrophotometry.
- xiii. Determination of iron by 1,10-phenanthroline method in water.
- xiv. Determination of chromium in water by spectrophotometry using diphenyl carbazide.
- xv. Determination of fluoride in water by spectrophotometric method.
- xvi. Determination of lead in water by polarographic method.

#### Recommended Reading :

1. Indian Pharmacopoeia, 1996 (for exp. 1).
2. "Analytical Chemistry", 6<sup>th</sup> edition, G. D. Christian. (for expts. 2, 4, 5, 8, 10).
3. Vogel's "Textbook of Quantitative Chemical Analysis", 5<sup>th</sup> ed. (for expts. 3, 6, 11, 15).
4. "Fundamentals of Analytical Chemistry", 7<sup>th</sup> ed., D. A. Skoog, D. M. West and F. J. Holler (for expts. 7, 9, 11, 13, 14).
5. "Quantitative Organic Analysis", 2<sup>nd</sup> ed., A. I. Vogel (for exp. 12).
6. "Standard Method for the Examination of Water and Waste Water", 19<sup>th</sup> ed., L. S. Clesceri, A. E. Greenberg and R. R. Trassel (Eds.), APHA (1989).
7. "Environmental Chemistry", 3<sup>rd</sup> ed., A. K. De (1994).
8. "Fundamentals of Environmental Chemistry", 2<sup>nd</sup> Ed., Stanley E. Manahan (2001).
9. "Environmental Chemistry", I. Williams, John Wiley & Sons Ltd, New York (2001).
10. "Elementary Practical Organic Chemistry", Part - I, Small Scale Preparation, A I Vogel, Longmans.
11. "Practical Organic Chemistry", Frederick George Mann and Bernard Charles Saunders, Longmans, Green and Co. Ltd. London, 4<sup>th</sup> Edition, 1960

## EXAMINATION PATTERN

### Theory Examination:

Total Marks: 300

Four papers of 3 hours duration of 75 marks each.

|            |                                  |
|------------|----------------------------------|
| Paper I :  | Chemical Engineering             |
| Paper II : | Advanced Chemistry               |
| Paper III: | Instrumental Methods of Analysis |
| Paper IV:  | Safety, Health & Environment     |

### Practical Examination:

Total Marks: 200

Three days examination of 7 hrs / day.

|         |                            |          |
|---------|----------------------------|----------|
| Day 1 : | [I] Journal                | 20 marks |
|         | [II] Paper I major expt    | 25 marks |
|         | [III] Paper II major expt  | 25 marks |
| Day 2 : | [IV] Paper I minor expt    | 15 marks |
|         | [V] Paper II minor expt    | 15 marks |
|         | [VI] Paper III major expt  | 25 marks |
| Day 3 : | [VII] Paper III minor expt | 15 marks |
|         | [VIII] Paper IV major expt | 25 marks |
|         | [IX] Paper IV minor expt   | 15 marks |
|         | [X] Viva voce              | 20 marks |

Mark List : [I] + [II] + [III] + [IV] + [V] = 100 marks

[VI] + [VII] + [VIII] + [IX] + [X] = 100 marks

- Note :
1. Visits to various industries/research centers must be arranged. Report of such industrial visits undertaken must be included in the journal.
  2. Students should be assigned projects, of 3-6 week duration, preferably in industry, during Diwali and/or summer vacation. A project report must be prepared during the second year and may be evaluated on the basis of a presentation made thereon during the second year practical examination.
  3. A student is expected to submit a journal, containing the record of the experiments carried out during the year, duly certified by the Head of the Department/Institution.
  4. A student will not be permitted to appear at the practical examination unless he/she produces a certified journal. If the journal is lost, the student should produce a certificate from the Head of the Department/Institution stating that he/she has satisfactorily completed the experimental work.