

SARDAR PATEL UNIVERSITY Programme & Subject: M.Sc. (Industrial Chemistry) Semester: 2 Syllabus with Effect from: June 2019

Paper Co	de: PS02CICH27	Total Credit: 4
Title Of P	Paper: Industrial Analysis - II	
Unit	Description in Detail	Weightage (%)
	Details of practicals to be worked out by department	100

Paper Code: PS02CICH28		Total Credit: 4
Title Of P	aper: Chem.Engg. Practicals - II	
Unit	Description in Detail	Weightage (%)
	Practicals based on Heat transfer Operations and Chemical Reaction Engineering. Details of practicals to be worked out by department	100

Paper Code: PS02CICH29		Total Credit: 4
Title	Of Paper:Unit Processes	
Unit	Description in detail	Weightage (%)
1	Introduction, definition, agent, technologies and applications of Nitration.	25
2	Introduction, definition, agent, technologies and applications of Esterification, Hydrolysis, hydration.	25
3	Introduction, definition, agent, technologies and applications of Alkylation.	25
4	Introduction, definition, agent, technologies and applications of Oxidation, Synthesis Based on Carbon Monoxide and Hydrogen.	25

- 1. Unit processes in organic synthesis, P. H. Groggins, Tata Mcgraw Hill pub. 5th edition
- 2. Chemistry of petrochemical processes, Sami Mater, Lewis Hatch, Gulf Professional pub. 2nd edition
- 3. Industrial Organic Chemistry, K.Weissermal, H.J.Arpe, Wiley VCH. 4th edition
- 4. Chemistry and technology of basic organic and petrochemical synthesis, N.N. Lebedev, Mir pub.

Paper Code: PS02CICH30		Total Credit: 4
Title Of Paper: Heat Transfer Operations and Stoichiometry		
Unit	Description in detail	Weightage (%)
1	Introduction to Fourier's law, Newton's law and Stefan	25
	Boltzman law. Three dimensional heat conduction	
	equation in rectangular and cylindrical co-ordinates,	
	Effect of variables such as thermal conductivity, Heat	
	transfer from extended surfaces. Calculations for	
	Kirchhoff's law Absorption Transmission Reflection	
	and Emission of radiation. Heat transfer coefficients	
	Effect of scale formation, Fouling factors.	
2	Design of Heat transfer equipments- Shell& tube,	25
	double pipe and plate heat exchangers, multi-pass heat	
	exchangers, LMTD correction factors, Effectiveness	
	and number of transfer units for heat exchangers,	
	principle and working of multi effect evaporators-	
	forward feed, mixed feed and backward feed	
-	evaporators.	
3	Mass balance calculation for processes with and without	25
	chemical reactions, recycle & purge operations.	27
4	Energy balance calculation for processes with and	25
	without chemical reactions.	

- 1. Unit Operations of Chemical Engineering, W. McCabe, J. Smith, McGraw Hill Co 7th edition
- 2. Chemical Engineering, Vol 1 to VI, Coulson & Richardson, Pergamon Press. 4th edition
- 3. Engineering Heat Transfer, C.P.Gupta, R.Prakash, Nomchand& Bros., Roorkee. 7th edition.
- 4. Process Heat Transfer, D.Q.Kern, Mc.Graw Hill Co.
- 5. Fundamentals of Engg. Heat & Mass Transfer, R. C. Sachieve, Wiley Ltd.

Paper Code: PS02CICH31		Total Credit: 4
Title	Of Paper:Petrochemical Technology	
Unit	Description in detail	Weightage (%)
1	Primary raw materials for petrochemicals: Crude oil,	25
	Natural Gas, Coal, Oil shells, Tar sand & Gas hydrates.	
	Crude oil Exploration Techniques and Crude oil	
	analysis	

2	Processing Operations in Petroleum Refinery: Physical	25
	separation processes (Unit Operations), Chemical	
	Conversion Processes (Unit Processes), Production of	
	Hydrocarbon Intermediates	
3	Petrochemicals based on synthesis gas, Alkanes	25
	(Methane, Ethane, & Propane), Alkenes (Ethylene &	
	Propylene)	
4	Petrochemicals based on C4 Olefins & Diolefins, BTX.	25
	Lubricating Oil and Grease	
	Test Methods for petroleum products	

References:

- 1. Chemistry of Petrochemical Process, Sami Matar, Lewis F. Hatch, Gulf Professional Publishing. Boston.
- 2. Fundamental of Petroleum Chemical Technology, P. Belov, Mir Publications, Moscow.
- 3. Advanced Petroleum Refining, G. N. Sarkar, Khanna Publishers, Delhi
- 4. Petrochemicals, Peter Wisheman, John Wiley & Sons, New York
- 5. Fundamentals of Petroleum and petrochemical Engineering, UttamRaiChaudhari,CRC Press,Taylor & Francis group
- 6. Organic chemistry, warren, oxford university press

Paper Code: PS02EICH23		Total Credit: 4
Title Of Paper: Technology of Paint Manufacturing, Printing		
Inks &	& Heavy Duty Protective Coatings	
Unit	Description in detail	Weightage (%)
1	Principles of paint formulation, concept of pigment	25
	volume concentration, theory of pigment wetting &	
	dispersion, dispersion technology	
2	Coating manufacturing equipments-ball mill, sand mill,	25
	basket mill, attritor, High speed disperser	
3	Different types of inks, manufacturing of inks, different	25
	printing processes	
4	Corrosion & Technology of heavy duty protective	25
	coatings, technology of marine coatings	

- 1. Surface coating technology, Vol 1 & 2,OCCA, Chapman & Hall, London & New York
- 2. Paints & surface coatings, theory & practice, 2nd edition,R.Lambourne& T.A.Stevens,William Andrew Publishers
- 3. Technology of printing inks, E.A. Apps
- 4. Protective Print coatings for metals, Fraun Hofer &Boxaln,Particullis Press,England Basics of Paint Technology, 1stedition, C.Malshe

Paper Code: PS02EICH24		Total Credit: 4
Title Of Paper: Air Pollution Control Technology		
Unit	Description in detail	Weightage (%)
1	Definition, sources of air pollution- Natural and anthropogenic. Vehicular pollution and its control. Aeroallergens- sources, biology and health effects. Effects of pollution on humans, animals, plants and materials and services, ambient air quality standards and exhaust emission standards from vehicles. Principal atmosphere pollutants – particulate matter, CO2, CO,	25
2	HCs, NOx, acid rain asbestos and metals Environmental factors and air pollution – Heat, insulation, wind, precipitation, mixing height and topography, plume – behavior, Gaussian plum model and box model, sampling and measurement of air pollution – ambient air and stack. Indoor air pollution	25
3	Prevention and control pollution – Technology for particulate and gaseous pollution abatement. Air pollution episodes – Bhopal, Chernobyl, Los Angeles and London smog, Indonesian forest fire. Recent case studies on air pollution. Clean development mechanisms: carbon sequestration, carbon foot print, carbon trading and carbon markets	25
4	Statistics – sampling, data presentation techniques, frequency distribution, mean median, mode, standard deviation, standard error, t – test, probability, correlation and regression, analysis of variance	25

- 1. Air quality management, Stern A. C.
- 2. Air pollution, Perkin H. G., Mc grow hill
- 3. Air pollution, Sharma B. K. and Kaur H
- 4. Air pollution, Rao M. N. and Rao H. V. N.
- 5. Biostatistics, K. S. Negi, AITBS publishers
- 6. Biostatistics, P. N. Malhan, Himalayan publication house
- 7. Sewage and air pollution engineering, Garg S. K.