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PG Program in Petrochemical and Refining

Examination Assignments

November 2012

INSTRUCTIONS FOR EXAMINATION ASSIGNMENTS

- Electronic (email, fax) submission of the assignments is not acceptable.
- The assignments have to be submitted by the student on standard A4 size paper in legible hand written, typed or printed format only.
- Do not copy from the answers of other participants. If it is noticed the assignment of such participants will not be accepted.
- The assignment for each paper should be written separately. Do not write the assignment for all the papers in continuity. However, all the assignments are to be submitted together.
- No two or more participants should submit their assignments in one envelope.
- The participants should mention their name and enrollment number on each page of submitted assignment copy.
- The last date of submission of Assignments is 30th November, 2012.

  The assignments have to be submitted to:
  The Program Coordinator
  ICIS
  C-56A/28, 1st Floor, Sector-62, Noida-201301
  U.P. INDIA
- Participants are advised to keep a photocopy of submitted assignments.
- The participants should mention their name and enrollment number at the top of the envelope.
- The participant should also mention **Examination Assignment** at the top of the envelope.

Introduction To Petroleum Industry

Max. Marks: 100

SECTION A

Very Short Answer Type Questions (30-40 Words)

Attempt any four Questions : 4 × 5 = 20 Marks

1. What are the 2 types of distillation columns? Define & compare both types.
2. Explain the significance of column rebuilders. Explain kiered process with the help of diagram.
3. Define and explain winy crude oils.
4. What are the basic raw materials supplied by petroleum refineries.
5. Define paralysis and its significance.
6. Write down the applications of hydro treating process.

SECTION B

Short Answer Type Questions (150-200 words)

Attempt any four Questions: 4 × 10 = 40 Marks

1. Explain calorific value of a substance.
2. Explain the steps of modern refinery process for gasoline components.
3. Explain the various advantages of hydro treating over solvent refining.
4. Explain murex process and extraction.
5. Explain the following
   (I) greases
   (ii) ceresin
6. What action should be taken if fire or a leak event takes place?
7. Explain PCRA and its activities.

SECTION C

Long Answer Type Questions (800-1000 words)

Attempt any two Questions: 2×20=40 Marks

1. Explain the chemical composition of petroleum.
2. Write down the process of electrical desalting for crude oils. Explain with the help of well labeled flow chart.
3. Explain LPG. Write down its characteristics, applications, advantages & storage.
4. Explain the refining process.

Petroleum & Petrochemical

Max. Marks: 100

SECTION A

Very Short Answer Type Questions (30-40 Words)

Attempt any four Questions : 4 × 5 = 20 Marks

1. Explain carbonylation.
2. Explain isomerization and catalytic reforming.
3. What do you understand by hydrogenation.
4. Define the term petrochemicals.
5. Explain hydrogen obtained from microbes.
6. Explain the term ethylene glycols.
7. What do you understand by crystallization and filtration.

SECTION B

Short Answer Type Questions (150-200 words)

Attempt any four Questions: 4 × 10 = 40 Marks

1. What do you mean by polymerisation.
2. Explain saturated hydrocarbons and unsaturated hydrocarbon.
3. Explain any two physical methods of separation of gas mixtures.
4. Explain chemical processes used in industrial organic synthesis.
5. Give some overview on industrial production of hydrogen along with disadvantages of it.
6. Explain isooctane and maleic anhydride.

SECTION C

Long Answer Type Questions (800-1000 words)

Attempt any two Questions: 2×20=40 Marks

1. Briefly explain LUBRICANTS
2. What is hydrogen cells. Explain electrolytic method and steam iron method.
3. Explain chemical processing of paraffin hydrocarbons and chemical processing of ethylene hydrocarbons.
4. Explain the terms:-
   a) Phenol
   b) Acetone
   c) Ethylene glycol

Chemical Information Sources

Max. Marks: 100

SECTION A

Very Short Answer Type Questions (30-40 Words)

Attempt any four Questions : 4 × 5 = 20 Marks

1. Give overview of chemical literature with its main types.
2. Write about primary literature the major forms of primary scientific publication.
3. Explain spectral complications.
4. Explain biomolecule sequence and structure databases.
5. Define and give overview of Beilstein and Gmelin.
6. Explain patents.
7. What is Molecular formula index.

SECTION B

Short Answer Type Questions (150-200 words)

Attempt any four Questions: 4 × 10 = 40 Marks

1. What do you mean by CAS. Explain the basic rules of CAS Nomenclature.
2. Write a short note on chemistry on www.
3. Differentiate between basic search skills and electronic search skills.
4. Describe the procedure of structure searching by using scifinder scholar.
5. Write short note on chemical connectivity and structure searches (2-D).
6. Write short note on chemical structure, property and shape based searches (3-D).

SECTION C

Long Answer Type Questions (800-1000 words)

Attempt any two Questions: 2 × 20 = 40 Marks

1. Explain structure searching and its uses.
2. Explain chemical safety and toxicology information.
3. (A) What are basic necessities of chemical safety and toxicology information? Describe.
   (B) Why National library of medicines TOXNET system and the canadian centre for occupational health and safety database help in chemical safety.
4. Write down notes on “current science on internet”. Give list of chemical applications of World Wide Web.

Modern Petroleum Refining Processes
Or
Petrochemical Production System

Max. Marks: 100

SECTION A

Very Short Answer Type Questions (30-40 Words)

Attempt any four Questions : 4 × 5 = 20 Marks

1. Explain Oil and Gas scene.
2. Explain thermo viscosity.
3. Differenciated between pump back reflux and pump around reflux towers.
4. What do you understand by inhibitor sweetening.
5. What do you mean by catalytic cracking.
6. Give some overview on upgradation of heavy crudes.
7. Explain thermal properties of petroleum fraction.

SECTION B

Short Answer Type Questions (150-200 words)

Attempt any four Questions: 4 × 10 = 40 Marks

1. Define the term gas and classification of gas.
2. Explain in brief blending of gasolines
3. Explain lead doctoring of gasoline and catalytic desulfurisation.
4. Explain fluid coking flexi coking and contact coker.
5. Explain the composition of petroleum.
6. Explain the following:-
   a) Latent heat of vaporisation
   b) Latent heat of fusion
   c) Thermal expansion
   d) Spontaneous ignition temperatures

SECTION C

Long Answer Type Questions (800-1000 words)

Attempt any two Questions: 2 × 20 = 40 Marks

1. Explain briefly lube oils and its composition.
2. Explain briefly visbreaking and cracking for production of gasoline
3. Briefly explain overhead corrosion in distillation unit and topping operation
4. Explain treatment of kerosene and liquid sulfurdioxide extraction of aromatics.

Petroleum Refining & Technology

Max. Marks: 100

SECTION A

Very Short Answer Type Questions (30-40 Words)

Attempt any four Questions : 4 × 5 = 20 Marks

1. What do you understand by product slate and product specifications
2. Explain yield stress model pipeline test
3. What do you mean by Ramsbottom method
4. Define the following:-
   a) Pulsation b) Dumping
   c) Coning d) Blowing
5. Explain sweetening processes
6. Define Air-blowing along with diagram
7. Define the following Air pollutants from refining operations
   a) Sulphur Compounds b) Hydrocarbons
   c) Carbon monoxide

SECTION B

Short Answer Type Questions (150-200 words)

Attempt any four Questions: 4 × 10 = 40 Marks

1. Explain the drilling for oil and gas
2. Briefly explain rheological classification of fluid
3. Define liquefied petroleum gases with composition of LPG and properties of LPG
4. Explain thermal cracking reactions along with process description
5. Explain catalytic isomerization along with UOP butamer isomerization process and UOP Penex process.
6. Explain vacuum distillation process

SECTION C

Long Answer Type Questions (800-1000 words)

Attempt any two Questions: 2 × 20 = 40 Marks

1. Briefly explain hydrocarbons and non-hydrocarbons along with classification of crude oils
2. Explain briefly atmospheric distillation of crude oil and vacuum distillation of reduced crude oil
3. Briefly explain the following terms:-
   a) Delayed coking b) Fluid coking
4. Explain the applications of Hydrocraking,Types,Reactions, Catalysts and its process.

Computational Chemistry

Max. Marks: 100

SECTION A

Very Short Answer Type Questions (30-40 Words)

Attempt any four Questions : 4 × 5 = 20 Marks

1. What do you understand by photoelectric effect
2. Define the term inactive orbitals
3. What is carcinogenicity
4. What do you mean by photo-induced toxicity
5. What do you understand by torsion energy
6. Differenciate between stretching energy and binding energy
7. Define the following term:
   a) Monte carlo methods b) Intermolecular potentials
   c) Car – parrinello methods d) Gibbs duhem method
   e) Molecular dynamics methods

SECTION B

Short Answer Type Questions (150-200 words)

Attempt any four Questions: 4 × 10 = 40 Marks

1. Explain molecular mechanics and its method
2. Explain Hartree – fock energy expression and its equations
3. Describe Dirac Notation and properties predicted by electronic structure theory
4. Drive the expression "The mathematics of DIIS and explain programming DIIS
5. Describe all four continuum solvation methods
6. Explain, understanding the relative free energy Hamiltonian along with the advantage and disadvantage of slow growth method

SECTION C

Long Answer Type Questions (800-1000 words)

Attempt any two Questions: 2 × 20 = 40 Marks

1. Briefly explain computational chemistry, roles, its application and components of computational chemistry. Describe performance targets for the mesoscale
2. Briefly describe the symmetry & sample Z – matrix
3. Explain briefly the software used in computational chemistry
4. Describe biopolymers and briefly explain beta glucan technologies .