Mahavir Education Trust's
SHAH & ANCHOR KUTCHHI ENGINEERING COLLEGE
Chembur, Mumbai - 400 088

Course Name- Engineering Chemistry-II **Date-06/04/2023**

Syllabus for Internal Assessment –I **Academic Year 2022-2023** **Semester-II**

Green Chemistry and Synthesis of drugs

Introduction – Definition, significance
Twelve Principles of Green chemistry, numerical on atom economy,
Conventional and green synthesis of Adipic acid, Indigo, Carbaryl, Ibuprofen, Benzimidazole, Benzyl alcohol, % atom economy and their numerical.
Green fuel- Biodiesel.

Concept of Electrochemistry

Introduction, concept of electrode potential, Nernst equation, types of electrochemical cells, concept of standard electrode with examples, electrochemical series, simple numerical.

Fuels and Combustion

Definition, classification, characteristics of a good fuel, units of heat (no conversions).
Calorific value- Definition, Gross or Higher calorific value & Net or lower calorific value, Dulong's formula & numerical for calculations of Gross and Net calorific values.
Solid fuels- Analysis of coal- Proximate and Ultimate Analysis- numerical problems and significance.

Practice Questions for Internal Assessment –I

Subject: Engineering Chemistry-II **Date: 06/04/2023**

Academic Year 2022-2023 **Semester-II**

Q No	Short Answer Questions
	Green Chemistry and Synthesis of Drugs
1	Explain "prevention of waste" Principle of Greeen Chemistry
2	Explain the drawbacks of preparation of Indigo by traditional methods
3	Explain with example the principle "Use of renewable feedstock"
4	Give an example of "proper designing of chemical products"?
5	Biodiesel is a greener fuel, explain
	Fuel and Combustion
6	Explain the difference of HCV and LCV
7	Give the significance of the presence of volatile matter in coal
8	What are the factors based on which a fuel is selected? (give any four)
9	What is the importance of determining fixed carbon in coal?
	Concept of Electrochemistry
10	What are the advantages of Standard hydrogen electrodes?
11	What are the advantages of calomel electrodes?
12	What are the disadvantages of Standard hydrogen electrodes?
13	What are the disadvantages of calomel electrodes?
14	Write the cell reaction and calculate standard emf of the following cell Cd(s) | Cd+2(aq) || +(aq) | Ag(s) E°Cu= 0.337 V, E°cell= -0.403 V
15	Give any three factors on which Electrode potential is dependent?
16	The standard emf of the following cell is 1.94V Cr(s) / Cr3+(1M)//Pt 2+(aq)(1M)/Pt(s). Calculate standard electrode potential of Pt electrode , if Standard potential for Cr electrode is -0.74V
17	What are applications of emf series

Q No	Long Answer Questions
Green Chemistry and Synthesis of Drugs	
1	What Substitution reaction will have more atom economy or addition reaction will have more atom economy explain with example
2	What is trans-esterification Reaction? Explain with the reaction?
3	Calculate the percentage atom economy for the following reactions with respect to allyl chloride and acetophenone; $CH_3\text{-}CH{=}CH_2 + Cl_2 \rightarrow Cl\text{-}CH_2\text{-}CH{=}CH_2 + 2HCl$ Allyl chloride $C_6H_6 + CH_3COCl \rightarrow C_6H_5COCH_3 + HCl$ Acetophenone
4	Explain conventional and green chemistry route of production of adipic acid or Indigo or Carbaryl. Highlight the green chemistry principles involved.
Fuel and Combustion	
5	Calculate higher and lower calorific value of coal having following analysis C=88%, H=3%, N=1.5%, O=5% ,S=0.5%, remaining ash content. Latent heat of condensation of water vapour is 587 cal/gm.
6	2.4 g of air-dried coal sample subjected for analysis was taken in the crucible, after heating it in an electric oven at 105-110 degree celsius for 1 hour was found to weigh 2.31g. The residue was ignited at 750 degree celsius to a constant weight of 0.2142g . determine moisture content and ash content
7	A coal sample was subjected to Ultimate analysis following results were obtained (a)0.25g of sample on combustion gave 0.801g of CO2, and 0.0216 g of H2O.Calculate percentage of C and H in given sample. (b) 3.2g of coal sample was burnt in Bomb calorimeter produced 0.203g of BaSO4.Calculate percentage of S.
8	In Ultimate analysis 1.4g of coal sample in estimation of nitrogen by Kjaldahl's method liberated ammonia was absorbed in 50ml 0.1N H2SO4. The resultant solution required 10 ml of 0.1N NaOH for complete neutralization. The blank titration reading is 50ml.
9	Compare between Octane number and Cetane number.
10	Explain determination of %moisture and %volatile matter in a coal sample.
Concept of Electrochemistry	
11	Compare between Electrolytic cell and Galvanic Cell
12	Calculate electrode potential of copper, if the concentration of CuSO4 is 0.2 M at 23°C. E°Cu+2|Cu is 0.34 V
13	Calculate the potential of the following electrochemical cell at 25°C Cu(s) | Cu+2(aq)(0.50M) || H+(aq) (0.01 M)| H_2(0.95 atm);Pt