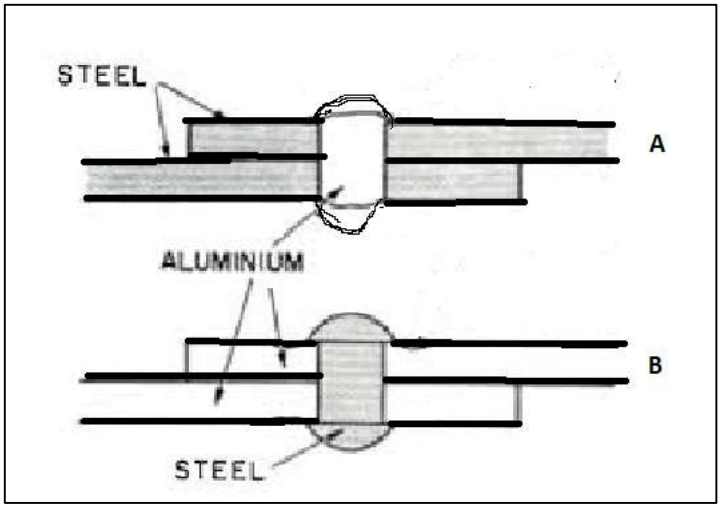
Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

End Semester Examination
May 2021

Max. Marks: 60 | **Duration: 135 Minutes**
Class: FY B.Tech | **Semester: I**
Course Code: AS102 | **Branch: IT/COMPS**
Name of the Course: Engineering Chemistry

Instructions:
1. **All Questions are Compulsory**
2. **Draw neat diagrams**
3. **Assume suitable data if necessary**
4. **Atomic weights : H=1, C=12, O=16, Na=23, Br= 80**
5. **Galvanic series is given at the end for your reference**

Question No.		Max. Marks	CO
Q2 (i)	The figure below shows two plates joined together by a rivet. Observe the figure carefully and answer the following questions :  a. State which part of the structure will corrode in A and B giving reason. b. Out of A and B, which is the safer option and why? c. Suggest a suitable method to minimise corrosion in the above design	2 2 1	AS 102.3
Q2 (ii)	Explain the role of sensing electrode, counter electrode and reference electrode in an electrochemical sensor with the help of a suitable example	4	AS 102.5

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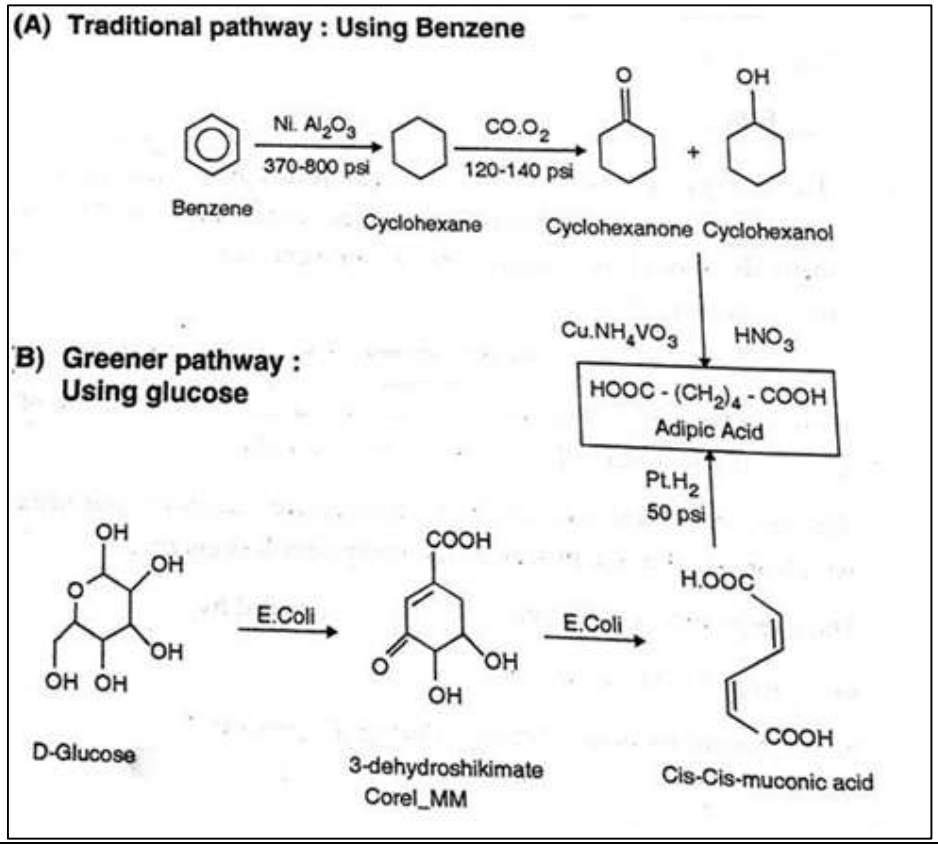
Q2 (iii)	Calculate the Atom Economy w.r.t. molecule "A" for the following reaction CH_3-C(CH_3)(Br)-CH_3 + CH_3CH_2ONa → CH_2=C(CH_3)$_2$ + CH_3CH_2OH + NaBr A	3	AS 102.5
Q2 (iv)	The synthesis of adipic acid by traditional and green pathway is given below. Outline the application of Green Chemistry in this example :  	3	AS 102.5
Q 3 (i)	A fuel has the following composition by volume : H_2 = 24%, CH_4 = 35% C_2H_6 = 6, C_2H_2=5, C_2H_4 = 2.5, CO=7.6, CO_2=6.5, O_2=0.6, N_2=rest. Calculate the minimum amount of air (25% oxygen by weight) required at 25^{o}C and 80cm Hg for complete combustion per m^3 of the fuel.	5	AS 102.4
Q3 (ii)	What are swing batteries? Explain their principle and working with the help of an example. **Or** What are reserve batteries ? Explain their principle and working with the help of an example	4	AS 102.4

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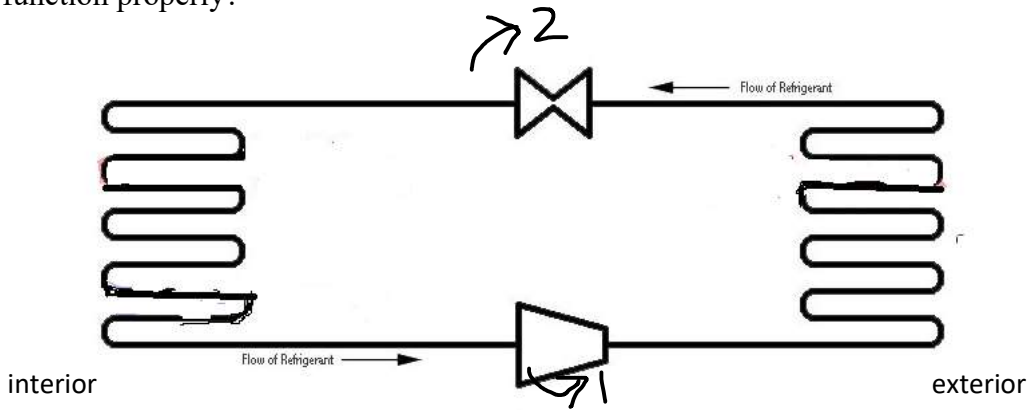
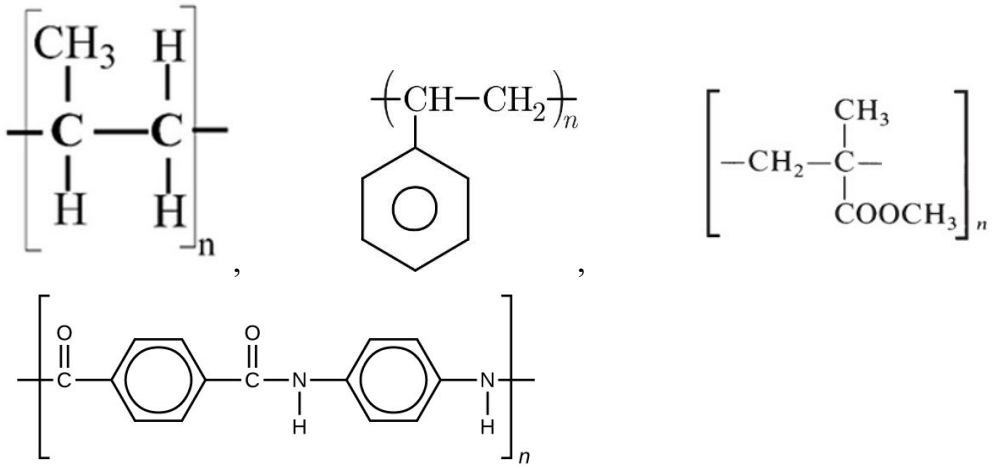
Q3 (iii)	Arrange the following hydrocarbons in increasing order of octane number with due justification : 2-methyl-2-pentene, n-pentane , cyclopentane , 3 methyl pentane, 2-methyl-1-pentene, 2,2,3-trimethylbutane	3	AS 102.4
Q3 (iv)	Hydrogen gas has a calorific value of 34500 Kcal/Kg. However, hydrogen fuel cells are preferred as an energy source rather than thermal power plants operating on Hydrogen. Why?	3	AS 102.4
Q4 (i)	The figure below shows the schematic diagram of a refrigerator. Name the part labelled "1" and explain its relevance to the functioning of the refrigerator with the help of thermodynamic principles. What will happen if this part does not function properly? 	5	AS 102.1
Q4 (ii)	Arrange the following polymers in increasing order of their Glass Transition Temperature giving reasons for your answer : 	4	AS 102.2

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Q4 (iii)	What are doped conducting polymers? Explain with examples **or** Explain extrinsic conducting polymer with examples	3	AS 102.2
Q4 (iv)	How is FeO different from ZnO with reference to semi conducting behavior? **or** Correlate the structure of carbon nanotubes with their properties (any three)	3	AS 102.2

Galvanic Series