

SDM College of Engineering & Technology, Dharwad

Department of Chemistry

Internal Assessment – I

Semester & Branch: I Sem., Common to all

Date: 26-09-2019

Course Code & Title: 18UCYC100 & Engineering Chemistry

Time: 2:00 to 3:00 PM

Course Instructors: Dr. AAK, Dr. NSR and Prof. AT

Max. Marks: 20

Sections: A, B, C & D.

Note: Answer any one full question from Q.No.1 and Q. No.2. Q. No. 3 is compulsory.

	Marks
Q1	
a) Explain the construction, working and determination of glass electrode.	05
b) Describe the working of Zn-Air battery with neat diagram and mention its application.	05
Q2	
a) A cell is formed by dipping zinc rod in 0.05 M Zn^{2+} solution and Cu rod is dipped in 0.15 M Cu^{2+} solution. The standard electrode potential of Zn and Cu are -0.76 V and +0.34 V respectively. Write the cell representation, cell reactions and calculate the emf of the cell.	05
b) Explain construction, working, advantages and disadvantages of supercapacitors.	05
Q3	
a) Illustrate the construction, working and applications of Ag/AgCl electrode.	05
b) Define fuel cell. With neat diagram explain the working of Solid-Oxide fuel cell.	05

Q. No.	1.a	1.b	2.a	2.b	3.a	3.b
CO	I	I	I	I	I	I
PO	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2

Scheme and Solution: Internal Assessment – I

Semester & Branch: I Sem., Common to all

Date: 19-09-2019

Course Code & Title: 18UCYC100 & Engineering Chemistry

Time: 2:00 to 3:00 PM

Course Instructors: Dr. AAK, Dr. NSR and Prof. AT

Max. Marks: 20

Sections: A, B, C & D.

Note: Answer any one full question from Q.No.1 and Q. No.2. Q. No. 3 is compulsory.

	Marks
Q1	
a) Concentration cell definition.	1
Concentration cell diagram and explanation	1+1
Apply the Nernst equation	1+1
b) Ni-MH battery with neat diagram and Explanation	1+1
Anode and cathode reactions	1+1
One or two application.	1
Q2	
a) Anode and cathode reactions	1+1
$E^{\circ} = 3.17 \text{ V}$	1
Formula and substitution	1
$E_{\text{cell}} = 3.149 \text{ V}$.	1
b) Supercapacitors diagram and explanation	1+1
Working in details.	1
One or two advantages and disadvantages	1+1
Q3	
a) Calomel electrode diagram and explanation.	1+1
calomel electrode reactions	1
Apply the Nernst equation	1
Application	1
b) Fuel cell definition.	1
With neat diagram and explanation of methanol-oxygen fuel cell.	1+1
Anode and cathode reactions	1+1

QUESTION PAPER FORMAT FOR END SEM EXAM

USN	2	S	D							
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SDM COLLEGE OF ENGINEERING & TECHNOLOGY, DHARWAD.

**Department of Chemistry
Semester-End- Examination, Dec-2015**

Sub Code : 15UCYC100

Semester: I

Sub Title : Engineering Chemistry

Duration : 3hrs

Max Marks: 100

Note: Part A is compulsory; Answer any four questions from Part B

PART-A

Q1	Fill in the blanks	10Marks
ielectrodes that are selectively sensitive to certain ions and develop a potential proportional to the concentration of these ions.	1
ii	Aqueous electrolyte is not used inbatteries.	1
iii	The active material for the cathode in Nickel-Metal hydride battery is.....	1
iv	Caustic embrittlement is an example of.....corrosion.	1
v	In metal coating,..... are added to release the gas bubbles from the surface.	1
vi	The determination of hardness of water by EDTA is an example of.....titration.	1
viiis used as a catalyst for synthesis of petrol by Fischer-Tropsch process.	1
viii	Semiconductor grade silicone of 99.9999% purity can be obtained by.....	1
ix	In emulsion polymerization, around 50-100 surfactant molecules aggregate to form	1
x	The characteristic linkage of polycarbonate is.....	1
		10Marks
Q2		
a	What is gross calorific value? Calculate the gross and net calorific values of a fuel when 0.88 g of a coal sample burnt in bomb calorimeter. The mass of the water taken in calorimeter is 4.5 Kg; Rise in temperature is 2.5 °C. Water equivalent calorimeter is 550g. Specific heat of water is 4.187 J/g/K and latent heat of steam is 2458 J/g. Percentage of hydrogen in coal sample is 2.5.	5 Marks
b	Define 'alkalinity' and 'hardness' of water. In a COD test, 28.2 ml and 15.3 ml of 0.02 N FAS solution were required for blank and back titration respectively. The volume of test sample used is 30 ml. Calculate the COD of the sample solution.	5 Marks
	<u>PART-B</u>	
Q3		20Marks
a	Describe the construction of a glass electrode and explain the principle along with determination of pH of a given solution using glass electrode.	7 Marks
b	Define reserve battery. Explain the construction, working and applications of lead-acid battery.	7 Marks
c	What is fuel cell? Explain the construction, working and applications of H ₂ -O ₂ fuel cell.	6 Marks
Q4		20Marks
a	Define corrosion. Explain electrochemical theory of corrosion taking iron as an example.	6 Marks
b	Explain the Galvanization and Anodizing of Al processes to control the corrosion?	8 Marks
c	Explain the electroless plating of copper on PCB with neat diagram and its applications.	6 Marks
Q5		20Marks
a	Explain electroplating of decorative and hard chromium.	8 Marks

b	What is reforming of petroleum? Give any five reactions involved in reforming.	6 Marks
c	Explain the construction and working of photovoltaic cell.	6 Marks
Q6		20Marks
a	Give the synthesis and applications of epoxy resin and silicone rubber.	8 Marks
b	What are conducting polymers? Explain the synthesis of carbon fiber and mention its applications.	6 Marks
c	Define 'COD'. Discuss the determination of dissolved oxygen by Winkler's method.	6 Marks
Q7		20Marks
a	Describe the following methods for desalination: i) Electrodialysis ii) Flash evaporation.	6 Marks
b	Explain the followings: i) Write the electrode reactions of Ni-MH battery ii) Effect of ratio of anodic and cathodic areas on rate of corrosion iii) Addition of structure modifier on quality of electrodeposit.	6 Marks
c	Explain the theory behind the conductometric titration. Draw and explain the conductometric titration curve for the titrations of strong acid versus strong base.	8 Marks

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Q. No	2. a	2.b	3.a	3.b	3.c	4.a	4.b	4.c	5.a	5.b	5.c	6.a	6.b	6.c	7.a	7.b	7.c
CO	4,	2	1	2	2	4	4	2	5	4	4	3	3	4	4	2,3	5
PO	bce	bce	a	ab	ab	bc	Bc	bce	bce	ab	a	bc	Bc	bce	bce	ab	hk