Hall Ticket Number:

Code No. : 12005 O2

## VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD B.E. I Year II-Semester Backlog Examinations, May-2017

Engineering Chemistry-II (Civil, Mech. & EEE)

Time: 3 hours

Max. Marks: 50

Note: Answer ALL questions in Part-A and any FIVE from Part-B

## Part-A (15 Marks)

1.	Write the cell reaction of glass electrode.	[1]
2.	Write the net reaction during use (discharging) of the lead – acid storage cell.	[1]
3.	How galvanization is different from cathodic protection?	[1]
4.	What are the number of phases present in saturated solution of NaCl?	[1]
5.	Comment on the criteria for selection of lubricants for specific purposes.	[1]
6.	Specific conductance of 0.1 N CuSO <sub>4</sub> solution at 298 K is 40.8 S/Cm. Calculate its equivalent and molar conductance at same temperature.	[2]
7.	Differentiate primary and secondary batteries.	[2]
8.	Iron corrodes faster under drops of salt solution. Justify.	[2]
9.	Calculate the number of degrees of freedom in the decomposition of solid calcium carbonate in a closed vessel.	[2]
10.	The selection of a refractory for a furnace lining has to be chosen based in its chemical nature. Explain with examples.	[2]
	Part-B $(5 \times 7 = 35 Marks)$	
11.	a) An iron wire is immersed in a solution containing ZnSO <sub>4</sub> and NiSO <sub>4</sub> . The concentration of each salt is 1M. Predict, giving reasons, which of the following reaction is likely to proceed. (i) Iron reduces $Zn^{2+}$ ions. (ii) Iron reduces $Ni^{2+}$ ions. Given $E^{\circ}(Zn^{2+}/Zn) = -0.76V$ ; $E^{\circ}(Fe^{2+}/Fe) = -0.44V$ ; $E^{\circ}(Ni^{2+}/Ni) = -0.25V$ .	[3]
	b) Derive Nernst equation. How does it explain the dependence of electrode potential on concentration of the electrolyte solution?	[4]
12.	a) Explain the construction and working of phosphoric acid fuel cell.	[3]
	b) Illustrate Zn-C battery with its merits and demerits.	[4]
13.	a) Discuss mechanism of wet corrosion with a relevant example.	[4]
	b) Explain galvanic corrosion.	[3]
14.	a) Explain the Lead Silver system. How can this system be applied to the process of desilverisation of Argentiferous lead?	[4]
	b) Write short notes on (i) Triple point (ii) Condensed Phase rule	[3]
15.	a) How are refractories classified? Explain a process for measurement of refractoriness.	[4]
	b) Discuss the applications of membranes in modern technology.	[3]

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16. a) Write the Nernst equation and calculate the EMF of the following cell at 298 K. $Mg(s)/Mg^{2+}$ (0.001M) // Cu <sup>2+</sup> (0.0001M)/ Cu(s). Given that E <sup>0</sup> Cu <sup>2+</sup> / Cu = 0.34 V; E <sup>0</sup> Mg <sup>2+</sup> /Mg = -2.37 V.	[3]
b) Explain the construction of Lead acid battery and write the reactions involved when it behaves as galvanic cell.	[4]
17. Write short notes on any two of the following:	[7]
a) Electro plating and Electro less plating	[1]
b) Phase rule and its torms	
c) Mechanism of lubrication.	
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15 at 150% are refractories destified? Explain a process for metallocities of restar contents.	
b) Discuss the applications of membranes in modern tophysics.	