Registration no:

Total Number of Pages: 02   bput question papers visit http://www.bputonline.com   **Msc.I**
FCYC601

6th Semester Regular Examination 2016-17
PHYSICAL CHEMISTRY-IV
BRANCH(S): Applied Chemistry
Time: 3 Hour
Max Marks: 70
Q Code:Z138
Question No.1 which is compulsory and any five from the rest
The figures in the right hand margin indicate marks.

Q1   Answer the following questions: (2 x 10)
a)   What is Wine effect?
b)   Write two limitations of standard hydrogen electrode.
c)   Why fireflies glows at night?
d)   Will Fe(s) be oxidized to Fe^{2+}, when it reacts with 0.1 M HCl?
     (E^o Fe^{+2}/Fe = -0.44V)
e)   Define specific and equivalent conductance. What is the effect of dilution on them?
f)   The equivalent conductance of 0.01N acetic acid was found to be 16.30 ohm^{-1} cm^2 eq^{-1} at 25^{0}C. The ionic conductance of H^+ and CH_3COO^- ions at infinite dilution are 349.8 and 40.9 ohm^{-1} cm^2 eq^{-1}. What percentage of acetic acid is dissociated at the above concentration?

g)   What is quenching? Explain internal and external quenching.
h)   What is single electrode potential? What are the factors that affects the single electrode potential of a metal in contact with its ions?
i)   What is quantum yield? At what condition the quantum yield will be unity?

j)   Electrode potential is an (extensive/ intensive) property. Justify your answer.

Q2   Give a brief account of Debye-Huckel-Onsager theory of strong electrolytes and explain asymmetry and electrophoretic effect with suitable diagram.   (10)

Q3 a) State and explain Lambert-Beer's law? Write the limitations of this law.   (5)
b)   A monochromatic radiation is incident on a solution of 0.05 molar concentration of an absorbing substance. The intensity of the radiation is reduced to one fourth of the initial value often opposing through 10 cm length of the solution. Calculate the molar extinction coefficient of the substance.   (3)
c)   Plot the graphs showing the conductance titration of the following two reactions.   (2)
     i. $MgSO_4 + 2NaOH \rightarrow Mg(OH)_2 + Na_2SO_4$
     ii. $MgSO_4 + Ba(OH)_2 \rightarrow Mg(OH)_2 + BaSO_4$

Q4 a) What is a chemical cell? Discuss Reversible and Irreversible cells with suitable examples. (1+4)

b) Write the difference between electrochemical cell and electrolytic cell (3)

c) Define EMF of a cell? Calculate the emf of the following cell if it works under standard condition: (2)
$Cu_{(s)}/Cu^{+2}_{(aq)} \parallel Ag^{+}_{(aq)} /Ag_{(s)}$
[Given $E^{o} Cu^{2+}/Cu$= 0.34 volt, $E^{o} Ag^{+}/Ag$ = 0.80 volt)]

bput question papers visit http://www.bputonline.com

Q5 a) What is a photochemical equilibrium? Explain with suitable examples. (3)

b) Give a brief account of kinetics of Hydrogen-Bromine reaction. (7)

Q6 a) What do you mean by transport number? Show that the transport numbers of anion and cation is unity. (3)

b) Discuss briefly Hittorf's' method to determine the transport number of silver and nitrate ions. (7)

Q7 a) State and explain Faraday's laws of electrolysis. (6)

b) How many hours does it take to reduce 3 mol of Fe^{3+} to Fe^{2+} with 2 ampere current? (2)

c) Calculate the charge required to deposit 6.75 g of Al during the electrolysis of molten $AlCl_3$. (2)
(Atomic mass of Al= 27 g mol^{-1}; F= 96500 C mol^{-1})

Q8   Write short notes on any two of the following: (2x5)
a) Photosensitization
b) Electroplating
c) Jablonski Diagram
d) Nernst Equation

bput question papers visit http://www.bputonline.com