

CARMEL COLLEGE OF ARTS, SCIENCE & COMMERCE FOR WOMEN

SEMESTER END EXAMINATION SEMESTER VI OF B.SC

PHYSICAL CHEMISTRY (PAPER CHC108 )

Time: 2 hours

Date: 09 /07/2021

Marks: 30

Instructions:

1. Answer the following Question Paper for the online exam and upload the **PDF** of the answer book strictly on Google Classroom.
2. Figures to the right indicate full marks.
3. Use of calculators is allowed.
4. Please avoid malpractices while answering .Its morally wrong.

QI. ANSWER **ANY FIVE** OF THE FOLLOWING. (5x2=10 mks)

- 1.. Explain in brief the reactions of alkaline storage battery.
2. Why isn't there an explosion like an atomic bomb in nuclear reactors as nuclear fission processes take taking place in both ?
3. Why do shielding of protons cause 'chemical shift' of protons to shift upfield in NMR?
4. Draw the diagram of the Breeder Reactor and label all the parts.
5. Draw and discuss the radial distribution curves for 3s and 3p orbitals.
6. State any two postulates of VBT.
7. State the principle of ESR spectroscopy, give examples of ESR active molecules.
8. With the help of diagram distinguish between Fluorescence and Phosphorescence.

Q2. ANSWER **ANY FOUR** OF THE FOLLOWING: (4x5=20mks)

1. Draw and explain in brief the low resolution and high resolution NMR spectra of a)  $\text{CH}_3\text{COOCH}_2\text{CH}_3$  b)  $\text{CH}_3\text{CHClCH}_3$  (5mk)
  
2. a) Calculate the activity coefficient of  $\text{CdCl}_2$  in 0.01M  $\text{CdCl}_2$  solution in the following electrode at 25 C.  $\text{Cd} \mid \text{Cd}^{+2}$  ( $m=0.02$ ) (3mk)  
b) What should be the molality of  $\text{Na}_2\text{SO}_4$  in the solution of ionic strength 0.5 (2mk)
  
3. a) A buffer solution containing 0.05 mole sodium acetate and 0.01 mole acetic acid/ litre. Calculate the pH of the buffer solution. (2mk)  
b) Calculate the hydrogen ion concentration in moles per litre of a solution whose pH is 5.4 (3mk)
  
4. Derive the Schrodinger equation for the H-atom and separate the variables. (5mk)
  
5. a) Derive the expression for  $\Psi^+$  and  $\Psi^-$  in case of LCAO for  $\text{H}_2^+$  ion. (3mk)  
b) State the difference between dissociation and predissociation. (2mk)
  
6. a) Why is there a need for approximate methods to solve the Schrodinger equation? (3mk)  
b) Calculate the energy difference for the first electronic transition of an octa- tetra-ene molecule. (2mk)