

130522

VCD \_\_\_\_\_ Class: FYBT Semester: II Paper: Physical Chemistry II Duration: 2 ½ Marks: 75

1. Attempt **all** questions.
2. Draw **neat labelled diagrams** wherever necessary.
3. Use of **log tables** and **non-programmable calculator** is **allowed**.
4. For **Q2, Q3 and Q4** attempt (A and B) **OR** (C and D).

**Q 1 Attempt Multiple choice questions.**

40

1. A continuous sequence of consecutive states intermediate through states which the and the system passes is known as \_\_\_\_\_.  
(Process, Law, Property, Postulate)
2. The \_\_\_\_\_ of a system is defined as the sum of the internal energy of the system and the energy that arises due to its pressure and volume.  
(Enthalpy, Entropy, Path, Process)
3. \_\_\_\_\_ process is carried out at constant pressure.  
(Isochoric, Isobaric, Isothermal, Adiabatic)
4. The area around the system is known as \_\_\_\_\_.  
(System, Surrounding, Universe, Process)
5. Volume is an \_\_\_\_\_ property.  
(extensive, intensive, open, invalid)
6. The law of energy conservation is \_\_\_\_\_ law of Thermodynamics.  
(First, Second, Third, Zeroth)
7. Which of the following is extensive property?  
(Heat capacity, Gibb's energy, Volume, Density)
8. The \_\_\_\_\_ refers to the relationship between the rate of a chemical reaction and the concentration of the species taking part in it.  
(Order of reaction, average rate constant, instantaneous rate constant, rate law)
9. Which of the following statements about the catalyst is true?
  - a. A catalyst accelerates the rate of reaction by bringing down the activation energy,
  - b. A catalyst does not participate in the reaction mechanism,
  - c. A catalyst makes the reaction feasible by making  $\Delta G$  more negative,
  - d. A catalyst makes equilibrium constant more favourable for forward reaction.
10. In the rate equation, when the concentration of reactants is unity then the rate is equal to \_\_\_\_ (specific rate constant, average rate constant, instantaneous rate constant, rate law)
11. For a chemical reaction  $A \rightarrow B$ , it is found that the rate of reaction doubles when the concentration of A is increased four times. The order of reaction is  
(Two, One, Half, Zero)
12. What is the integrated rate equation for a first order reaction?  
( $[A]_t = [A]_0 e^{-kt}$ ,  $[A]_t = [A]_0 / e^{-kt}$ ,  $[A]_t = [A]_0 e^{-t}$ ,  $[A]_t = [A]_0 e^{-k}$ )
13. Which of the following factor does not affect the rate of reaction?  
(Concentration of the reactant, Temperature, Pressure, Effect of catalyst)
14. What will be the order of reaction if the rate law is given by \_\_\_\_\_  
Rate =  $k [SO_2]^1 [SO_3]^{-0.5}$  (1, 0.5, 2, -0.5)
15. What is the sum oxidation number of elements in  $H_2SO_4$ ? (+1, +2, -1, 0)
16. Select the compound in which iodine shows oxidation number -1.  
[  $I_2$ ,  $AgIO_4$ ,  $KI$ ,  $Zn(IO_3)_2$  ]
17. Oxidation number of H in  $H_2$ . (-1, +1, 0, +2)

18. Indicate the oxidizing agent in the following reaction:  
 $2\text{Cu}^{2+} + 4\text{I}^- \rightleftharpoons 2\text{CuI} + \text{I}_2$  ( $\text{I}^-$ ,  $\text{CuI}$ ,  $\text{I}_2$ ,  $\text{Cu}^{2+}$ )
19. Oxidation number of H in  $\text{NaH}$ ,  $\text{CaH}_2$  and  $\text{LiH}$ , respectively is  
 (-1, -1, -1; -1, +1, +1; +1, +1, -1; +1, +1, +1)
20. Which of the following rules is NOT correct with respect to oxidation number?  
 a. The oxidation number of hydrogen is always +1.  
 b. The algebraic sum of all oxidation numbers in a compound is zero.  
 c. An element in the free or the uncombined state bears oxidation number zero.  
 d. In all its compounds, the oxidation number of fluorine is -1.

**Q. 2 A** In a particular reaction 2 kJ of heat is released by the system and 6 kJ of work is done on the system. Determine  $\Delta H$  and  $\Delta U$  **07**

**Q. 2 B** Explain Entropy. **04**

**OR**

**Q. 2 C** Give detailed account on Thermodynamic Processes **07**

**Q. 2 D** Give 4 examples of extensive properties. **04**

**Q. 3 A** Find out the average rate of reaction between 200s to 800s using the given following data.  $2\text{N}_2\text{O}_5 \rightarrow 4\text{NO}_2 + \text{O}_2$  **07**

Time /s	$\text{N}_2\text{O}_5$ /M	$\text{NO}_2$ /M	$\text{O}_2$ /M
0	0.258	0	0
200	0.212	0.152	0.170
800	0.130	0.190	0.220

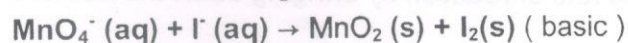
**Q. 3 B** What is the overall order of reaction? Give one example. **04**

**OR**

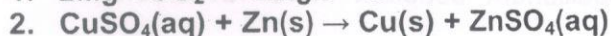
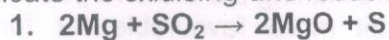
**Q. 3 C** Explain half life of first order of reaction with an example. **07**

**Q. 3 D** Explain molecularity of an elementary reaction along with one example. **04**

**Q. 4 A** Balance the following redox reaction by Ion electron method: **07**

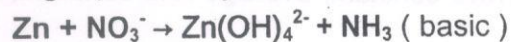


**Q. 4 B** Indicate the oxidising and reducing agent in the following reactions: **04**

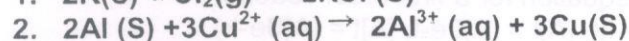
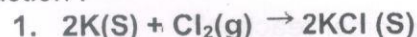


**OR**

**Q. 4 C** Balance the following equations by oxidation number method: **07**



**Q. 4 D** Write the following redox reactions in the oxidation and reduction half reaction : **04**



**Q. 5** Do as directed (Any TWO) **02**

- a. State True or False: A reversible process is a process in which the change is carried out such that the system and the surrounding are always in not equilibrium.
- b. Average rate of reaction
- c. Define oxidation number.
- d. What is a substitution reaction?