VCD: IT0423 CLASS: FYBT SUB: PAPER III - BASIC CHEMISTRY-II

2 ½ Hours

Total 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 sub-questions (A and B) **OR** (C and D).

Q 1 Do as directed (Any fifteen) **15**

1. What is 'internal energy'?
2. True or False. ΔG is positive for a spontaneous reaction.
3. Explain the term : Path function.
4. Give an example of an 'intensive property'.
5. Explain the term : Isochoric process.
6. The unit for specific heat capacity is _____.
7. For a zero order reaction, the rate of reaction is independent of _____
8. What is a pseudo first-order reaction?
9. For a second-order reaction, what is the unit of the rate of the reaction?
10. What is rate law?
11. What is the molecularity of elementary reactions?
12. What is the unit of the rate of the reaction?
13. When the rate of the reaction is equal to the rate constant, the order of the reaction is _____ order of reaction.
14. What is meant by Substitution reaction?
15. What is the oxidation number of **S** in $S_2O_3^{-2}$?
16. What is meant by oxidation reaction?
17. The oxidation number of **Cr** in $K_2Cr_2O_7$ is _____
18. Give one example of Addition reaction.
19. True or False. When an element becomes reduced its oxidation number goes down
20. Balance the following unbalanced reaction : $CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$

Q. 2 A Derive the mathematical expression for mechanical work. **08**

Q. 2 B Explain First law of thermodynamics for various processes. **07**

OR

Q. 2 C a) Explain the change in enthalpy of a system is equal to heat transferred from it at the constant pressure. **04**

b) What is System? Explain the Properties of the system. **04**

Q. 2 D Calculate the constant external pressure required to compress 2 moles of an ideal gas from volume of 25 dm^3 to 13 dm^3 when the work obtained is 4862.4 J. **07**

Q. 3 A What is the overall order of reactions? Explain about First and second order of reactions using suitable examples. **08**

Q. 3 B Write a difference between order and molecularity. **07**

OR

Q. 3 C Write a note on rate law using suitable examples. **08**

Q. 3 D Find out the average rate of reaction for the given reactions between 400s to 600s. $2\ N_2O_5 \longrightarrow 4NO_2 + O_2$ **07**

Time /s	$[N_2O_5]$/M	$[NO_2]$/M	$[O_2]$/M
0	0.0300	0	0
200	0.0213	0.0174	0.00435
400	0.0152	0.0296	0.00740
600	0.0108	0.0384	0.00960

Q. 4 A a) Explain substitution reactions with suitable examples. **04**

b) Identify the substance oxidised, reduced, oxidising agent and reducing agent of following reactions: **04**
$Pb(s) + PbO_2(s) + 2H_2SO_4(aq) \rightarrow 2PbSO_4(s) + 2H_2O(l)$

Q. 4 B Balance following reaction by oxidation number method : **07**
$H_2SO_4(aq) + C(s) \rightarrow CO_2(g) + SO_2(g) + H_2O(l)$ (Acidic)

OR

Q. 4 C Balance following reaction by Ion Electron method : **08**
$MnO_4^-(aq) + I^-(aq) \rightarrow MnO_2(s) + I_2(s)$ (Basic)

Q. 4 D What is an Oxidation and Reduction reaction? Give two examples of each. **07**

Q. 5 Write Short notes on **any three** of the following 15

a. Exothermic and endothermic reactions

b. Types of systems

c. Graphical representation for half life reactions

d. Molecularity of elementary reactions

e. Elimination reaction with two suitable examples.
