Name: **Enrolment No:**	

UPES

End Semester Examination, May 2023

Course: Geochemistry **Semester : II**

Program: B.Tech. APE-UP **Time : 03 hrs.**

Course Code: PEGS1009 **Max. Marks: 100**

Instructions: Read all the instructions below carefully and follow them strictly.

1) **Mention Roll No. at the top of the question paper.**
2) **Internal choice is given in Q. no. 10.**
3) **Attempt all parts of a question at one place only.**

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Differentiate between aromatic and non-aromatic compounds.	**4**	**CO1**
Q 2	Discuss the following terms: Phase, Component, Degree of Freedom.	**4**	**CO2**
Q 3	Define solid solution and explain how it is different from a liquid solution.	**4**	**CO2**
Q 4	Define thermodynamic system and explain how it is different from surrounding.	**4**	**CO1**
Q 5	Define polymorphs with a suitable example.	**4**	**CO1**

SECTION B
(4Qx10M= 40 Marks)

Q 6	(i) How can you determine the % of C and % of H in our fuel sample. (ii) A sample of coal contains C = 90%, H = 9% and ash = 1%. The following data were obtained when the above coal was tested in a bomb calorimeter: Weight of coal burnt = 0.83 g Weight of water taken = 540 g Water equivalent of bomb and calorimeter= 2,300 g Rise in temperature = 2.62°C Fuse wire correction = 10.0 cal Acid correction = 50.0 cal. Calculate the gross calorific value of coal.	**10**	**CO1**
Q 7	(i) Discuss the terms: Standard solution, end point, molarity, and normality of a solution. (ii) How will you prepare 100 ml 0.04 N NaOH solution?	**5** **5**	**CO2**

Q 8	Discuss three broad types of dissolved constituents found in sea water. Explain the reasons for their variation with depth and latitude.	**10**	**CO3**
Q 9	Discuss in detail various theories that explain the origin of oceans on earth.	**10**	**CO3**
SECTION-C (2Qx20M=40 Marks)			
Q 10	(i) With the help of a suitable diagram, explain the process of liquation and electrolytic refining of metals. **OR** Discuss any two methods in detail by which an ore can be concentrated before reduction to pure metal. (ii) Draw a neat phase diagram of water system. Discuss the behavior of various equilibrium involved in the system with varying pressure and temperature. **OR** Calculate the phase, components and degree of freedom in the following systems a) $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$ b) An aqueous solution of sodium chloride c) Saturated solution of sucrose at 15˚ C	**10** **10**	**CO2**
Q 11	Define biogeochemical cycle and explain why earth is a super system. Discuss in detail four sub systems that constitute earth super system.	**10+10**	**CO4**