



13	A. Explain the ion exchange process in the softening of water? [5M] B. Define carbonate and non-carbonate hardness of water? [5M]	CO4	Level 3
OR			
14	A. Explain the reasons for scale and sludge formation and write their disadvantages in boilers? [5M] B. Write about phosphate conditioning and calgon conditioning? [5M]	CO4	Level 2
15	A. Explain the construction and working of the calomel electrode? [5M] B. What is electro chemical series? Write its significance and applications? [5M]	CO1	Level 3 Level 2
OR			
16	A. Explain the construction and working of lithium-ion batteries? [5M] B. Explain about H ₂ -O ₂ fuel cells? [5M]	CO1	Level 3
17	A. Explain about Electrophilic addition reactions. [5M] B. Write a note on optical isomerism? [5M]	CO1	Level 4 Level 3
OR			
18	A. Explain the SN ¹ and SN ² mechanism with suitable example? [5M] B. Explain the hydroboration of olefins? [5M]	CO1 CO2	Level 2 Level 3
19	A. Write a note on chemical shift? [5M] B. Explain the basic principle of NMR? [5M]	CO2 CO3	Level 4 Level 3
OR			
20	A. What is MRI? [5M] B. Write the application IR spectroscopy? [5M]	CO3 CO3	Level 4 Level 3