

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

15EE743

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019

Carbon Capture and Storage

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What are the main approaches to CO₂ capture? Explain. (08 Marks)
- b. Draw and explain Rankine steam cycle for a heat engine using water and steam as the working fluids. (08 Marks)

OR

- 2 a. List different storage option for CO₂. (04 Marks)
- b. Discuss geological carbon storage. (06 Marks)
- c. What is Syngas? How do you produce Syngas from methane? (06 Marks)

Module-2

- 3 a. Explain pre combustion capture of carbon in power generation. (06 Marks)
- b. With the help of a process diagram, explain amine based CO₂ capture (absorption) from flue gas. (10 Marks)

OR

- 4 a. Explain chemical looping for hydrogen production. (06 Marks)
- b. Draw the block diagram to represent cement production and explain carbon capture. (10 Marks)

Module-3

- 5 a. Explain modes of adsorption process. (08 Marks)
- b. Explain porous membrane transport process. (08 Marks)

OR

- 6 a. Explain physical and chemical fundamentals of membranes. (08 Marks)
- b. With a neat sketch, explain fluidized adsorption bed configuration. Also explain the process of adsorption. (08 Marks)

Module-4

- 7 a. Explain the air separation unit flow scheme. (06 Marks)
- b. List the characteristics need to be fulfilled by optimal feedstock for mineral carbonation. (04 Marks)
- c. Explain fluid flow in porous media. (06 Marks)

OR

- 8 a. List the factors which makes separation of CO₂ from light hydrocarbons by distillations complicated. (04 Marks)
- b. Explain the following with respect to direct carbonation: i) Gas-solid route ii) Aqueous route. (08 Marks)
- c. List the advantages and disadvantages of saline aquifier. (04 Marks)

Module-5

- 9 a. Discuss carbon storage in terrestrial ecosystems. (06 Marks)
- b. Explain afforestation and reforestation. (04 Marks)
- c. List the advantages of aqueous microalgae cultivation for biomass production. (06 Marks)

OR

- 10 a. List the limitations of open pond algal biomass production systems. (04 Marks)
- b. Explain modeling climate-ecosystem interactions. (08 Marks)
- c. Explain light conversion efficiency and saturation. (04 Marks)

* * * * *