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B.E. / B.TECH. DEGREE EXAMINATION, MAY 2023

Eighth Semester

CH16020 – FRONTIERS OF CHEMICAL ENGINEERING

*(Chemical Engineering)***(Regulation 2016)**

Time: Three hours

Maximum : 100 marks

Answer ALL questions

PART A - (10 X 2 = 20 marks)

1. Classify the principles process intensification.
2. State the significance of Dittus-Boelter equation.
3. Infer the internal approach in concept generation.
4. Draw the basic process flow chart for IPPD.
5. Comment on the future availability trend of fossil fuel in the world.
6. List out the energies that are dependent and non-dependent of solar energy.
7. Name the various method of heat treatment of steel.
8. Write some important bearing alloys and its compositions.
9. Classify Kingdom Protista and Kingdom Animalia.
10. Sketch ultra structure of Prokaryotic cell.

PART B - (5 X16 = 80 marks)

11. (a) (i) Explain in details Process Intensification toolbox. (8)
 - (ii) Enumerate the concept of Integrated Heat Exchangers in separation processes. (8)
- (OR)**
- (b) (i) Explain Taylor Couette Reactor in detail with suitable industrial process simulation. (8)
 - (ii) Discuss process intensification in treatment of waste water. (8)
12. (a) (i) Describe the methodology used in new product development. (8)
 - (ii) Explain the need for integration of customer, designer, material supplier and process planner. (8)

(OR)

(b) (i) Summarize the reasons why reducing the number of parts in a product might reduce production costs. Also explain some reasons why costs might increase. **(10)**

(ii) Compare technology-driven products and user- driven products. **(6)**

13. (a) (i) Examine the impact of environmental consequences of fossil fuel usage. **(8)**

(ii) Explain in details about different types of hydro Electric Energy systems with neat diagram. **(8)**

(OR)

(b) (i) Explain the impacts of biomass construction, production and operation. **(8)**

(ii) With a neat sketch, exemplify the bioenergy generation through fermentation. **(8)**

14. (a) Elucidate the polymerization and explain in detail addition polymerization and condensation polymerization. **(16)**

(OR)

(b) Discuss the properties and applications of the following four ceramics. **(16)**

(1) Silica (2) Zirconia (3) SiC (4) Cubic boron nitride.

15. (a) Tabulate the historical developments of biomaterials that are used as implants. **(16)**

(OR)

(b) Discuss the classical and non classical bioisosteric replacement strategies in analog based design of drugs with examples. **(16)**
