Reg. No. : | | | | | | | | | | | |

T 3093

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Third Semester

Biotechnology

BT 1201 — PRINCIPLES OF CHEMICAL ENGINEERING

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Convert 14 psi to atm, N/m^2, and Kgf/m^2.

2. Write down different system of unit with unit for length and weight in each system of unit.

3. What is recycling?

4. What is humidity?

5. What is sensible heat?

6. What is latent heat?

7. What is potential flow?

8. State two applications of Fluid mechanics in Chemical Engineering.

9. Name four pumps used in chemical process application.

10. What is minimum fluidization velocity?

PART B — (5 × 16 = 80 marks)

11. (a) Explain steps involved in Numerical differentiation and Integration. (16)

Or

(b) Explain the basic principles of mass and energy conservation and write the same for five cases of chemical operation. (16)

12. (a) The dry bulb and wet bulb temperature of the air is found to be 35 and 25 degree Centigrade respectively. Find out :

(i) Humidity,

(ii) Humid heat,

(iii) Percentage saturation,

(iv) Percentage of moisture in the air. (16)

Or

(b) Explain various unit operations available for mass transfer operation. (16)

13. (a) (i) Calculate the heat required to raise the temperature of water of 12 kg from 35 to 43 degree centigrade. (6)

(ii) Derive the first law of thermodynamics for flow process. (10)

Or

(b) (i) Derive the relationship C_p and C_v.

(ii) Explain second law of thermodynamics and applications of second law. (6 + 10)

14. (a) (i) Explain compressible fluid and incompressible fluid. (6)

(ii) What is Bernoulli's equation? Derive this equation for fluid flow. (10)

Or

(b) (i) Explain the working principles of various U tube manometer with neat sketch. (10)

(ii) Explain flow behavior in turbulent flow. (6)

15. (a) With a neat sketch explain the operating characteristics of piston pump. (16)

Or

(b) Explain various phenomenon of fluidization in detail. (16)