Total No. of printed pages = 4

END SEMESTER EXAMINATION FOR (NEP)
November/December, 2025

Semester : 3rd

Branch : Chemical Engineering

Course Code : CHPC-303(NEP)

Course Name : STOICHIOMETRY AND THERMODYNAMICS

Full Marks – 60

Pass Marks – 24

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

(i) Objective Questions are compulsory. (Q.Nos. 1 to 3)

(ii) Answer any *five* from Q.Nos. 4 to 9.

1. Fill in the blanks :   1×5=5

   (a) According to Charle's law, _____ is constant.

   (b) Volume occupied by 1 kmol of gas at NTP is _____ litre.

   (c) Law of conservation of mass was stated by _____.

(d) Heat is a _____ function.

(e) Slope of an Isobaric process is _____.

2 Match the following Columns : 1×5=5

Column-A	Column-B
(a) Isochoric process	(i) Path function
(b) Carnot cycle	(ii) Point function
(c) Work	(iii) Temperature = constant
(d) Internal energy	(iv) Volume = Constant
(e) Isothermal process	(v) Maximum efficiency

3. Write True or False : 1×5=5

(a) There are 7 fundamental units.

(b) Dimension of Area = $[L^2]$.

(c) Pound is in MKS system.

(d) According to Boyle's law, Volume is constant.

(e) Ideal gas law is valid for liquids.

4. (a) What do you mean by Dimensional consistency ? Give an example. 3

(b) What is the dimension of velocity ? 2

(c) Calculate the absolute pressure in atm if gauge pressure of water from the free surface is 98.1kPa. 4

5. (a) Define Normality, Molarity and Molality. 3

(b) 120 gram of caustic soda (NaOH) is dissolved in water to prepare 2 litres of solution. Find Normality and Molarity of the solution. 6

6. (a) State Raoult's law. 2

(b) State Ideal gas law. 3

(c) 600 ml of air is at 27°C .What is the volume at 56°C ? 4

7. (a) State 0th law of Thermodynamics. 2

(b) State 1st law of Thermodynamics. 2

(c) Calculate the change in the internal energy of the system if 300 Joule of heat is added to the system and a work of 2500 Joule is done. 2

(d) At 300K, two moles of an ideal are isothermally expanded to three times their initial volume. Calculate the amount of work done by the gas. (Use R= 8.314 J/K.mol). 3

8. (a) Explain Carnot cycle. 5

   (b) A carnot heat engine works between 300K and 600K. What is the efficiency of the heat engine ? If it consumes 100 J. What is the heat rejected in the cycle ? 2+2+4

9. (a) State Clausius statement. 3

   (b) Explain Refrigeration cycle. 6