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Ch-404/ST&K/4th Sem/2018/J/A

**STOICHIOMETRY, THERMODYNAMICS
AND KINETICS**

Full Marks – 70

Time – Three hours

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

Answer *all* the questions from PART – A and any *three* from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

(a) Law of conservation of mass was formulated by _____ in _____.

(b) Isobars of an element have same _____, but differ in _____.

(c) $C_p - \text{---} = R$.

[Turn over

(d) _____, _____ and _____ are called sub-atomic particles.

(e) Avogadro's Number (N) is equal to _____.

(f) First law of thermodynamics is about conservation of _____.

2. Give short and direct answers : 1×10^{-10}

(a) Define valency.

(b) Define rate of a chemical reaction.

(c) Define Latent heat.

(d) State Third law of thermodynamics.

(e) Distinguish between Unit process and Unit operation.

(f) Define Compression ratio.

(g) Distinguish between catalytic and non-catalytic reaction.

(h) What is an isothermal process ?

(i) State Boyle's law.

(j) Define Atomic mass.

3. Write true or false : 1×5=5

- (a) No symbol contains more than four letters.
- (b) Law of multiple proportions was formulated by John Dalton.
- (c) Calculations based on chemical equations are known as Stoichiometric.
- (d) Avogadro stated that- "The ultimate particle which can exist in free state is the molecule."
- (e) In a cyclic process the change in internal energy is one.

PART - B

Mark - 45

Answer any *three* questions.

4. (a) What are the laws of chemical combination ?
Explain any one with example. 5+5=10

(b) Calculate the percentage composition of the elements in CaCO_3 . 5

5. (a) Neon sample occupies 4L at a pressure of 5×10^4 Pa and 273 K temperature. Calculate the volume of the sample at STP. 5

(b) Calculate the minimum quantity of Zn required to produce 10 gms of H_2 from H_2SO_4 and find the weight of the resulting $ZnSO_4$ formed. 5

(c) What volume of CO_2 can be obtained at $15^\circ C$ and 740 mm Hg pressure by reacting 10 gms of chalk ($CaCO_3$) with dil. HCL ? 5

6. What is refrigeration ? What are the two types of refrigeration machines ? Explain any one.

3+2+10=15

7. What do you mean by 'rate of a reaction' ? Explain the different types of chemical reactions.

5+10=15

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