Q.P. Code :00581

[Time: Three Hours] **[Marks:70]**

Please check whether you have got the right question paper.

N.B: 1. All questions are compulsory.
2. Draw neat, labelled diagrams wherever necessary.

Q.1. **a)** Explain supercritical fluid state & give its applications. **(03)**

b) What is optical activity? Give its applications. **(02)**

c) When 0.44gm of a substance was dissolved in 22.2gm benzene, the freezing point of benzene was lowered by 0.567^0C. If K_f=5.12^0C, mol^{-1}, calculate the molecular weight of the substance. **(03)**

d) Define thermodynamics & give its applications & limitations. Classify thermodynamic systems. **(04)**

e) State & Explain Faraday's law of electrolysis **(03)**

Q.2. **a)** Explain Linde's method for liquefaction of gases. **(04)**

OR

Elaborate on Claude's method for liquefaction of gases.

b) What is dielectric constant? Give its applications in pharmacy. **(03)**

c) Explain Hess's law of constant heat summation. **(04)**

Q.3. **a)** Explain Ostwald & Walker's Dynamic method for measurement of relative lowering of vapour pressure. **(04)**

b) Explain efficiency of heat engine. An engine operating between 150^0C & 25^0C takes 500 J from high temperature reservoir. Calculate the work done by it, assuming that there are no frictional losses. **(04)**

OR

Give different statements of second law of thermodynamics. What is entropy? Explain its importance

c) Explain equivalent conductance of a weak electrolyte at infinite dilution. **(03)**

Q.4. **a)** Derive the equation for deviation of real gases from ideal gas. **(04)**

b) Explain principle and working of Abbe's refractometer. **(03)**

c) Explain a method to determine the molecular weight of a non-volatilve solute by elevation in boiling point. **(04)**

OR

Justify 'Depression in freezing point is a colligative property'.

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Q.5. **a)** Write a short note on polymorphism. **(04)**

b) What is Osmosis and describe modern Osmometer. **(04)**

c) Define the following **(03)**

i) Heat of formation

ii) Heat of combustion

iii) Heat of solution

OR

Define Bond energy. Calculate ΔH for reaction: **(03)**

C_2H_4 (g) + $3O_2$ (g) → $2C0_2$ (g) + $2H_2O$(g) from the following values of bond energies:

Bond	Bond energies (KJ)
C-H	414
O=0	499
C=0	724
O=H	460
C=C	619

Q.6. **a)** The Van der Waal's constant for ethane are **(03)**

a=5.57, b=0.064

Calculate the external pressure and internal pressure for ethane at 300 K. The volume of ethane is 2.5 m^3/Kmol and R=8.3153 KJ/Kmol.K

b) Write a short note on fractional distillation **(03)**

c) Write a short note on Gibb's Free Energy **(03)**

d) State the postulates of Arrhenious theory of electrolytic dissociation. **(02)**

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