WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Visharambag, Sangli – 416415

First Year B.Tech. Group B (ELE, ELN. CV&CSE)
ESE , ODD SEMESTER, AY 2022-23
Engineering Chemistry (6CH101)

ESE

PRN: _____

Day & Date: Monday, 27/02/2023 Time: 10.30 AM to 12.30 PM Max Marks: **50**

IMP: Verify that you have received question papers with correct course code, branch etc.

Instructions
a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
e) Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
f) Except PRN anything else writing on question paper is not allowed.
g) Exchange/Sharing of stationery, calculator etc. not allowed.
h) Use **HB / dark pencil** to draw the diagram.

Text on the right of marks indicates course outcomes (Only for faculty use)		Marks	
Q1	A)	**A 1.834 g Brass sample is dissolved in Conc. HCl and diluted to 250 ml in a volumetric flask. In one analysis, the zinc in a 25.00-ml portion of the solution is precipitated as $ZnNH_4PO_4$, and subsequently isolated as $Zn_2P_2O_7$, yielding 0.126 g. The copper in a separate 25.00-ml portion of the solution is treated to precipitate as CuSCN, yielding 0.243 g. Calculate the %w/w Zn and the %w/w Cu in the sample.(FW= Zn=65.38, $Zn_2P_2O_7$= 304.72, Cu= 63.54 CuSCN= 121.64)**	5	CO3
	B)	**A water sample was found to contain following impurities in mg/l $Ca(HCO_3)_2$:81 mg/l (MW 162) $Mg(HCO_3)_2$:87.6 mg/l (MW 146), $CaSO_4$:54.4 mg/l (MW136), $MgSO_4$:12 mg/l (MW 120), $CaCl_2$:11.1 mg/l (MW111) Calculate Temporary, Permanent & Total hardness of water in ppm.**	5	CO3
	C)	**A solid fuel contains 83% Carbon, 3 % Sulphur, 6 % Hydrogen, 3% Oxygen, 2 % Nitrogen and 3 % ash. Calculate it's Gross and Net Calorific Value using Dulongs formula. Assume latent heat of condensation of steam as 587 Kcal/Kg.**	5	CO3
	D)	**Following data was recorded while determining calorific value of solid coal fuel, containing 5 % Hydrogen using Bomb Calorimeter. Mass of coal burned = 0.90 gm, Mass of water taken in copper calorimeter = 800 gm, Water equivalence of apparatus = 2000gm, Rise in temperature = 2.98 ^{0}C, Cooling correction = 0.02^{0}C, Acid correction = 50 cal, Fused wire correction = 20 cal. Calculate Higher & Lower Calorific value of coal. Assume latent heat of condensation of steam as 587 cal/ gm**	5	CO3

Q2 A) Draw neat labeled diagram of Sulphur system. 4

B) List technological applications of Eutectic system. 3

C) Define Terms: i) Soft water ii) Temporary hard water iii) Co- precipitation 3

Q3 A) Give an account of vulcanization of Crude rubber. 5

B) Distinguish between Thermosetting and Thermo softening plastics. 5

Q4 A) What is 'Thermal analysis'? Give its classification on the basis measuring parameter during Thermal analysis. 4

B) Draw & Interpret various TGA thermograms (Δm Vs Temperature). 6

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