SUBJECT CODE NO:- P-167
FACULTY OF ENGINEERING AND TECHNOLOGY
F.E. Examination MAY/JUNE-2016
Engineering Chemistry & Environmental Science
(Revised)

[Time: Two Hours]   [Max Marks:40]

"Please check whether you have got the right question paper."

N.B
    i) <u>Q.No.1 is compulsory</u>.
    ii) <u>Solve any two</u> questions from the remaining questions.
    iii) Figures to the right indicate full marks.
    iv) Use of non - programmable calculator is allowed.

Q.1   Answer the following questions(<u>Any Five</u>)   10
    a)   Draw the structure of EDTA.
    b)   Calculate hardness in terms of $CaCO_3$ equivalent, if water sample contains 111mg of $CaCl_2$ per lit.
    c)   Give any four factors responsible for the selection of coal.
    d)   Match the pair

	A		B
i)	Gasoline	1.	As a lubricant
ii)	Kerosene	2.	I.C. engine fuel
iii)	Diesel	3.	Jet engine fuel.
iv)	Heavy oil	4.	Diesel engine fuel.

    e)   Write the structure & name of monomer of Teflon
    f)   Differentiate between thermosetting & thermoplastic polymers.
    g)   What happens when temporary hard water is boiled? Give its equation
    h)   Write two advantages of gaseous fuel over liquid fuels.

Q.2   a)   A sample of hard water gives the following results on analysis.   06
        $Ca(HCO_3)_2$ = 81 ppm, $Mg(HCO_3)_2$ =73ppm,
        $mgcl_2$ = 95ppm, $CaSO_4$ = 34ppm,
        $mgSO_4$ =30ppm, CO_2 = 44ppm, NaCl = 58.5ppm.
        Calculate temporary, permanent & total hardness of water sample.
    b)   Describe ion exchange resin process with suitable diagram.   05
    c)   Give the applications of colorimeter.   04

Q.3   a)   Explain proximate analysis of coal with its significance.   06
    b)   Define the following terms.   05
    i)   Chemical fuel ii) calorific value iii) octane no iv) Cetane no v) ignition temp.
    c)   Calculate the gross & net calorific value of coal sample form the following data obtained from a bomb   04
        calorimeter. Weight of coal is 0.73gm. Weight of water in the calorimeter is 1500gm. Water equivalent of
        calorimeter is 170gm. Initial temp is 25^0C & final temp is 28^0C. Percentage of hydrogen in coal is 2.5% & latent
        heat of steam is 587 cal/gm.

Q.4   a)   Give preparation, properties & applications of polyurethane   06
    b)   What do you mean by vulcanization of natural rubber? Distinguish between natural rubber & synthetic   05
        rubber.
    c)   Explain free radical polymerization mechanism.   04

Q.5   a)   Explain how is scale & sludge formed in boiler? Give its effects.   05
    b)   What is brackish water? How to desaline it by reverse osmosis?   04
    c)   What is polymer? Sketch out its classification.   03
    d)   Draw a neat & well labeled diagram of bomb calorimeter.   03

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