Silo

EI-173

B.E. (Ist Sem.) (CGPA) Civil Engg. Exam.-2015

ENGINEERING CHEMISTRY

Paper : CE-102

Time Allowed : Three Hours
Maximum Marks : 60

Note : Answer all questions Parts of the questions should be attempted at one place.

Q.I Choose the correct answer— 2 each

(i) Which chemical is most suitable for the removal of calcium sulphate scale—

(a) EDTA (b) HCl

(c) HI (d) EBT

(ii) Main constituent of LPG is—

(a) Methane

(b) Butane

(c) Propane

(d) Benzene

P.T.O.

(iii) A good refractory material should be—

(a) Non-porous (b) High porous

(c) Less Porous (d) None of these

(iv) Which of the following is used as antioxidant to prevent the oxidation of lubricant—

(a) Phenol

(b) Amines

(c) Organic phosphides

(d) All of the above

(v) Identification of functional groups in a compound can be done by—

(a) IR spectroscopy

(b) Gas chromatography

(c) UV spectroscopy

(d) NMR

Q.II (a) Describe the significance and determination of BOD. 4

(b) What are boiler scales ? What are ill-effects of scales in boilers ? Discuss various internal conditioning methods to prevent scale formation. 6

or

A water sample on analysis gave the following results—

(a) Ca^{+2} = 30 mg / lt

(b) Mg^{+2} = 18 mg / lt

Contd. .....

(c) K^+ = 19.5 mg / lt

(d) CO_2 = 11 mg / lt

(e) HCO_3^- = 122 mg / lt

(f) Cl^- = 35.5 mg / lt

(g) SO_4^{2-} = 48 mg / lt

Calculate total, hardness and alkalinity present in water sample. Also calculate lime and soda required for softening one litre of this sample of hard water. 10

Q.III (a) Draw a well labelled diagram of bomb calorimeter for delermination of calorific value of a solid fuel. 4

(b) What is carbonization ? Describe Otto Hoffmann method for manufacture of metallurgical coke. 6

or

(a) What is knocking in an internal combustion engine ? How is it related to the structure of the constituents of hydrocarbons ? 4

(b) The % analysis by volume of producer gas is H_2 = 18.3%, CH_4 = 3.4%, CO_2=25.4%, CO_2=5.1%, N_2 = 47.8%. Calculate the volume of air required per m^3 of the gas. 6

Q.IV (a) Discuss setting and hardening of portland cement with chemical reactions involved in it. 4

(b) Write short notes on the following— 6

(i) Copper alloy

(ii) Refractoriness

or

(a) What is vulcanization ? How it brings about the changes in properties of natural rubber ? 4

(b) Explain briefly—

(i) Silicon Resin

(ii) Adhesives

Q.V (a) Discuss the mechanism of hydrodynamic lubrication. 4

(b) Write note on — 6

(i) Cathodic protection

(ii) Metallic coatings

or

(a) What is corrosion ? Discuss various factors that influence the rate of corrosion. 4

(b) Explain following properties of lubricant— 6

(i) Aniline point

(ii) Cloud and pour point

Q.VI (a) State and derive Beer-Lambert's law. 4

(b) Discuss the mechanism of depletion of ozone layer. What are the adverse effects of depletion of ozone layer ? 6

or

(a) Write note on applications of IR. 4

(b) State the principle involved, instrumentation and applications of gas chromatography.

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