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Total No. of Questions : 6]

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[3861]-158

F. E. (Semester - II) Examination - 2010

APPLIED SCIENCE - II

(CHEMISTRY)

(2008 Pattern)

Time : 2 Hours]

[Max. Marks : 50

Instructions :

- (1) *All questions are compulsory.*
- (2) *Black figures to the right indicate full marks.*
- (3) *Neat diagrams must be drawn wherever necessary.*
- (4) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- (5) *Assume suitable data, if necessary.*

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- Q.1)** (A) Explain different types of Calorific Values of Fuel. How it can be determined by using Boy's Gas Calorimeter. [07]
- (B) Explain Octane Number and Cetane Number of Fuel. [06]
- (C) One gram of coal sample was burnt in oxygen. Carbon Dioxide was absorbed in KOH and water vapour in CaCl_2 . The increase in weight of KOH and CaCl_2 was 3.157 and 0.504 gm respectively. Determine %C and %H in the sample. [04]

OR

- Q.2)** (A) Explain in brief the process with diagram for distillation of Crude Petroleum. Give composition, boiling range and uses of any three fractions obtained. [07]
- (B) Give composition, properties and applications of :
- (a) CNG
- (b) LNG [06]

- (C) Volumetric Analysis of Producer Gas is $H_2 = 20\%$, $CO = 22\%$, $N_2 = 50\%$, $CH_4 = 2\%$, $CO_2 = 6\%$.

Find volume of air required for complete combustion of $1m^3$ of gas. [04]

- Q.3)** (A) Explain mechanism of corrosion by oxygen with respect to Mg, Au, Cr and Mo metals and state Pilling - Bedworth Rule. [07]
- (B) Explain H_2 Evolution and O_2 Absorption Mechanism. [06]
- (C) Why Anodic Coatings are better than Cathodic Coatings ? [04]

OR

- Q.4)** (A) Discuss various factors affecting Corrosion. [07]
- (B) Explain Galvanic Corrosion with the help of Galvanic Series. [06]
- (C) Write a note on Electroplating. [04]

- Q.5)** (A) What are the causes, disadvantages and prevention of Scales and Sludges in Boiler ? [06]
- (B) In water system, name phases in equilibrium at the following conditions :
- (i) $-273^\circ C$
 - (ii) $0.0075^\circ C$ and 4.58 mm pressure
 - (iii) $374^\circ C$ and 218.5 atm. pressure
 - (iv) $0^\circ C$ and 1 atm. pressure [06]

- (C) A water sample is not alkaline to phenolphthalein. However, 100 ml of the sample on titration with N/50 HCl required 16.9 ml to obtain end point using methyl orange as indicator. What are the types and amount of alkalinity present in the sample ? [04]

OR

- Q.6)** (A) What is Hardness of Water ? Give reasons behind it and explain EDTA Method for the determination of Hardness of Water. **[06]**
- (B) State Gibb's Phase Rule. Explain the terms involved in it. What are the limitations of Phase Rule ? **[06]**
- (C) Write a note on Caustic Embrittlement. **[04]**
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