RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR

B.A./B.SC. THIRD SEMESTER (July – December), 2011

Mid-Semester Examination, September, 2011

Date : 12/09/2011 **INDUSTRIAL CHEMISTRY (Honours)**

Time : 2 pm – 4 pm Paper : III Full Marks : 50

(Use separate answer scripts for each group)

Group – A

Unit - I

(Ceramic Technology)

Answer **any five** questions :

1. Describe with equations the process of setting / hardening of portland cement. [5]

2. Describe how Portland slag cement (PSC) is manufactured? What is the limit of GGBFS content in PSC as per IS : 455 – 1989? Discuss merits and demerits of PSC over OPC. [2+1+2]

3. Briefly describe the process of manufacture of High Alumina cement (known as cement Fondu). Mention its principal uses. [4+1]

4. Define "glass" from Physical and Chemical view points. Discuss Physical and Chemical properties of glass. [2½×2]

5. Fill up the blank (any five) : [1×5 = 5]
   a) The word ceramic is derived from _____ and means _____ clay.
   b) Where metal _____; ceramic _____
   c) Refractory industry was confined to silica refractory in its beginning but later on Steel Technology forced it to switch over to _____ refractories.
   d) The raw material for _____ refractory is major contributor to CO_2 in air.
   e) Steel slag should be cast to _____ and used for road making.
   f) Synthetic refractory materials are _____; but _____ for more life.

6. Discuss Raw Materials for making basic refractories. How are they processed? What are the additives to make a basic refractory non-wettable? [5]

7. Write short notes on (any two) : [2½×2]
   a) Quartz and Quartzite
   b) Dolomite and Sea water Magnesite
   c) Syllimanite and Kyanite.

Unit – II

(Fuels and Furnaces)

Answer any three questions :

8. Calculate the gross C.V and theoretical air requirement for pure Nonane for complete combustion (CV of C = 8137 cal/g; H = 34500 cal/g) [5]

9. Write short notes on (any two) [2½×2]
   a) LPG
   b) Peat and Lignite
   c) Wood and Charcoal

10. Describe with sketch the process of manufacture of producer gas. [3+2]
    In a trial on a producer, the following data are obtained.
    Gas yield — 3000 NM^3 / Ton of coke
    C.V of coke — 5800 KCal/Kg
    C.V of gas — 1160 $Kcal/NM^3$
    Find its cold gas efficiency.

11. Describe the HTC process for manufacture of Metallurgical coke.
    Mention two important Bye Products which are used in Fertilizer and Paints industry. [4+½+½]

Group – B

Answer **any two** questions out of three questions :

1. Briefly Explain Production of Hot metal in blast furnace with sketch. [5]

2. Write short notes on :
    a) Hydro metallurgy, Electro – metallurgy and Pyro metallurgy advantages and disadvantages
    b) Continuous casting of steel [2·5+2·5]

3. Briefly explain production of copper matte from copper ore. [5]