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**SARDAR PATEL UNIVERSITY**  
**B. Sc. Semester - I Examination**  
**Tuesday, 27<sup>th</sup> November 2012**  
**INDUSTRIAL CHEMISTRY (Vocational)**  
**US01CICV01**

**Title: Industrial aspects of chemistry**

**Time: 2.30pm to 4.30pm**

**Total Marks: 70**

**Q. 1 Answer the following Multiple Choice Questions (Attempt all) [10]**

- i. Which of the following is not a petroleum product  
(a) Petrol (b) Paraffin wax  
(c) Bees wax (d) Kerosene oil
- ii. Kerosene is a mixture of  
(a) Alkenes (b) Alkynes  
(c) Alkanes (d) Arenes
- iii. The most important energy yielding constituent in natural gas is  
(a)  $C_2H_4$  (b)  $CH_4$   
(c)  $C_2H_2$  (d)  $H_2S$
- iv. Which of following is the main constituent of coal gas?  
(a) Methane (b) CO  
(c)  $H_2$  (d)  $O_2$
- v. Which of this is not a primary fuel?  
(a) Peat (b) Natural gas  
(c) Charcoal (d) Coal
- vi. Which of following forms clinkers?  
(a) Moisture (b) Volatile matter  
(c) Ash (d) Nitrogen
- vii. Which of the following is a reserve carbohydrate in plants?  
(a) Starch (b) Glycogen  
(c) Dextrin (d) Inulin
- viii. The structure of methyl carbinol is  
(a)  $CH_3CH_2OH$  (b)  $CH_3OH$   
(c)  $CH_3CH_2CH_2OH$  (d)  $(CH_3)_2CHOH$
- ix. What is the melting point of aluminium oxide  
(a)  $2072^{\circ}C$  (b)  $20^{\circ}C$   
(c)  $270^{\circ}C$  (d)  $1027^{\circ}C$
- x. Which of the following is not an isotope of carbon  
(a)  $^{12}C$  (b)  $^{13}C$   
(c)  $^{14}C$  (d)  $^{11}C$

**Q.2 Answer the following short question (Any ten) [20]**

- i. What is thermal cracking?
- ii. Define the term refining.
- iii. Write advantage of LPG over gasoline as a motor fuel.
- iv. Define fuel with suitable example.
- v. What is the carbonization of coal?
- vi. Write the chemical composition of wood.
- vii. Write the properties of starch.
- viii. Enlist the various processes for manufacture of paper.
- ix. Write the uses of ethylene glycol.
- x. Write uses of clay.
- xi. Give properties of silica
- xii. What is quartz glass?

Q.3	(a) Give brief outlines on classification, origin and mining of petroleum.	[06]
	(b) Write a note on catalytic cracking.	[04]
	Or	
Q.3	(a) Discuss the mechanism on thermal cracking.	[06]
	(b) Write a note on natural gas.	[04]
Q.4	Explain proximate analysis of coal.	[10]
	Or	
Q.4	Explain ultimate analysis of coal.	[10]
Q.5	(a) Write note on acetate silk	[06]
	(b) Write preparation properties and uses of inulin	[04]
	Or	
Q.5	Explain preparation, properties and uses of starch.	[10]
Q.6	Discuss the importance, availability, forms and structure of alumina and silica	[10]
	Or	
Q.6	Write note on	[10]
	1. Clay	
	2. Mica	



- (8) Write : Complete energy balance equation.
- (9) Define : Combustion, Calorific Value.
- (10) Explain : Dew point temperature and Wet bulb temperature.
- Q. 3 (a) Prove that for gaseous mixture, the mole percentage composition is equal to volume percentage composition. (06)
- (b) Explain average molecular weight and density of gaseous mixture. (04)
- OR**
- Q. 3 (a) Discuss the phenomenon of Vapor pressure of the liquids. (04)
- (b) A natural gas has the following compositions by volume. (06)
- $\text{CH}_4 - 82\%$ ,  $\text{C}_2\text{H}_6 - 12\%$ ,  $\text{N}_2 - 6\%$
- Calculate the density of gas at 288 K and 101.32 KPa and composition in weight percent.
- Q. 4 (a) Explain the concept of material balance and material balance calculations. List the steps followed in material balance calculation. (04)
- (b) The dilute acid containing 25%  $\text{H}_2\text{SO}_4$  is concentrated by commercial grade Sulfuric acid containing 98%  $\text{H}_2\text{SO}_4$  to obtain desired acid containing 65%  $\text{H}_2\text{SO}_4$ . Find the quantities of the acids required to make 1000 kg of desired acid. (06)
- OR**
- Q. 4 (a) Write short note on: Recycle Operation (06)
- (b) Explain : (1) Material Balance Problems (04)
- (2) Process and Process Variables
- Q. 5 Write statement of law of conservation of energy. Derive the equation  $\Delta U = Q - W$  assuming usual notations. (10)
- OR**
- Q. 5 Explain effect of temperature on heat of reaction. (10)
- Q. 6 (a) Give classification of fuels. (04)
- (b) Discuss combustion reactions for burning of fuels. (06)
- OR**
- Q. 6 Write short note on: (06)
- (a) Calorific Value (06)
- (b) Units to express composition of vapor bearing gaseous mixture (04)