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[A-29]

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SARDAR PATEL UNIVERSITY

M.Sc. (Analytical Chemistry) **Examination,** IV**th** **Semester**(CBCS)

Tues**day**, **Date:** 28.04.2015

Session: Morning, **Time:** 10.30 a.m. to 1.30 p.m.

Paper: PS04ECHE05, **Subject:** Environmental Chemistry

Total Marks: 70

N.B.: i) The numbers of the marks carried by each question is indicated at the end of the question
ii) Assume suitable data if considered necessary and indicate the same clearly.

Q.1 Answer by highlighting the right option [08]

i) A term TDS refers to
a) Total dissolved solids **b)** Total dilution value
c) Total density substituent's **d)** Both (a) and (c)

ii) Which is the first component of sampling train?
a) Collector **b)** Vacuum source
c) Metering device **d)** None

iii) An air pollutant responsible for loss of metallic luster is
a) SO_2 **b)** CO
c) CO_2 **d)** NO_X

iv) An ideal temperature of promoting pyrolysis is around
a) 1000 °C **b)** 550 °C
c) 700 °C **d)** 910 °C

v) A gas transportation and disposal of solid wastes emit is
a) CO b) CO_2
c) Both a) & b) d) SO_2

vi) Conversion of organic fossil wastes and carbonaceous materials into CO, H_2 and CO_2 carried out in a technique is called
a) Landfill **b)** Pyrolysis
c) Gasification **d)** MBT

vii) Ozone layer exists at an altitude of
a) ~50 Kms **b)** ~11 Kms
c) ~23 Kms **d)** ~50 Kms

viii) Plants absorb elemental nitrogen, via their roots, in the form of
a) Soluble nitrate salts **b)** Nitrogen
c) Nitrogen dioxide **d)** Proteins

Q.2 Attempt any **Seven** [14]

i) State the terms 'TLV' and 'PHS'.
ii) What do you mean by acid rain? Outline mechanism of acid rain.
iii) Discuss turbidity and hardness of water.
iv) Define temporary and permanent hardness, stating ways of expressing them.
v) Give an account of chemical and other solid wastes.
vi) Show the mechanism of Bio-drying process.
vii) Draw and describe in brief soil horizons of soil-profile.
viii) What is composition of air? Average molar mass of atmosphere is close to that of nitrogen gas! Explain [N=14,O=16,Ar=40,CO_2=44].

ix) What do you understand by hydrosphere? Name its important components with their significances.

Q.3 **a)** Illustrate sampling train for the air sample. A 27 L air sample when collected and absorbed in KI solution required 30.24 mL of 0.1018 M $Na_2S_2O_3$ solution to titrate librated I_2 equivalent to Cl_2 gas. Calculate the concentration of Cl_2 gas in the sample in ppm. [06]

b) Answer the following [06]

i) Sulfur dioxide in a 10 L air sample was converted into SO_4^{2-} by appropriate treatment, and then SO_4^{2-} into $BaSO_4$(s) using 25.2 mL of 0.04 M $BaCl_2$ solution. $BaSO_4$ precipipates were filtered, and filtrate thus left required 36.0 mL of 0.02017 M EDTA solution to titrate excess Ba^{2+}. Calculate concentration of SO_2 in ppm in the air sample [Ba=137.33, S=32, Cl=35.5].

ii) Write a note on ozone depletion.

OR

b) Outline following

i) Analysis of NO–NO_x and CO–CO_x.

ii) Effect of air pollutant on man and materials.

Q.4 **a)** Enlist parameters which are employed for physical examination of water, and discuss them in detail. [06]

b) Answer the following [06]

i) Give a detail account of major components of water. Discuss analysis of water and its significant effect.

ii) Name various surface water pathogens, stating their importance.

OR

b) State the term 'COD'. If a 1 L solution contains 425 mg of potassium hydrogen phthalate, KHP, calculate theoretical COD value in mg/mL

Q.5 **a)** Write a note on methods for disposal of wastes. [06]

b) Answer the following [06]

i) Give the major causes of soil pollution.

ii) Describe the Biomagnifications process.

OR

b) State municipal solid waste. Describe construction and demolition of wastes with suitable examples.

Q.6 **a)** State the term 'particulate matters'. Show merits and demerits of particulate matters. Give an account of inorganic and organic particulate matters. [06]

b) What do you mean by weathering processes? Describe in brief processes of soil formation. State the common features of soil. [06]

OR

b) Illustrate 'pathways of pollutant'. Write a note on sources and sinks of NOx.

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