APPLIED CHEMISTRY
Examination Paper-2017
BTEUP- Polytechnic, Ist Semester
(Common to all Branches)

[Time : 2:30 hours] [Maximum Marks : 50] [Minimum Marks : 17]

Note:

(i) Attempt all questions. All questions carry equal marks.

(ii) Students are advised to specially check the Numerical Data of question paper in both versions. If there is any difference in Hindi Translation of any question, the students should answer the question according to the English Version.

(iii) Use of Pager and Mobile Phone by the students is not allowed.

1. Answer any ten parts of the following: **[10 × 1 = 10]**

(i) Define Binding Energy. What is its source?

(ii) Which contains both polar and non–polar bonds?

(a) NH_4Cl (b) HCN (c) H_2O_2 (d) CH_4

(iii) Which of the following has lowest electronegativity?

(a) Al (b) P (c) S (d) Si

(iv) When potassium permagnate solution is titrated with a solution containing Fe^{2+} ions the Indicator used in water litration is.

(a) Phenolphthalene (b) Methyl Orange

(c) Methyl Red (d) Self Indicator

(v) Name one chargeble commercial cell.

(vi) Write the relation between activation energy, rate constant and temperature.

(vii) Write the percent average composition of oil gas.

(viii) Why water is a good solvent?

(ix) Sky looks blue because:

(a) Due to dispersion effect (b) Due to reflection

(c) Due to scattering (d) Due to transmission

(x) Greases are not used to lubricate:

(a) Rail axile boxes (b) Gears

(c) Delicate instruments (d) Bearings working at high temperatures

(xi) Oil and fats are called as _____

(xii) Hexa chloro ethane (C_2Cl_6) is used as_____.

2. Answer any five parts of the following: **[5 × 2 = 10]**

(i) Derive on the basis of quantum numbers the maximum number of electrons which may be present in third shell of an atom.

(ii) The molecule of $MgCl_2$ is linear while the molecule of $SnCl_2$ is angular. Explain.

(iii) What is meant by S block and P block elements ? Give one example of each.

(iv) Distinguish between rate and rate constant of reaction. Write their units for second order reaction.

(v) What is a co-ordination number? What are the co-ordination numbers of ions in NaCl and CaF_2 crystals?

(vi) Both increase in temperature and presence of catalyst increase the rate of reaciton. How do they bring this about?

(vii) What is solubility product? Give its applications.

3. Answer any two parts of the following: **[2 × 5 = 10]**

(i) (a) Although HCl is a covalent compound but it is ionized in its aqueous solution why?

(b) What do you understand by electro chemistry? Discuss its main characteristics and applications.

(ii) (a) Write the constituents of coal gas. How it is manufactured? Explain its by product obtained give their applications.

(b) What are causes for scale formation in boilers? How does it affect the functioning of boilers?

(iii) (a) Write short note on:

(i) Coagulation (ii) Peptization (iii) Electrodialysis

(b) Explain the important characteristics of lubricants. Under what operating conditions would you use lubricating oil, greeases and solid lubricants.

4. Answer any two parts of the following: **[2 × 5 = 10]**

(i) (a) What are polymers? Giving various methods used in polymerization.

(b) Explain briefly thero setting plastics and thermoplastics with suitable examples.

(ii) (a) What is paint? Explain main constituents of paints. Discuss the different kinds of paints.

(b) What is soap? Describe manufacturing of soap by hot process. Why it is usefull?

(iii) (a) Write short note on:

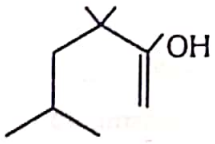
(i) Hardening of oils (ii) Oil and fats.

(b) Write short note on:

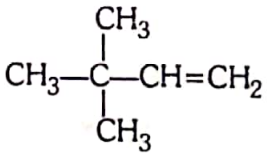
(i) Hydrogenation of oils (ii) Tri Nitroglycerine

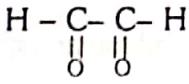
5. Answer any two parts of the following: **[2 × 5 = 10]**

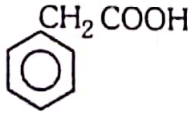
(i) Write down IUPAC name of the following:

(a) 

(b) $CH_2 = CH - CH_2 - OH$

(c) 

(d) 

(e) 

(ii) What happens when.

(a) Bromine water is treated with (i) C_2H_4 (ii) C_2H_2. What is its utility?

(b) Sodium acetate is heated with soda lime.

(c) Benzene is heated with methyl chloride in presence of an hydrous $AlCl_3$.

(d) Toluene is treated with a hot solution of potassium permagnate.

(e) Benzene is oxidised with air in the presence of catalyst.

(iii) (a) Explain the reaction mechanism of the following reactions giving one example for each.

(i) Ellimination reaction (ii) Addition reaction

(iii) Dehydration of alcohol

(b) Explain the term

(i) Acetylation and (ii) Alkylation