R.G.P.V. Bhopal (MP)

B.E. (1st/ 2nd Semester) EXAMINATION

ENGINEERING CHEMISTRY [BE-101]

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Time: 3Hrs Max Marks: 100 Min Marks: 35

Note:Attempt any 5 questions taking 1 question from each unit. All question Carry equal marks.

UNIT-I

Q.1.(a) Explain the principal and process of Lime- soda softening of water giving the different chemical reactions involved in the process. Give advantage of hot lime-soda process.? 10

(b) Define different units for expressing hardness of water. Give relationship between these units.? 10

OR

Q.2.(a) What is boiler scale? What is ill-effect of scales? Discuss various internal Conditioning methods to prevent scale formation.? 10

(b) What is the principal of EDTA titration? How can the permanent hardness of the water be determined by this method ?10

UNIT-II

Q.3.(a) What are the difference between gross and net calorific value ? 5

(b) A coal has the following composition by weight:

C= 90%, O = 3.0, S =0.5% and ash = 2.5%. Net calorific value of the coal was Found to be 8490.5 kcal/kg. Calculate the percentage of hydrogen and higher Calorific value of coal.? 10

(c) How the calorific value of coal can be determined by Bomb calorimeter ? 5

OR

Q.4.(a) Write the significance & determination of proximate analysis of coal.? 5

(b) A Sample of coal was analysis as follow:

2.5 gm sample of coal was weighed in a silica crucible after heating for 60 minutes at 110 C. the residue weigh L obtained 2.425 gm. The crucible then was covered with a vented lid and heated strongly for 7 minutes at 950 C ± 20 C. the weight of residue was 1.520 gm. The crucible was then heated without lid, until a constant weight was obtained. The weight of the final residue was 0.232 gm. Calculate the percentage result of the above in from of proximate analysis. 10

(c) Explain moving bed catalytic cracking ? 5

UNIT-III

Q.5. Explain the following properties of lubricants and discuss their significance: 20

(i) Flash and Fire points

(ii) Cloud and pour points

(iii) Saponification number

(iv) Neutralization Number

OR

Q.6.(a) Explain Mechanism of Lubrication? 5

(b) Write short note on viscosity measurements? 5

(c) Write short note on solid lubricants? 5

(d) Define and classify lubricants with suitable examples? 5

UNIT-IV

Q.7. Explain the following with example: 20
(i) Addition polymerization
(ii) Condensation polymerization
(iii) Co- polymerization
(iv) Vulcanization of rubber

OR

Q.8. Discuss preparation, properties and uses of 20
(i) PMMA
(ii) Buna S
(iii) Polyethylene
(iv) Nylon 6:6

UNIT-V

Q.9.(a) Draw a labeled diagram of rotary kiln used for manufacture of Portland cement by wet process gives various chemical reactions taking place in furnace. ? 10
(b) Discuss Chromatography and its application? 5
(c) Define and classify refractory with suitable examples? 5

OR

Q.10. Write short note on the following 20
(a) Setting & Hardening of cement
(b) Beer's – Lambert Law
(c) IR – spectroscopy and its applications