Roll No. | | | | | | | | | | | | | |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY, PRAYAGRAJ

Subject Code : BAS202 **Subject : Engg. Chemistry**

Course: B.Tech. **SEMESTER: II**

THIRD SESSIONAL EXAMINATION, EVEN SEMESTER, (2024-2025)

Branch : All

Time –1hr 30 min **Maximum Marks – 30**

1. Attempt any *FIVE* questions.

Q N	QUESTION	Marks	CO	BL
a.	100 ml of water sample has a hardness equivalent to 12.5 ml of 0.08 N $MgSO_4$. What is its hardness in degree French.	2	CO4	L5
b.	Why does $Mg(HCO_3)_2$ require double amount of lime for softening?	2	CO4	L1
c.	Why do we express hardness of water in terms of $CaCO_3$ equivalent?	2	CO4	L3
d.	Calculate the weight and volume of air required for combustion of 3Kg of carbon.	2	CO4	L1
e.	Give the composition of biogas with the help of diagram.	2	CO4	L1
f.	Give the condition when GCV=NCV.	2	CO4	L2

2. Attempt any *ONE* of the following.

Q N	QUESTION	Marks	CO	BL
a.	The ultimate analysis of a coal gave the following result: C=84%, S=1.5%, N=0.6%, H=5.5%, and O=8%. Calculate the GCV and NCV of the coal using Dulong's formula.	5	CO4	L1
b.	Why ion exchange method is considered more efficient than zeolite process in some applications?	5	CO4	L2
c.	Calculate the amount of lime (90%) and soda (98%) for the treatment of 1000000 Liters of water containing: $Ca(HCO_3)_2$ =8.1ppm, $CaCl_2$=33.3ppm, HCO_3^-=91.5ppm, $MgCl_2$=38ppm, and $Mg(HCO_3)_2$=14.6ppm. The coagulant $Al_2(SO_4)_3$ was added at the rate of 17.1 mg/L of water.	5	CO4	L2

3. Attempt any *FIVE* questions.

Q N	QUESTION	Marks	CO	BL
a.	What is meant by functionality of monomers?	2	CO5	L1
b.	What is the limitation of raw rubber? How can it improve?	2	CO5	L1
c.	Why do all simple organic molecules not produce polymers?	2	CO5	L2
d.	Write the structure of Zieglar-Natta catalyst.	2	CO5	L1
e.	Give a brief account of the applications of conducting polymers.	2	CO5	L1
f.	How will you synthesise Nylon-6 from cyclohexanone oxime.	2	CO5	L2

4. Attempt any *ONE* of the following.

Q N	QUESTION	Marks	CO	BL
a.	Write preparation, properties and uses of: (i) PET (ii) PMMA .	5	CO5	L1
b.	How will you synthesise 2-hydroxypropane and t-butyl alcohol from CH_3MgBr.	5	CO5	L3
c.	Differentiate between thermoplastic and thermosetting polymers with examples.	5	CO5	L1

Bloom's Taxonomy Level (BL) :-Remember (L1), Understanding (L2), Apply (L3), Analyze (L4), Evaluating(L5), Creating(L6)