Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2018

EN3BS04 Engineering Chemistry

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Maximum permissible limit for industrial effluent discharge is: **1**
(a) 2100ppm (b) 210.00ppm (c) 21.00ppm (d) 2.10ppm

ii. Deficiency of DO means: **1**
(a) Water is pure (b) Water is polluted
(c) Water contained CO_2 (d) Water contained dissolved mineral

iii. Calorific value of petrol is: **1**
(a) 50.8mg/kg (b) 45.8mg/kg (c) 48.1mg/kg (d) 40.1mg/kg

iv. We do not get this from petroleum distillation: **1**
(a) LPG (b) Gasoline (c) Coke (d) Coal

v. What is approximate chemical composition of fire clay: **1**
(a) $Al_2O_3.\ 2SiO_2.\ 2H_2O$ (b) $Al_2O_3.\ 3SiO_2.\ 2H_2O$
(c) $Al_2O_3.\ 4SiO_2.\ 2H_2O$ (d) $Al_2O_3.\ SiO_2.\ 3H_2O$

vi. High Temperature Lubricants are: **1**
(a) Silicones (b) Organic Amines
(c) Polyglycol (d) Polymerized Hydrocarbon

vii. Refractories are classified into: **1**
(a) Acidic Refractories (b) Basic Refractories
(c) Neutral Refractories (d) All of these

viii. Width of nano wires is: **1**
(a) 10^{-9}mm (b) 10^{-9}cm (c) 10^{-9}m (d) 10^{-9}nm

ix. This group is not an auxochrome: **1**
(a) –OR (b) –OH (c) –C=C (d) $–NH_2$

x. Standard electrode potential of hydrogen electrode is: **1**
(a) Positive (b) Negative (c) Zero (d) No definite Value

Q.2 i. Describe the characteristics of Municipal water. **2**

ii. Discuss any four sources of water describing their characteristics and properties. **3**

iii. Hardness of 1,00,000 litres of sample of water was completely removed by passing it through a zeolite softener. The softener required 400 litres of sodium chloride solution containing 100gm/lt of sodium chloride for regeneration. Calculate the hardness of sample water in ppm. **5**

OR iv. Describe complexometric titration to calculate hardness of water on the basis of: **5**
(a) Principle of EDTA titration (b) Role of buffer

Q.3 i. Define chemical fuel with example. **2**

ii. What is knocking? Discuss its relation with chemical structure and octane rating of the fuel. **3**

iii. Compare solid, liquid and gaseous fuel on the basis of their merits and demerits. **5**

OR iv. Define Bio gas. Discuss its advantages and disadvantages. Draw a simple well labelled ray diagram of bio gas plant. **5**

Q.4 i. (a) Why biodegradable polymers are important. Explain. **4**
(b) Differentiate between natural and synthetic rubbers with examples.

ii. Describe three types of mechanisms of lubricants with examples and diagram. **6**

OR iii. Write down the chemical formula, properties and uses of PVC. **6**

Q.5 Write short note on any two:

i. Manufacture of cement. **5**

ii. Superconductor and their uses. **5**

iii. Preparation properties and uses of fullerene. **5**

Q.6 i. Draw electromagnetic radiation spectrum marking the wavelengths with the names of radiations. **3**

ii. Describe the instrumentation and uses of NMR spectroscopy. **7**

OR iii. Write the applications of EMF measurements. **7**

******

Marking scheme
EN3BS04 Engineering Chemistry

Q.1	i.	Maximum permissible limit for industrial effluent discharge is: (a) 2100ppm	**1**
	ii.	Deficiency of DO means: (b) Water is polluted	**1**
	iii.	Calorific value of petrol is: (b) 45.8mg/kg	**1**
	iv.	We do not get this from petroleum distillation: (d) Coal	**1**
	v.	What is approximate chemical composition of fire clay: (a) Al_2O_3. $2SiO_2$. $2H_2O$	**1**
	vi.	High Temperature Lubricants are: (d) Polymerized Hydrocarbon	**1**
	vii.	Refractories are classified into: (d) All of these	**1**
	viii.	Width of nano wires is: (c) 10^{-9}m	**1**
	ix.	This group is not an auxochrome: (c) –C=C	**1**
	x.	Standard electrode potential of hydrogen electrode is: (c) Zero	**1**
Q.2	i.	Characteristics of Municipal water 0.5 mark for each point (0.5 mark *4)	**2**
	ii.	Any four sources of water describing their characteristics and properties. 0.75 mark for each point (0.75 mark *4)	**3**
	iii.	Calculate the hardness of sample water in ppm.	**5**
OR	iv.	Describe complexometric titration to calculate hardness of water on the basis of: (a) Principle of EDTA titration 3 marks (b) Role of buffer 2 marks	**5**
Q.3	i.	Chemical fuel definition 1 mark Example. 1 mark	**2**
	ii.	Definition of knocking 1 mark Its relationship with chemical structure 1 mark Octane rating of the fuel. 1 mark	**3**
	iii.	Merits 2.5 marks Demerits 2.5 marks	**5**
OR	iv.	Definition of Bio gas 1 mark Advantages and disadvantages 2 marks Ray diagram of bio gas plant. 2 marks	**5**
Q.4	i.	(a) Definition of biodegradable polymers 1 mark Example and Explanation 1 mark (b) Differentiate between natural and synthetic rubbers Definition 1 mark Differentiation 1 mark	**4**
	ii.	Three types of mechanisms of lubricants Explanation 1 mark each (1 mark *3) 3 marks Diagram 0.5 mark for each (0.5 mark *3) 1.5 marks Example 0.5 mark for each (0.5 mark *3) 1.5 marks	**6**
OR	iii.	Chemical formula 1 mark Properties 2 marks Uses of PVC. 3 marks	**6**
Q.5		Write short note on any two:	
	i.	Manufacture of cement Process 2 marks Diagram & explanation 3 marks	**5**
	ii.	Superconductor and their uses. Definition and Example 2 marks Uses and Explanation 3 marks	**5**
	iii.	Preparation properties and uses of fullerene. Structure 1 mark Preparation 1 mark Property 1 mark Uses 2 marks	**5**

Q.6	i.	Draw electromagnetic radiation spectrum marking the wavelengths with the names of radiations. Diagram with labelling		**3**
	ii.	Instrumentation Diagram	1 mark	**7**
		Explanation	2 marks	
		Uses of NMR spectroscopy.	4 marks	
OR	iii.	Any five applications of EMF measurements.		**7**
		5 Application	5 marks	
		Explanation	2 marks	

******