Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination Dec 2024

EN3BS14 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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	Which lubricant is used in railway tracks? (a) Graphite (b) Molybdenum disulphide (c) Axle grease (d) Lard oil	**1**	01	01, 02, 06, 07, 12	01	
	ii.	Viscosity Index is Hundred (100) for- (a) Paraffinic base Gulf oil (b) Paraffinic base Pennsylvanian oil (c) Naphthenic base Gulf oil (d) Naphthenic base Pennsylvanian oil	**1**	01	01, 02, 06, 07, 12	01	
	iii.	Bakelite is formed by the reaction of_____? (a) Hexamethylene diamine and adipic acid (b) Adipic acid and methyl amine (c) Phenol and formaldehyde (d) Styrene and butadyene	**1**	01	01, 02, 06, 07, 12	01	
	iv.	Deoxyribose Nucleic Acid is an example- (a) Biopolymer (b) Biodegradable polymer (c) Natural rubber (d) Synthetic rubber	**1**	01	01, 02, 06, 07, 12	01	
	v.	Which of the following material is used in telecommunication? (a) Fullerene (b) Nanowires (c) CNT (d) Optical fibres	**1**	01	01, 02, 06, 07, 12	01	

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vi.	Which of the following superconductor is known as hard superconductor? (a) Type I Superconductor (b) Type II Superconductor (c) Type III Superconductor (d) None of these	**1**	01	01, 02, 06, 07, 12	01		
vii.	The wavelength of UV-Visible spectroscopy ranges from? (a) 200 – 400nm (b) 400 – 800nm (c) 200 – 800nm (d) None of these	**1**	01	01, 02, 06, 07, 12	01		
viii.	Bathochromic band shift is relevant to shift towards- (a) Shorter wavelength (b) Longer wavelength (c) Higher energy (d) Higher frequency	**1**	01	01, 02, 06, 07, 12	01		
ix.	Gibbs free energy is expressed as- (a) $\Delta G^\circ = \Delta H^\circ + T\Delta S^\circ$ (b) $\Delta G^\circ = \Delta H^\circ / T\Delta S^\circ$ (c) $\Delta G^\circ = \Delta H^\circ * T\Delta S^\circ$ (d) $\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$	**1**	01	01, 02, 06, 07, 12	02		
x.	Which of the following is not a state function? (a) Enthalpy (b) Gibbs free energy (c) Work (d) Entropy	**1**	01	01, 02, 06, 07, 12	02		
Q.2 i.	Define aniline point along with its significance.	**2**	01	01, 02, 04, 07, 12	02		
ii.	Classify liquid lubricant with example.	**3**	02	01, 02, 03, 05, 06, 07, 09, 12	03		
iii.	Compare and outline the differences between hydrodynamic and boundary lubrication (with diagram).	**5**	02	01, 02, 03, 05, 07	04		
OR iv.	Distinguish the differences between Cleaveland open cup and Penskey Martin closed cup apparatus along with diagram.	**5**	02	01, 02, 03, 05, 07	04		
Q.3 i.	Explain Biodegradable polymers and its advantages.	**2**	01	01, 02, 04, 07, 12	02		

ii.	Give the classification of polymer.	**3**	02	01, 02, 03, 05, 06, 07, 09, 12	03		
iii.	Execute the preparation (with chemical reaction) and application (at least 4) of Bakelite.	**5**	03	01, 02, 03, 04, 06, 09, 12	05		
OR iv.	Articulate the vulcanization process (with chemical reaction) and application of vulcanized rubbers.	**5**	03	01, 02, 03, 04, 06, 09, 12	05		
Q.4 i.	Discuss about fullerene and its structure.	**2**	01	01, 02, 04, 07, 12	02		
ii.	Illustrate the different classification of optical fibers.	**3**	02	01, 02, 03, 05, 06, 07, 09, 12	03		
iii.	Elucidate the properties and application of superconductors.	**5**	03	01, 02, 03, 04, 06, 09, 12	05		
OR iv.	Illustrate the properties and application of graphene.	**5**	03	01, 02, 03, 04, 06, 09, 12	05		
Q.5 i.	Explain different types of electronic transition.	**2**	02	01, 02, 03, 05, 06, 07, 09, 12	03		
ii.	Outline the instrumentation of IR spectroscopy along with diagram.	**3**	02	01, 02, 03, 05, 07	04		
iii.	Describe the principle and application of UV-Visible Spectroscopy.	**5**	03	01, 02, 03, 04, 06, 09, 12	05		
OR iv.	Discuss the principle and application of gas chromatography.	**5**	03	01, 02, 03, 04, 06, 09, 12	05		
Q. 6	Attempt any two:						
i.	Elucidate EMF and its application.	**5**	03	01, 02, 03, 04, 06, 09, 12	05		
ii.	Compare and contrast between wet and dry corrosion.	**5**	02	01, 02, 03, 05, 07	04		
iii.	Contrast and compare the differences between enthalpy and entropy.	**5**	02	01, 02, 03, 05, 07	04		

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Marking Scheme
EN3BS14 Engg Chemistry

Q.1	i)	**(a) Graphite**	**1**
	ii)	**(b) Paraffinic base Pennsylvanian oil**	**1**
	iii)	**(c) Phenol and formaldehyde**	**1**
	iv)	**(a) Biopolymer (b) Biodegradable polymer**	**1**
	v)	**(d) Optical fibres**	**1**
	vi)	**(b) Type II Superconductor**	**1**
	vii)	**(c) 200 – 800nm**	**1**
	viii)	**(b) Longer wavelength**	**1**
	ix)	**(d) $\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$**	**1**
	x)	**(c) Work**	**1**

Q.2	i.	Definition	– 1 mark	**2**
		Significance	– 1 mark	
	ii.	Three Types (each carry 1 marks)		**3**
	iii.	At least 5 differences		**5**
		Difference	– 3 marks	
		Diagram	-2 marks	
OR	iv.	At least 5 differences		**5**
		Difference	– 3 marks	
		Diagram	-2 marks	

Q.3	i.	Definition	– 1 mark	**2**
		Advantages	– 1 mark	
	ii.	At least 3 Classifications		**3**
	iii.	Preparation	– 1 mark	**5**
		Chemical Reaction	– 2 mark	
		Application (4 at least) - each carrying 0.5 marks		
OR	iv.	Process	- 1 mark	**5**
		Chemical reaction	- 2 marks	
		Application (4 at least) - each carrying 0.5 marks		

Q.4	i.	Definition	– 1 mark	**2**
		Structure	– 1 mark	
	ii.	Three Types (each carry 1 marks)		**3**
	iii.	Properties	-2.5 marks	**5**
		Application	-2.5 marks	
OR	iv.	Properties	-2.5 marks	**5**
		Application	-2.5 marks	

Q.5	i.	Four types of electronic transition		**2**
	ii.	Diagram	-1 mark	**3**
		Instrument explanation	-2 mark	
	iii.	Principle	-2 mark	**5**
		Application	-3 mark	
OR	iv.	Principle	-2 mark	**5**
		Application	-3 mark	

Q. 6	i.	Definition + Formula	-2 mark	**5**
		Application	-3 mark	
	ii.	At least 5 differences (1 marks each)		**5**
OR	iii.	At least 5 differences (1 marks each)		**5**

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