TED (21)1004

(Revision-2021)

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Reg.No.....

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2023

APPLIED CHEMISTRY

[Maximum marks: 75] [Time: 3 Hours]

PART A

I. Answer all the following questions in one word or one sentence. Each question carries 1 mark

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	Which quantum number defines the three-dimensional shape of an atomic orbital?	M1.02	U
2	The type of bond formed when the shared pair of electrons are contributed by only one of the combining atoms is called ..... bond.	M1.03	U
3	Write the relationship between pH and pOH.	M2.02	U
4	What is the reason for hardness of water?	M2.03	U
5	In salt water NaCl would be considered as the.....	M2.01	U
6	A one atom thick layer of carbon atoms is called.....	M3.03	R
7	Name the monomer of natural rubber.	M3.02	R
8	According to electronic concept, removal of electrons is	M4.01	U
9	What is a non-electrolyte?	M4.03	R

PART B

II. Answer any eight questions from the following. Each question carries 3 marks.

(8 x 3 = 24 Marks)

		Module outcome	Cognitive level
1	State Heisenberg's uncertainty principle. Give its mathematical statement.	M1.02	U
2	Explain the formation of a covalent bond with an example.	M1.03	U
3	Calculate the molarity of the solution containing 10.6g Na_2CO_3 in 500mL. (Atomic weight of Na-23, C-12, O-16)	M2.01	A
4	Hard water does not produce lather readily with soap. Give reason.	M2.03	U
5	Calculate the pH of 0.01M NaOH solution.	M2.02	A
6	Differentiate between homo polymers and copolymers. Give one example for each.	M3.02	U
7	Write a note on safety glass.	M3.01	R
8	What are carbon nanotubes? How are they classified?	M3.03	R
9	What is a fuel cell? Give one example.	M4.04	R
10	State Faraday's first law of electrolysis. Give its mathematical statement.	M4.02	R

PART C

Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Write the postulates of Bohr's model of atom. Give any three demerits of Bohr's atom model. (7 marks)	M1.01	R
	OR		
IV	(a) Write the de Broglie relation for a material particle and explain the terms. Calculate the de Broglie wavelength for an electron moving with a velocity of 10^4 ms^{-1}. (h = 6.625 x 10^{-34} kgm^2s^{-1}, m = 9.1 x 10^{-31}kg) (5 marks)	M1.02	U
	(b) State Aufbau principle. (2 marks)	M1.02	R
V	(a) What are buffer solutions? How are they classified? Write one example for each type. (5 marks)	M2.02	R
	(b) Suggest suitable indicators for the following titrations. (i)Na_2CO_3 x HCl (ii) NaOH x $H_2C_2O_4$ (2 marks)	M2.01	A
	OR		
VI	(a) Explain ion-exchange method for the removal of permanent Hardness. (5 marks)	M2.03	U
	(b) What is boiler scale? (2 marks)	M2.03	R
VII	(a) List any five applications of pH. (5 marks)	M2.02	R
	(b) 20 ml of NaOH solution was neutralized by 25ml of HCl solution of normality 0.01. Find the normality of NaOH solution. (2 marks)	M2.01	A
	OR		
VIII	(a) Draw a flow chart showing the production of potable water for municipal supply. (5 marks)	M2.04	U
	(b) What is soda lime process? (2 marks)	M2.03	R
IX	(a) What is refractory material? List the characteristics of refractories? (5 marks)	M3.01	R
	(b) List the merits of Vulcanisation. (2 marks)	M3.02	R
	OR		
X	(a) Explain the classification of nanomaterials based on dimension with one example for each. (5 marks)	M3.03	U
	(b) What are the components of brass and bronze? (2 marks)	M3.01	R
XI	(a) Write any four differences between electrolytic cell and electrochemical cell. Give one example for each. (5 marks)	M4.03	U
	(b) Define electrochemical series. (2 marks)	M4.04	U

	OR		
XII	(a) Define corrosion. Explain the cathodic protection method for the prevention of corrosion. (5 marks) (b) Define electrolysis. (2 marks)	M4.05 M4.03	U R
XIII	(a) Explain the electroplating of Nickel on mild steel object. (5 marks)	M4.03	U
	(b) Distinguish between electrolytes and non – electrolytes. (2 marks)	M4.03	U
	OR		
XIV	(a) Calculate the mass of silver deposited by the electrolysis of $AgNO_3$ solution by passing a current of 6A for 10 minutes. (Equivalent weight of Ag = 106g, IF = 96500C) (5 marks)	M4.02	A
	(b) What is secondary cell? Give one example. (2 marks)	M4.04	U

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