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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

ENGINEERING CHEMISTRY - I

[Time: 3 hours

(Maximum marks: 100)

PART — A

(Maximum marks: 10)

Marks

- I Answer all questions in one or two sentences. Each question carries 2 marks.
 - 1. What is hard water? Give the reason for hardness.
 - 2. Give any two physical properties of water.
 - 3. What is the role of Platinum in contact process for the manufacture of H₂SO₄?
 - 4. Human Blood has a constant PH of 7.4. How is this maintained?
 - 5. What is alloy? Why is Carbon added to Iron in the manufacturing of steel?

 $(5 \times 2 = 10)$

PART — B

(Maximum marks: 30)

- II Answer any five of the following questions. Each question carries 6 marks.
 - 1. Explain the important features of solid catalyst with suitable examples.
 - 2. What is bronsted theory of acids and bases? Write the conjugate pair of the following.
 - (a) HCl

(b) HNO.

(c) NH,

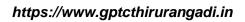
- (d) CH₃COO
- 3. Write any three important applications of pH. Calculate the pH of 0.01M H₂SO₄.
- 4. What is CNT? Write its important properties.
- 5. (a) What are the disadvantages of using hard water in boiler?
 - (b) What is sterilisation of water? Mention any two methods.
- 6. Explain fusion method for the preparation of Brass. Give the composition of Brass.
- 7. Write the physical properties of metals.

 $(5 \times 6 = 30)$



2

Marks PART — C (Maximum marks: 60) (Answer one full question from each unit. Each full question carries 15 marks.) Unit — I 5 III (a) Distinguish between atom and molecule. (b) Give any 4 applications of nanomaterial. (c) What are catalytic promoter and catalytic poison? Give 2 examples each. OR (a) Give the applications of CNT. (b) Explain any two methods of preparation of CNT. 6 (c) What is homogeneous and heterogeneous catalysis? Give 2 examples. Unit — II (a) What is neutralisation? Explain on the basis of Arrhenius theory and Lewis theory. (b) What is ionic product of water? Give its mathematical statement and value at 25°C. (c) Calculate the Normality and Molarity of H₂SO₄ solution containing 4.9 gm of acid in 500ml. (At wt of S - 32, H - 1, O - 16) (ii) Na, CO, solution containing 5.3gm of base in 500ml. 6 (At wt of Na - 23, C-12, O-16) Or 5 VI (a) What is a buffer solution? How is it classified, give examples. (b) Calculate the pH of (i) 0.01 M HC1 (ii) 0.01 M NaOH (c) What are indicator? Suggest a suitable indicator for the titration of 6 HCl × Na,CO, (ii) CH,COOH × NaOH. Justify your answer. Unit -- III 5 VII (a) Explain Ion Exchange method for removal of permanent hardness of water. 4 (b) What are the advantages of reverse osmosis in desalination of water? (c) What is potable water? What are the characteristics of potable water? 6







		Mark	CS				
VIII	(a)	What is desalination of water? Explain desalination by reverse osmosis.	5				
	(b)	What is temporary hardness? A solution of Ca(HCO ₃) ₂ is boiled and the residue obtained is filtered off. Is the remaining solution soft water explain your answer.					
	(c)	Draw a flow chart and explain the process of making potable water.	6				
		Unit — IV					
IX	(a)	What are the purposes of making alloy ?	5				
	(b)	Give any two limitations and advantages of powder metallurgy.	4				
	(c)	Explain: (i) annealing (ii) Quenching (iii) Tempering and (iv) Nitriding. How does it affect the properties of steel?					
		OR					
X	(a)	Impurities in steel changes the physical properties. Give the effect of the following elements in steel.					
		(i) P (ii) S (iii) N (iv) O and (v) M_n	5				
	(b)	What are the uses of powder metallurgy ?	4				
	(c)	Explain powder metallurgy with the different steps involved	6				