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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST - 1

Even Semester: 2018-19

Course Code: CHE 101

Course Name: Engineering Chemistry

Programme & Sem: B.Tech (Chemistry Cycle) & II Sem

Date: 06 March 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. Why is hardness always expressed in terms of equivalents of Calcium Carbonate
2. State law of chemical equivalence.
3. Define End Point and Equivalence Point

Part B

Answer **any two** Questions. **Each** question carries **eight** marks. (2Qx8M=16)

4. What are Precipitation titrations? Explain Argentometric titration methods with reactions.
5. a) Mention any four advantages of Instrumental method of analysis over Titrimetric analysis
b) What is Zeolite? Explain Zeolite process of water treatment with reactions and suitable diagram.
6. Explain Complexometric titration with a suitable example and an indicator
7. a) What is Caustic Embrittlement? How it can be avoided?
b) Explain removal of microorganisms by bleaching powder method

Part C

Answer **any one** Question. Question carries **twelve** marks. (1Qx12M=12)

8. Calculate the temporary, permanent and total hardness (in degree Clarke and degree French) of a water sample containing: $\text{Ca}(\text{HCO}_3)_2 = 11 \text{ mg/L}$, $\text{Mg}(\text{HCO}_3)_2 = 10.5 \text{ mg/L}$, $\text{CaSO}_4 = 14.8 \text{ mg/L}$, $\text{MgSO}_4 = 13.0 \text{ mg/L}$, $\text{MgCl}_2 = 8.9 \text{ mg/L}$, $\text{NaCl} = 6.5 \text{ mg/L}$ (atomic wt: $\text{Ca}=40$; $\text{Mg}=24$; $\text{S}=32$; $\text{O}=16$; $\text{H}=1$; $\text{C}=12$; $\text{Cl}=35.5$; $\text{Na}=23$)

OR

9. Explain the different stages in the removal of suspended impurities with suitable reactions and diagram.



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**PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING**

TEST - 2

Even Semester: 2018-19

Course Code: CHE 101

Course Name: Engineering Chemistry

Program & Sem: B.Tech & II Sem (Chemistry Cycle)

Date: 15 April 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

- (i) Read the question properly and answer accordingly
- (ii) Question paper consists of 3 parts
- (iii) Scientific and non-programmable calculators are permitted

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. Define degree of polymerization with an example.
2. What is T_g? Write any two significances of T_g.
3. Write any two differences between electrolytic cells and galvanic cells.

Part B

Answer **any two** Questions. **Each** question carries **eight** marks. (2Qx8M=16)

4. Complete the below reaction with the chemical structure of the products,
 - a) Butadiene + Acrylonitrile ----->
 - b) Butadiene + Styrene ----->
 - c) Hexamethylene diamine + Sebacic acid ----->
 - d) Novolac Hexamethylenetetramine ----->
5. What is called compounding of plastics? Name and function of additives used in this process.
6. Explain the construction and cell reactions of lead-acid battery.
7. Describe the construction and working of Leclanche cell.

Part C

Answer **any one** Question. **Each** question carries **twelve** marks. (1Qx12M=12)

8. Describe the steps involved in the free radical polymerization mechanism.
9. Define fuel-cell. Mention the advantages of fuel cells over conventional batteries. Give the cell representation and cell reactions of Hydrogen-Oxygen fuel cell.



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PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM/MAKE UP END TERM EXAMINATION

Semester: Summer Term 2019

Date: 25 July 2019

Course Code: CHE 101

Time: 2 Hours

Course Name: Engineering Chemistry

Max Marks: 80

Program & Sem: B. Tech & (ODD Sem) (2017&2018 Batch)

Weightage: 40%

Instructions:

- (i) Read the questions properly and answer accordingly
- (ii) Question paper consists of 3 parts

Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. What is corrosion? Write any four differences between dry corrosion and wet corrosion.
2. What are fuels? Explain gross/high and net/low calorific values of fuels.
3. What are refractories? Write the requisite properties (any four) of a good refractory.
4. What is knocking? Define Cetane and Octane number.

Part B

Answer **all** Questions. **Each** question carries **ten** marks. (3Qx10M=30)

5. What is the principle of Bessemer process for production of steel? Describe Bessemer process with labelled diagram.
6. Discuss differential metal and differential aeration corrosion with suitable example.
7. What is electroplating? Describe the process of electroplating of hard and decorative chromium.

Part C

Answer **any two** Questions. **Each** question carries **fifteen** marks. (2Qx15M=30)

8. What is Gibb's phase rule? Explain phase diagram of water system by applying phase rule.
9. Define cracking with relevant reaction. Explain fluidized bed catalytic cracking with a neat labelled diagram.
10. Calculate the Total hardness, Temporary Hardness and Permanent hardness of a water sample containing the following: $Mg(HCO_3)_2$: 8.5 mg/L ; $MgSO_4$: 4.8 mg/L ; $MgCl_2$: 4.9 mg/L ; $CaSO_4$: 12.1 mg/L ; $Ca(HCO_3)_2$: 7.2 mg/L. (Atomic Weights: Ca:40, Mg: 24, H: 1, C: 12, O:16, S: 32, Cl: 35.5, N: 14)



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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

SUMMER TERM/MAKE UP END TERM EXAMINATION

Semester: Summer Term 2019

Date: 25 July 2019

Course Code: CHE101

Time: 3 Hours

Course Name: Engineering Chemistry

Max Marks: 80

Program & Sem: B.Tech & II Sem (Even) (2018 Batch)

Weightage: 40%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **one** mark.

(2Qx10M=20M)

1a. Match the following

A	Potentiometry	i	Polyamide
B	Refractories	ii	Corrosion increases
C	Galvanization	iii	Determination of pH
D	Silicon rubber	iv	Coke
E	As the ratio of anodic to cathodic area decreases	v	Withstand >3000°C
F	Bessemerisation Process	vi	Potential
G	Nylon 6,6	vii	Anode is +ve, cathode is -ve
H	pKa	viii	Inorganic polymer
I	Beehive oven process	ix	Steel
J	Electrolytic cell	x	Coating Zn on Fe

1b. Choose the correct answer

- i. Indicator used in Iodine experiments is _____
a. EBT b. Ferrion c. Starch d. methyl orange
- ii. which one among the following is a thermosetting polymer
a. polyethylene b. PVC c. Bakelite d. all the above
- iii. Hardness of water can be expressed in terms of
a. ppm b. degree Clarke c. degree French d. all the above
- iv. As the standard electrode potential increases rate of corrosion
a. Decreases b. increases c. remains same d. all the above
- v. Simple biproducts are eliminated in _____ polymerization process
a. Addition b. copolymerization c. condensation d. all the above
- vi. A good refractory should have
a. Dimensional stability b. Refractoriness c. chemical inertness d. all the above
- vii. Electrolyte used in Lead acid battery is
a. KOH b. H₂SO₄ c. Lithium halide d. NH₄Cl

- viii. At triple point of water degrees of freedom $F =$
- 0
 - 1
 - 2
 - 3
- ix. The process of suddenly cooling hot steel to required temperature is called
- Annealing
 - Quenching
 - Tampering
 - all the above
- x. Knocking can be minimized by using
- Antiknocking agents
 - higher octane number fuel
 - critical compression ratio
 - all the above

Part B

Answer **any 6** Questions. **Each** question carries **five** marks. (6Qx5M=30M)

- Give the classification of fuels. Mention examples for each.
- Discuss the process of electroless plating of Nickel with relevant reactions.
- With a neat labelled diagram explain the fluidized bed catalytic cracking process.
- Write a note on differential metal corrosion. Give an example.
- Discuss the process of bessemerisation of steel with labelled diagram.
- Mention any 5 characteristics of a good fuel.
- Write the flow chart for setting and hardening of cement.
- Define the following: a. GCV b. Knocking c. Phase d. Annealing e. Corrosion

Part C

Answer **any 2** Questions. **Each** question carries **fifteen** marks. (2Qx15M=30M)

- What is Gibbs phase rule? Discuss the application of phase rule to water system with a neat labelled phase diagram.
- With a neat labelled diagram discuss the process of manufacturing of cement.
- Calculate the Temporary hardness, Permanent hardness and Total hardness in ppm, degree French and degree Clarke units by the following data: $\text{Ca}(\text{HCO}_3)_2 = 10 \text{ mg/L}$, $\text{Mg}(\text{HCO}_3)_2 = 20 \text{ mg/L}$, $\text{CaSO}_4 = 30 \text{ mg/L}$, $\text{MgSO}_4 = 5 \text{ mg/L}$. Given that: Atomic weight of $\text{Ca} = 40$, $\text{Mg} = 24$, $\text{S} = 32$, $\text{O} = 16$, $\text{C} = 12$ and $\text{H} = 1$



Roll No

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Even Semester: 2018-19

Course Code: CHE101

Course Name: Engineering Chemistry

Program & Sem: B.Tech & II Sem (Chemistry Cycle)

Date: 21 May 2019

Time: 3 Hours

Max Marks: 80

Weightage: 40%

Instructions:

- (i) Read the question properly and answer accordingly.
(ii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** Question carries **one** mark.

(20Qx1M=20M)

1. Choose the correct answer

- i. Indicator used in complexometric titration is _____
a. Starch b. Ferrion c. EBT d. methyl orange
- ii. Which one among the following is a thermosetting polymer
a. Polyethylene b. PVC c. Bakelite d. all the above
- iii. Hardness of water can be expressed in terms of
a. ppm b. degree Clarke c. degree French d. all the above
- iv. This is not a type of corrosion
a. Differential metal b. Differential aeration
c. Stress Corrosion d. Differential weight
- v. Simple byproducts are eliminated in _____ polymerization process
a. Addition b. copolymerization c. condensation d. all the above
- vi. A good refractory should have
a. Dimensional stability b. Refractoriness c. chemical inertness d. all the above
- vii. Electrolyte used in Lead acid battery is
a. KOH b. H₂SO₄ c. Lithium halide d. NH₄Cl
- viii. At triple point of water, Degrees of Freedom (F) =
a. 0 b. 1 c. 2 d. 3
- ix. The process of sudden cooling hot steel to required temperature is called
a. Annealing b. Quenching c. Tempering d. all the above

- x. Knocking can be minimized by using
- Antiknocking agents
 - higher octane number fuel
 - critical compression ratio
 - all the above

2. Match the following

A	Potentiometry	i	Polyamide
B	Refractories	ii	H ₂ – O ₂
C	Galvanization	iii	Determination of pH
D	Nylon 6,6	iv	Total Hardness
E	pKa	v	Withstand >3000°C
F	Electrolytic cell	vi	Potential
G	EDTA	vii	Anode is +ve, cathode is -ve
H	Fuel cell	viii	Fuel
I	Temporary + Permanent Hardness	ix	Ethylenediaminetetraacetic acid
J	LPG	x	Coating Zn on Fe

Part B

Answer **any six** Questions. **Each** question carries **five** marks. (6Qx5M=30M)

- Give the classification of fuels. Mention examples for each.
- Discuss the process of electroplating of hard chromium.
- With a neat labelled diagram explain the fluidized bed catalytic cracking process.
- Write a note on differential metal corrosion. Give an example.
- Discuss the process of Bessemerization of steel with labelled diagram.
- Explain the Beehive oven method of coking process.
- Write the flow chart for setting and hardening of cement.
- Explain the Fischer-Tropsch process of production of synthetic petrol.

Part C

Answer **any two** Questions. **Each** question carries **fifteen** marks. (2Qx15M=30M)

- What is Gibbs phase rule? Discuss the application of phase rule to water system with a neat labelled phase diagram.
- Discuss the process of manufacturing of cement with suitable reactions.
- Calculate the Temporary hardness, Permanent hardness and Total hardness in ppm, degree French and degree Clarke units by the following data: Ca(HCO₃)₂=10 mg/L, Mg(HCO₃)₂=20 mg/L, CaSO₄=30 mg/L, MgSO₄=5 mg/L. Given that: Atomic weight of Ca=40, Mg=24, S=32, O=16, C=12 and H=1