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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKE-UP EXAMINATION JULY 2024**

**Semester**: II Semester

**Course Code**: CHE 1013

**Course Name**: Chemistry for Engineers

**Program** : B.Tech,

**Date**: 02 July 2024

**Time**: 1:30 PM to 4:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the question properly and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and Non-programmable calculators are permitted.*

**Part A [Memory Recall Questions]**

**Answer ANY TEN Questions. Each question carries 2 marks. (10Qx2M=20M)**

1. Name the mode of Charge transport in an electrolyte **(C.O.NO.1) [Knowledge Level]**

2. Define electrode potential **(C.O.NO.1) [Knowledge Level]**

3. List the qualities of solar energy **(C.O.NO.2) [Knowledge Level]**

4. Between Zinc and copper, Zinc acts as anode. Give a reason

**(C.O.NO.1) [Knowledge Level]**

5. Complete the following reaction, Li + MnO2 🡪 **(C.O.NO.1) [Knowledge Level]**

6. Name the material that is used as a cathode material for K-ion battery,

**(C.O.NO.1) [Knowledge Level]**

7. List the applications of Electrochemical series **(C.O.NO.1) [Knowledge Level]**

8. Mention the characteristics of PV Cells **(C.O.NO.2) [Comprehension Level]**

9. Define a capacitor and a Super capacitor **(C.O.NO.2) [Comprehension Level]**

10. List the structural properties of Graphene **(C.O.NO.3) [Comprehension Level]**

11. Define any one technique under Bottom-Up approach for Nanomaterial Synthesis

**(C.O.NO.3) [Comprehension Level]**

12. List the advantageous properties of nanomaterials in general

**(C.O.NO.3) [Comprehension Level]**

**Part B [Thought Provoking Questions]**

**Answer ANY FIVE Questions. Each question carries 10 marks. (5Qx10M=50M)**

13. Find the classification of a potassium ion battery, explain its construction and net cell reaction.  **(C.O.NO.1) [Knowledge Level]**

14. Differentiate between a Supercapacitor and a Battery

**(C.O.NO.2) [Comprehension Level]**

15. Describe the process of zone refining of silicon and its importance **(C.O.NO.2) [Comprehension Level]**

16. Describe the construction, cell representation and reactions of a Hydrogen-Oxygen

fuel cell. **(C.O.NO.1) [Comprehension Level]**

17. The nanomaterials can be synthesized by top-down and bottom-up approaches.

Differentiate top-down and bottom-up approaches for synthesizing nanomaterials.

**(C.O.NO.3) [Application Level]**

18. Correlate the size of the particles with their electrical, thermal, catalytic and optical

properties. **(C.O.NO.3) [Application Level]**

19. Production of electricity by thermal power plants is not a very efficient method and is a major source of pollution. We know that a galvanic cell directly converts chemical energy into electricity and is highly efficient. One of the most successful cell uses the reaction of hydrogen with oxygen to form water. Identify the name of that cell and illustrate its work with the diagram to understand that it is an eco-friendly device

**(C.O.NO.1) [Comprehension Level]**

**Part C [Problem Solving Questions]**

**Answer ANY TWO Questions. Each question carries 15 marks. (2Qx15M=30M)**

21) a) Explain the classification of batteries with two examples each (9 marks)

b) Explain the construction and cell reactions of Li-MnO2 battery (6 Marks) **(C.O.NO.1) [Comprehension Level]**

22) Explain in detail the different stages involved in the preparation of nanomaterials by

sol-gel process? **(C.O.NO.3) [Application Level]**

22) Construct the battery with the following materials,

a) LiCoO2 b) Graphite c) LiPF6 d) Dimethyl carbonate e) separator

Write the net cell reactions and applications of the above battery.

**(C.O.NO.1) [Knowledge Level]**