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**Question Paper Code : 51407**

**B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**First Semester**

**Civil Engineering**

**CY 2111/CY 14/080010001 – ENGINEERING CHEMISTRY - I**

**(Common to all Branches)**

**(Regulations 2008)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. Define alkalinity in water. How is alkalinity classified ?
2. Distinguish between soft water and demineralised water.
3. Write the repeating units for PVC and Teflon.
4. What are the important constituents of a composite ?
5. What is an isotherm ? What are its types ?
6. What is an adsorbent ?
7. Write an equation of a nuclear fission reaction.
8. What are fuel cells ?
9. Define viscosity index. How it is determined ?
10. What are the special characteristics of carbon nanotubes ?

**PART – B (5 × 16 = 80 Marks)**

11. (a) (i) Describe the methods of internal treatment of boiler water.  
(ii) Draw and explain break point chlorination curve.

**OR**

- (b) (i) Explain the following boiler troubles :  
(1) Scales and sludges  
(2) Caustic embrittlement.  
(ii) What is desalination ? Explain one method of desalination in detail.

12. (a) (i) Write the preparation, properties and uses of SBR and butyl rubber.  
(ii) What do you understand by vulcanization of rubber ? What are the advantages and disadvantages ?

**OR**

- (b) (i) List the differences between addition and condensation polymerization.  
(ii) Write a note on fiber reinforced polymer composites with suitable examples.

13. (a) (i) Derive Langmuir's adsorption isotherm.  
(ii) What are the factors affecting rate of adsorption ?

**OR**

- (b) (i) What are the differences between physisorption and chemisorption ?  
(ii) Derive Gibb's adsorption equation.

14. (a) (i) What is a nuclear reactor ? Explain the process of power generation using a neat diagram.  
(ii) Write a note on lithium batteries.

**OR**

- (b) (i) What are solar cells ? What are the challenges involved in the Conversion of solar energy into useful energy ?  
(ii) Explain the mechanism of hydrogen oxygen fuel cell.

15. (a) (i) What are refractories ? How are they classified ? Give essential requirements of good refractory material.  
(ii) Write notes on solid lubricants.

**OR**

- (b) (i) With a neat sketch, explain the mechanism of lubrication.  
(ii) How are carbon nanotubes prepared ? Describe any two methods.

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**Question Paper Code : 11294**

**B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**First Semester**

**Civil Engineering**

**MA 1101 – MATHEMATICS – I**

**(Common to all branches)**

**(Regulations 2008)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. Find the sum and product of the Eigen values of the matrix  $A = \begin{bmatrix} 1 & 2 & -2 \\ 1 & 0 & 3 \\ -2 & -1 & -3 \end{bmatrix}$ .
2. Find the characteristic equation of the matrix  $\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ .
3. Show that the sphere with center (1, 2, -2) and radius 3, passes through the origin.
4. Write down the equation of the cylinder whose axis is y – axis and the distance between the axis and the generating curve is a.
5. Find the radius of curvature of the parabola  $y^2 = 4ax$  at  $y = 2a$ .
6. If the center curvature of a curve at a variable point 't' on it is  $(2a + 3at^2, -2at^3)$ , find the evolute of the curve.