Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 40922

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

First Semester

Civil Engineering

CY 6151 – ENGINEERING CHEMISTRY – I

(Common to all branches except Marine Engineering)

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions.

PART – A   (10×2=20 Marks)

1. Explain functionality of a monomer with a suitable example.

2. What are co-polymers ? Give an example.

3. Predict the condition for spontaneous.

4. Define entropy.

5. State Beer-Lambert Law.

6. Define the terms chromophores and auxochromes with examples.

7. Calculate number of phases in $NH_4Cl_{(s)} \leftrightarrow NH_{3(g)} + HCl_{(g)}$.

8. What are the basic difference between brass and bronze ?

9. What is meant by nanochemistry ?

10. Differentiate the terms nano rods and nano wire.

PART – B   (5×16=80 Marks)

11. a) i) Bring out the differences between thermoplastics and thermosetting resins.   (8)

      ii) Write synthesis, properties and uses of nylon 6:6.   (8)

           (OR)

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    b) i) Discuss in detail about emulsion polymerisation techniques. (8)

       ii) Explain free radical mechanism of polymerization with an example. (8)

12. a) i) What is meant by Vant Hoff isotherm ? Derive an expression for the isotherm of a general reaction $aA + bB \leftrightarrow lL + mM$. (8)

       ii) Derive Maxwell's relationship for $dE = q - pdv$ (8)

$$H = E + pv$$

(OR)

    b) i) Derive Clausius-Clapeyron equation and discuss its application. (8)

       ii) Derive an expression for entropy change of reversible isothermal expansion of an ideal gas. (8)

13. a) i) Explain the principle of IR spectroscopy. Give its block diagram and explain the functions of the various components. (8)

       ii) State and explain Stark-Einstein and Beer-Lambert Law. Derive its mathematical expression and mention two of its limitations. (8)

(OR)

    b) i) With the help of a Jablonski diagram explain photophysical processes. (8)

       ii) Explain various electronic transitions occurring in UV spectroscopy. (8)

14. a) i) With the a neat phase diagram explain the salient features of Zn-Mg system. (8)

       ii) Write in detail on 1) stainless steel and 2) nichrome. (8)

(OR)

    b) i) Draw and explain the phase diagram of water system. (8)

       ii) What are the objectives of heat treatment ? Discuss any four heat treatment methods applied to improve the properties of alloys. (8)

15. a) i) Distinguish between bulk, molecule and nanomaterials. (8)

       ii) Write short notes on the following : 1) Nanoclusters 2) Nanotubes. (8)

(OR)

    b) i) Explain about the size dependent properties of nanomaterials. (8)

       ii) Discuss the solvothermal and electro-deposition method of synthesis of nanomaterials. (8)

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