CODE: 13BS1005   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, June-2017
ENGINEERING CHEMISTRY
(Common to ME, CE, CSE & IT)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) Write the monomers of nylon-6,6.
    b) Which constituent of cement causes its initial setting?
    c) Explain the role of nascent oxygen in ozonisation.
    d) Write the common units for hardness of water.
    e) What is pilling – Bed worth rule?
    f) Give the examples for anodic inhibitors.
    g) What is meant by knocking?
    h) Define a lubricant.
    i) What is meant by solar energy?
    j) Give the examples for nano materials.

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. (a) Distinguish between thermoplastic and thermosetting resins.   **4M**
    (b) Explain the wet process for Portland cement.   **8M**

(OR)

3. (a) Give the manufacture and uses of:(i) Teflon (ii) Bakelite   **6M**
    (b) Write the chemistry of setting and hardening of cement.   **6M**

UNIT-II

4. (a) Describe the estimation of hardness of water by EDTA method?   **8M**
    (b) Discuss the disadvantages of hard water.   **4M**

(OR)

5. (a) Describe the desalination of brakish water by Reverse Osmosis method?   **6M**
    (b) Explain the Ion-Exchange process.   **6M**

UNIT-III

6. (a) Explain the mechanism of dry corrosion.   **8M**
    (b) Write a note on galvanic corrosion, concentration cell corrosion.   **4M**

(OR)

7. (a) How is corrosion prevented by cathodic protection? Explain.   **6M**
    (b) Discuss the factors influencing corrosion.   **6M**

UNIT-IV

8. (a) Write short notes on (i) Anti Knocking Agents (ii) Octane.   **4M**
    (b) Explain fractional distillation of petroleum.   **8M**

(OR)

9. (a) Mention in detail the synthesis of petrol by Bergius process.   **6M**
    (b) Discuss the classification of lubricants with examples.   **6M**

UNIT-V

10. (a) Explain the photo voltaic cells with neat diagram.   **6M**
     (b) Explain the properties of nano materials   **6M**

(OR)

11. (a) Explain the principles of green chemistry.   **6M**
     (b) Give the engineering and biomedical application of nano materials.   **6M**

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ENGINEERING PHYSICS
(Common to EEE& ECE)

Time: 3 hours   Max. Marks: 70

PART-A

Answer all questions   **[10X1= 10M]**

1. a) Why cannot we obtain interference using two independent sources of light?
   b) What is population inversion?
   c) What is an optical fiber?
   d) Define coordination number.
   e) Obtain important conclusion from $E = \frac{n^2 h^2}{8ml^2}$.
   f) Does diffraction of light gives us some information about the nature
      (longitudinal/transverse) of light waves?
   g) What will be wavelength of an electron of energy 100eV?
   h) What is a primitive cell?
   i) Define piezoelectricity.
   j) Give examples of diamagnetic substances.

PART-B

Answer one question from each unit   **[5X12= 60M]**

UNIT-I

2. a) Describe Young's experiment for demonstration of interference of light. Derive an
      expression for fringe width.
   b) In Young's double slit experiment the distance between the slit is 0.5mm and distance
      of the screen from coherent source is 50cm. If the fringe width 0.05cm. Find the
      wavelength of light.   [9M+3M]

(OR)

3. a) What is Diffraction and give examples.
   b) Mention the types of diffraction and give the differences between them.
   c) In Fraunhofer diffraction at a single slit, the first diffraction maxima falls at 15^0 with a
      slit width 2.5 μm. Find the wavelength of light.   [2M+6M+4M]

UNIT-II

4. a) Explain the requirements of a laser system.
   b) Explain construction and working of He-Ne laser with the help of suitable diagrams.
                                                                          [4M+8M]

(OR)

5. a) What is meant by Acceptance angle for an optical fiber? Obtain expression for
      Numerical Aperture and Acceptance angle.
   b) Calculate the Numerical Aperture and Acceptance angle for an optical fiber with core
      and cladding refractive indices being 1.48 and 1.45 respectively. [8M+4M]

UNIT-III

6. a) Describe the seven crystal system with suitable examples.
   b) Calculate the packing factor of simple cubic structure. [7M+5M]

(OR)

7. a) What are the important features of miller indices?
   b) Show that $d = \frac{a}{\sqrt{h^2+k^2+l^2}}$ of a plane. [5M+7M]

UNIT-IV

8. a) Discuss about classification of magnetic material in detail.
   b) What are soft and hard magnetic materials? Give their characteristic properties.
   [7M+5M]

(OR)

9. a) Explain electronic polarizability. Derive an expression for electronic polarizability.
   b) Define Polarization vector and Electric displacement. Give the relation between E, D and P vectors. [8M+4M]

UNIT-V

10. a) Define i) Mean free path   ii) Drift velocity   iii) Mobility   iv) Relaxation time
    of electrons in metals with expression.
    b) A wire has resistivity of 1.58 X 10^{-8}Ω-m at room temperature. There are 5.8 X 10^{28} electrons per m^3. Calculate (i) relaxation time (ii) mobility. [8M+4M]

(OR)

11. a) Derive an expression for de Broglie wavelength of an electron.
    b) Deduce time independent Schrodinger wave equation. [7M+5M]

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