CODE:13BS1004
ADITYA INSITIUTE OF TECHNOLOGY AND MANAGEMENT,TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, April-2014
Engineering Physics
(Common to CE, ME, CSE & IT)

Time:3 hours   Max Marks:70

PART-A
Answer all questions   **[10X1=10]**

1. a). Why the central spot of Newton's Rings is dark?

   b). what type of wavelets are involved in fraunhofer diffraction?

   c). What type of pumping system is used in Ruby Laser?

   d).Define Numerical Aperture

   e). How many effective number of atoms a unit cell of BCC lattice contain?

   f). Sketch [101] plane in a cube.

   g). What is the susceptibility value of dia magnetic materials?

   h). Show that $P = \epsilon_0(\epsilon_r -1)E$

   i). what is the physical significance of wave function according to max Born?

   j). calculate the wavelength associated with an electron with energy 2000eV.

PART-B

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

Unit-I

2. a) Describe and explain the phenomenon of interference of light by young's
       double slit experiment.
   b) In Newton's rings experiment, the diameter of the 15th ring was found to be 0.59cm
      and that of the 5th ring was 0.336cm. if the radius of the plano convex lens is 100cm,
      compute the wavelength of light used.   [8M+4M]

(OR)

3. a) Explain what is meant by diffraction of light. How diffraction is different from
       interference?
   b) obtain the condition for primary maxima in Fraunhofer diffraction due to single slit.
                                                                                         [4M+8M]
Unit-II
4. a) Derive the relation between the probabilities of spontaneous and stimulated emissions
      in terms of Einstein's coefficients.

   b) Mention application of laser in medicine and industry?   [8M +4M]

(OR)

5. a) Explain the principle behind the functioning of optical fiber? Obtain the condition for light wave propagation in an optical fiber?

    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) Explain the terms lattice,Basis,Unit Cell and Primitive cell.

    b) Show that FCC is the most closely packed of all structures.   [4M+8M]

(OR)

7. a) What are Miller indices ? How are they obtained?

    b) Find out the miller indices of a plane whose intercepts are a ,b/2 and 3c.   [8M +4M]

Unit-IV

8. a) Define the terms 'magnetic susceptibility' and 'magnetic induction.

    b) What are the sources of permanent dipole moment in magnetic materials?

    c) Distinguish between dia,para and ferro magnetic materials.   [2+6+4]

(OR)

9. a) Explain the electronic polarizability in atoms and obtain an expression for electronic polarizability in terms of the radius of the atom.

    b) What is meant by polarization? Define various types of polarizations.   [8M+4M]

Unit-V

10. a) what are the assumptions of classical free electron theory.

    b) Obtain the expression for electrical conductivity of a metal on the basis of classical free electron theory.   [4M +8M]

(OR)

11. a) Show that the energy of a particle is quantized in one dimensional potential box.

    b) An electron is confined in one-dimensional potential well of width 3×10^{-10}m. Find the energy of electron when it is in the ground state.   [8M+4M]

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(AUTONOMOUS)
I B.Tech. I Semester Supplementary Examinations, April-2014
ENGINEERING CHEMISTRY
(Common to ECE, EEE)

Time: 3 hours   **Max Marks: 70**
<u>**PART – A**</u>
Answer all questions   **[10X1 = 10M]**

1. (a) Write the chemical structure of monomer of Teflon.
   (b) How many types of cements are there?
   (c) A water sample contains chlorides of Ca, K, Na and Mg. Which of these impurities are responsible for hardness of the sample?
   (d) Write the full form of EDTA.
   (e) Give an example of anodic inhibitor.
   (f) Define Pilling Bedworth Rule.
   (g) Define Octane number.
   (h) What is aniline point of a lubricant?
   (i) What do you mean by atom economy?
   (j) Expand MWNT.

<u>**PART – B**</u>
Answer one question from each unit   **[5X12 = 60M]**
Unit – I
2. a) Write any four differences between thermoplastics and thermosetting resins.
   b) What are polyesters? Explain preparation of any polyester with chemical equations.
   c) Explain the chemical composition of Portland cement.   [4M + 4M + 4M]
   (OR)
3. a) Distinguish addition and condensation polymerization with suitable examples.
   b) Write the preparation and properties of a Nylon polymer.
   c) Explain setting and hardening of Portland cement with chemical equations.

   [4M + 4M + 4M]

Unit – II
4. a) Explain the following methods used in the treatment of drinking water.
      i) Coagulation   ii) Breakpoint chlorination

   b) A water sample on analysis was found to contain the following: $Mg(HCO_3)_2$ = 83 mg/L, $Ca(HCO_3)_2$ = 134 mg/L, $CaSO_4$ = 124 mg/L, $MgCl_2$ = 84 mg/L, $CaCl_2$ = 94 mg/L and NaCl = 50 mg/L. Calculate the temporary and permanent hardness.   [6M + 6M]
   (OR)

5. a) Explain the principle and process of ion-exchange process of water treatment.
   b) Explain the principle and process of reverse osmosis of water purification. [6M + 6M]

Unit – III

6. a) Explain the mechanism of oxygen absorption corrosion with relevant chemical equations and diagram.
   b) Write the principle and process of corrosion control by sacrificial anodic protection.
   [6M + 6M]

(OR)

7. a) Distinguish dry corrosion and wet corrosion.
   b) Explain the effects of pH and temperature on corrosion rate with suitable examples.
   c) How do you protect underground pipelines from corrosion using impressed current method?
   [2M+4M+6M]

Unit – IV

8. a) Explain the synthesis of petrol using Fischer-Tropsch process.
   b) Explain thin film lubrication mechanism. [6M + 6M]

(OR)

9. a) What is cracking? Explain fixed bed catalytic cracking.
   b) Explain following properties of lubricating oils.
   i) Viscosity   ii) Flash & Fire points [6M + 6M]

Unit – V

10. a) How do you convert solar energy into electricity using photovoltaic cells? Explain principle and method.
    b) Mention any four applications of CNTs. [8M + 4M]

(OR)

11. a) Explain any three applications of green chemistry in engineering fields.
    b) Explain top down and bottom up approaches. [6M + 6M]

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