

Time: 3 Hours**Max Marks: 70M**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of question must be answered at one place only

UNIT-I

1. a) Define Interference? 2M
 - b) Derive the condition for path difference for interference in parallel thin film due to reflected light? 8M
 - c) In a Newton's rings experiment the diameter of the 15th and 5th rings were 0.59 and 0.336 cm. If the wave length of light used is 5890 Å. Calculate the radius of the plano-convex lens? 4M
- (OR)**
2. a) Distinguish between Interference and Diffraction 4M
 - b) Explain Fraunhofer Diffraction due to a single slit and derive conditions for principle maxima, secondary maxima and minima. Draw intensity distribution curve. 10M

UNIT-II

3. a) Explain the three quantum processes that may occur when light radiation interacts with matter with neat diagrams 6M
 - b) Explain construction and working of Ruby laser with help of neat diagrams 8M
- (OR)**
4. a) Define acceptance angle and numerical aperture. Derive the expression for both of them 8M
 - b) Explain the differences between the step index fiber and graded index fiber 6M

UNIT-III

5. a) State Heisenberg uncertainty principle. Show that electrons cannot exist within the nucleus on the basis of the above principle. 8M
b) An electron beam is accelerated from rest through a potential difference of 10000 V. Calculate the associated wavelength. 4M
c) Why is the wave nature of matter not apparent to our daily observation? Give a suitable example to illustrate the point. 2M

(OR)

6. a) Derive the Eigen values and Eigen functions for a particle in one dimensional box. 8M
b) Give the comparison between the MB, BE, FD statistics. 6M

UNIT-IV

7. a) What are the properties of dia, para and ferromagnetic materials? 8M
b) What is the Bohr magneton? Derive the expression for the Bohr magneton. 6M

(OR)

8. a) Give an account of domain theory of ferromagnetism. 6M
b) Distinguish between soft and hard magnetic materials. 4M
c) Explain the concept of magnetostriction and its applications. 4M

UNIT-V

9. a) Define the terms i) electric field intensity ii) electric displacement iii) Dielectric constant iv) susceptibility v) Relation between D,E and P 6M
b) Describe the phenomenon of electronic polarization and obtain an expression for electronic Polarizability in terms of radius of the atom. 8M

(OR)

10. a) Explain the phenomenon of Ferro electricity with particular reference to the BaTiO_3 . 6M
b) Explain the frequency dependence of polarization. 4M
c) Explain the various applications of dielectric materials. 4M

AR16

CODE: 16BS1004

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I B.Tech I Semester Regular & Supplementary Examinations, December-2017

ENGINEERING CHEMISTRY

(Common to CE, EEE & ME Branches)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place.

UNIT-I

1. (a) Differentiate between addition polymerisation and condensation polymerisation with suitable examples 6M
 - (b) Describe a moulding method for thermoplastic resins with a neat diagram 8M
- (OR)**
2. (a) Explain the role of gypsum in setting and hardening of cement 6M
 - (b) What are the different steps involved in the manufacture of cement by the “wet process”? Discuss various reactions taking place in rotating kiln? 8M

UNIT-II

3. (a) What is meant by sterilisation of water ? Explain how sterilisation of water is carried out by using Chlorine & Ozone 6M
 - (b) What is hardness? State the Zeolite process for the removal of hardness of water 8M
- (OR)**
4. (a) A water sample contains $\text{Ca}(\text{HCO}_3)_2 = 32.4 \text{ mg/l}$; $\text{Mg}(\text{HCO}_3)_2 = 29.2 \text{ mg/l}$; $\text{CaSO}_4 = 13.5 \text{ mg/l}$. Calculate the temporary and permanent hardness of water in ppm and °Clarke and °French 9M
 - (b) What is reverse osmosis ? How is seawater purified using this technique ? 5M

UNIT-III

5. (a) Explain the rusting of Iron with the help of electrochemical theory of corrosion 8M
(b) Discuss the following
(i) A copper equipment should not possess a small steel bolt 3M
(ii) Impure metal corrodes faster than pure metal under identical conditions 3M

(OR)

6. (a) Differentiate between chemical corrosion and electrochemical corrosion 6M
(b) Explain the mechanism of differential aeration corrosion. Give two examples where differential aeration effects are seen 8M

UNIT-IV

7. (a) With the help of a labelled diagram describe the fractional distillation of crude petroleum and name the various products obtained with their industrial uses 8M
(b) What is meant by knocking ? Describe the function of TEL 6M

(OR)

8. (a) Define a Lubricant. How does lubrication occur by thin film boundary lubrication ? 6M
(b) What is viscosity ? Explain the determination of the viscosity index of lubricating oil. Suggest measures to improve the viscosity index of an oil sample 8M

UNIT-V

9. (a) What is single electrode potential ? Explain construction and working of a calomel electrode 7M
(b) Explain Faraday's law of electrolysis 7M

(OR)

10. (a) How can you obtain electricity from solar energy ? Explain the principle and working of a solar cell. 7M
(b) What is green house effect ? Describe it with a neat diagram 7M

AR13

CODE: 13BS1004

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, DECEMBER-2017

ENGINEERING PHYSICS
(Common to CIVIL, MECH, CSE, IT)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is the Principle of super position of waves.
b) Define diffraction of light.
c) What is meant by population inversion.
d) What is the acceptance angle of optical fibre.
e) What is unit cell.
f) Define Miller indices.
g) Define magnetic permeability.
h) Define electric field.
i) Define mobility of electrons.
j) What is the physical significance of wave function.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Derive the expressions for diameters of dark and bright rings in Newton's rings experiment. **8M**
b) In Newton's rings experiment the diameter of 8th ring was 0.35 cm and diameter of 18th ring was 0.65cm. If the wavelength of light used is 6000\AA . Find the radius of curvature of plano convex lens. **4M**

(OR)

3. a) Describe Fraunhofer diffraction due to single slit and deduce the expressions for maxima and minima. **8M**
b) Comparison between Fresnel and Fraunhofer diffractions of light. **4M**

UNIT-II

4. a) What are characteristics of laser light. **4M**
b) With the suitable diagrams explain the construction and working of Ruby Laser. **8M**

(OR)

5. a) Explain the basic principle of optical fibre. **4M**
b) Derive the expressions for i) Acceptance angle and ii) Numerical Aperture of optical fibre. **8M**

UNIT-III

6. a) Define i) Space lattice and ii) Basis **4M**
b) Deduce the packing fraction of BCC structure. **8M**

(OR)

7. a) Draw the following planes in simple cube i) (111) ii) (732) and iii) (001) **6M**
b) Derive an expression for inter planar spacing between parallel planes having Miller indices (h k l). **6M**

UNIT-IV

8. a) Explain the classification of magnetic materials into dia, para and ferro materials **8M**
b) Find the relative permeability of ferromagnetic material if field of strength 220A/m produces magnetisation of 3300A/m in it. **4M**

(OR)

9. a) Define i) Displacement vector and ii) Dielectric constant. **4M**
b) Describe the phenomenon of electronic polarization and obtain the expression for electronic polarizability. **8M**

UNIT-V

10. a) Define i) Mean free path and ii) Drift velocity. **4M**
b) Obtain an expression for electrical conductivity of a metal on basis of classical free electron theory. **8M**

(OR)

11. a) Derive an expression for de Broglie wavelength of an electron. **4M**
b) Describe G.P. Thomson's experiment to verify the dual nature of matter. **8M**

AR13

CODE: 13BS1005 **SET-2**
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, December-2017
ENGINEERING CHEMISTRY
(Common to ECE, EEE)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define addition polymerization?
- b) What is a gypsum plaster?
- c) What are the uses of P.V.C.
- d) What is meant by hardness of water?
- e) What is concentration cell corrosion?
- f) Give examples for metals used as sacrificial anodes.
- g) What is meant by cracking?
- h) Write the importance of neutralization number of a lubricant.
- i) What is green house effect?
- j) What are photo voltaic cells?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Discuss the preparation, properties and applications of i) Teflon ii) Nylon 6:6
- b) Describe the manufacturing process of cement with a neat diagram.
(6+6)

(OR)

3. a) Discuss the chemistry of setting and hardening of cement.
- b) Discuss about the moulding constituents of plastics. (6+6)

UNIT-II

4. a) What is break point chlorination? Explain
b) Explain reverse osmosis method.
c) What is the role of coagulants in purification of water? (4+4+4)

(OR)

5. a) Discuss zeolite method for softening of water. Mention its drawbacks.
b) Explain hot lime soda method for softening of water. Write the disadvantages. (6+6)

UNIT-III

6. a) Explain the mechanism of electrochemical corrosion of iron in the presence of acid.
b) What are the factors affecting the rate of corrosion? Suggest some prevention methods. (6+6)

(OR)

7. a) Explain i) Sacrificial anode method ii) Impressed current method.
b) Explain the role of corrosion inhibitors in prevention of corrosion. (6+6)

UNIT-IV

8. a) Discuss fractional distillation of petroleum with a neat diagram.
b) Explain the mechanism of hydrodynamic lubrication. (6+6)

(OR)

9. a) Write the significance of i) Cloud and Pour point
ii) Flash and Fire point.
b) Discuss about octane number and cetane number of fuels. (6+6)

UNIT-V

10. a) Write the 12 principles of green chemistry
b) Write the biomedical applications of nano materials (8+4)

(OR)

11. a) Explain preparation, properties and applications of carbon nano tubes.
b) Write engineering applications of green synthesis. (8+4)