# AR16

**CODE: 16BS1004** **SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**I B.Tech I Semester Supplementary Examinations, February-2018**

**ENGINEERING CHEMISTRY**

**(Common to CE, EEE & ME Branches)**

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

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

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**UNIT-I**

| | | | |
|---|---|---|---|
| 1. | a) | Define plastics and any five differences between thermoplastics and thermo setting plastics. | 7M |
| | b) | How moulding of plastics is carried out by a compression and injection methods | 7M |
| | | **(OR)** | |
| 2. | a) | Write note on setting and hardening of Portland cement | 8M |
| | b) | Write note classification of cements | 6M |

**UNIT-II**

| | | | |
|---|---|---|---|
| 3. | a) | How the hardness of water is determined by EDTA method | 8M |
| | b) | Write note on Break point chlorination | 6M |
| | | **(OR)** | |
| 4. | a) | Explain the softening of hard water by hot lime-soda process and mention it advantages. | 8M |
| | b) | What is disinfection process and how this process is carried out by Chlorination and Ozonisation | 6M |

**UNIT-III**

| | | | |
|---|---|---|---|
| 5. | a) | Write note on (i) Water-line corrosion (ii) Concentration cell corrosion | 6M |
| | b) | Define corrosion and explain the mechanism of electro chemical corrosion with suitable example | 8M |
| | | **(OR)** | |
| 6. | a) | What is the principle involved in Cathodic protection method and how corrosion can be controlled by sacrificial method | 8M |
| | b) | What are the factors affecting the rate of corrosion | 6M |

**UNIT-IV**

| | | | |
|---|---|---|---|
| 7. | a) | Define fuel and explain how the synthetic petrol is manufactured by Fischer – Tropsch method | 8M |
| | b) | Write note on classification of crude oil | 6M |
| | | **(OR)** | |
| 8. | a) | Explain the following (i)Flashpoint (ii)Aniline point | 6M |
| | b) | Define lubricant and write classification of lubricants with suitable examples | 8M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | a) | What is electrochemical series and write its significance | 6M |
| | b) | Describe the construction and working of calomel electrode | 8M |
| | | **(OR)** | |
| 10. | a) | Explain the conversion of solar energy into electrical energy by photo voltaic cells | 8M |
| | b) | Write note on Green house effect | 6M |



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# AR16

**CODE: 16BS1003** **SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**I B.Tech I Semester Supplementary Examinations, February-2018**

**ENGINEERING PHYSICS**

**(Common to ECE, CSE & IT 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 | Show that the diameter of $n^{th}$ dark ring is directly propositional to square root of natural number in Newton's rings | 8M |
| | b | Explain briefly interference of light due to thin films. | 2M |
| | c | In Newton's rings experiment, the diameters of $4^{th}$ and $12^{th}$ rings are 0.4 cm and 0.7 cm respectively. Calculate the diameter of $20^{th}$ dark ring. | 4M |

**(OR)**

| | | | |
|---|---|---|---|
| 2. | a | Derive the condition for obtaining minima for the diffraction pattern due to single slit. | 8M |
| | b | Explain clearly what is diffraction of light? | 2M |
| | c | Parallel light is normally incident on a single slight. The central maximum fans out at $30^0$ on both sides of the direction of the incident light of wave length 5000 Å. Calculate the slit width. | 4M |

## UNIT-II

| | | | |
|---|---|---|---|
| 3. | a | With a neat block and energy level diagrams, discuss the construction and working of Ruby LASER | 10M |
| | b | Discuss the various schemes of pumping mechanisms in LASERs. | 4M |

**(OR)**

| | | | |
|---|---|---|---|
| 4. | a | Distinguish between the step index and graded index fibres with relevant sketches. | 8 M |
| | b | Explain the terms acceptance angle and acceptance cone. | 6 M |

## UNIT-III

| | | | |
|---|---|---|---|
| 5. | a | Establish the one dimensional Schrödinger's wave equation for a particle confined in a box, hence give the discrete energy levels that are available to the particle. | 10M |
| | b | Determine the energy of the lowest three energy levels for an electron in a square well of width 3 Å. | 4M |

**(OR)**

| | | | |
|---|---|---|---|
| 6. | a | Explain the physical significance of wave function. Derive Schrodinger time independent equation. | 10M |
| | b | State uncertainty principle. Write its mathematical form for the following pairs of variables.<br>(i). Position and momentum<br>(ii). Energy and time | 4M |

## UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a | Distinguish between paramagnetic, diamagnetic and ferromagnetic substances. Also briefly the term ferrimagnetisms on the basis of magnetic dipoles of the atoms. | 10M |
| | b | Find the relative permeability of the ferromagnetic material if a magnetic field of strength 220 A/m produces magnetization of 3300 A/m in it. | 4M |

**(OR)**

| | | | |
|---|---|---|---|
| 8. | a | What are the soft and hard magnetic materials? Give their characteristic properties and applications. | 10 M |
| | b | Explain the significance of Curie temperature for a ferromagnetic material. | 4M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | a | Describe the phenomenon of electronic polarization and obtain the expression for electronic polarizability. | 10M |
| | b | The relative permittivity of argon is 1.000435. The number of atoms/$m^3$ is $2.7\times10^{25}$. Calculate atomic polarizability. | 4 M |

**(OR)**

| | | | |
|---|---|---|---|
| 10. | a | Derive expression for ionic polarizabilty. | 6 M |
| | b | Distinguish between polar and non-polar dielectrics. | 4M |
| | c | Discuss in details the various dielectric breakdown mechanisms. | 4M |



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# AR13

**CODE: 13BS1005** **SET-1**

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

## I B.Tech I Semester Supplementary Examinations, February-2018

**ENGINEERING CHEMISTRY**
**(Common to EEE & ECE)**

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

**PART-A**

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

1. a) What is meant by degree of polymerization?
   b) What are Puzzolona cements?
   c) Define Hardness of water.
   d) Write the chemical formula of Zeolite.
   e) What is meant by corrosion?
   f) Give the chemical formula of rusting of iron.
   g) Define fuel.
   h) What is aniline point?
   i) What is green Chemistry?
   j) What is a nano particle?

**PART-B**

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

**UNIT-I**

2. (a) Distinguish between addition and condensation polymerisation. **6M**
   (b) Give an account of (i) chemical composition of cement (ii) Setting and hardening of cement **6M**

**(OR)**

3. (a) Describe the moulding methods of plastics? **8M**
   (b) Write a brief account on the following (i)Function of gypsum in cement (ii) PVC **4M**

**UNIT-II**

4. (a) Describe the domestic water treatment methods. **8M**
   (b) Explain the break point of chlorination. **4M**

**(OR)**

**5.** (a) Explain the Zeolite process for softening of water. **6M**
   (b) Write a note on (i) chlorination (ii) ozonization. **6M**

**UNIT-III**

6. (a) Explain the theory of corrosion. **8M**
   (b) Write a note on inhibitors. **4M**

**(OR)**

**7.** (a) Explain the mechanism of wet corrosion. **8M**
   (b) Explain how proper designing can control corrosion. **4M**

**UNIT-IV**

8. (a) Describe the fractional distillation of petroleum with neat diagram. **8M**
   (b) Explain the following properties of lubricants (i) cloud point, (ii) pour point. **4M**

**(OR)**

9. (a) Mention in detail the synthesis of petrol by and Fischer-Tropschs process **6M**
   (b) Explain the thick film lubrication with its mechanism. **6M**

**UNIT-V**

10. (a) Explain the harnessing solar energy. **6M**
    (b) Write a short note on Carbon Nano Tubes **6M**

**(OR)**

11. (a) Explain the green synthesis and Engineering Applications. **8M**
    (b) Write a short note on Fullerenes. **4M**



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# AR13

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

**I B.Tech I Semester Supplementary Examinations, February-2018**

**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 meant by interference of light.
   b) What is the diffraction of light.
   c) What is the meta stable in laser system.
   d) What is meant by acceptance angle of optical fibre.
   e) What is primitive cell.
   f) State Bragg law.
   g) Define magnetic filed strength.
   h) What is the value of permittivity of free space or vaccum.
   i) Define the mean free path 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) Explain interference phenomenon in thin parallel film due to reflected light. **8M**
   b) A parallel beam of light of wavelength 5890 Å is incident on a glass plate having refractive index is 1.5 such that the angle of refraction in the plate is $60^0$ calculate the smallest thickness of the plate which will appear dark by reflected light. **4M**

**(OR)**

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

## UNIT-II

| | | | |
|---|---|---|---|
| 4. | a) | Explain the construction and working of He-Ne gas Laser. | **8M** |
| | b) | Mention any four applications of Laser. | **4M** |
| | | **(OR)** | |
| 5. | a) | Differences between Step Index fibres and Graded Index fibres | **6M** |
| | b) | Explain advantages of optical fiber in communication systems. | **6M** |

## UNIT-III

| | | | |
|---|---|---|---|
| 6. | a) | Define i) Coordination number and ii) Atomic radius | **4M** |
| | b) | Deduce the packing fraction of FCC structure. | **8M** |
| | | **(OR)** | |
| **7.** | a) | Draw the following planes in simple cube i) (101) ii) (100) and (123) | **6M** |
| | b) | State and explain Bragg's law. | **6M** |

## UNIT-IV

| | | | |
|---|---|---|---|
| 8. | a) | Deduce the relation between magnetic susceptibility and relative permeability | **4M** |
| | b) | Comparison between soft and hard magnetic materials | **8M** |
| | | **(OR)** | |
| 9. | a) | Define i) electric field and ii) Polarization vector | **4M** |
| | b) | Describe the phenomenon of electronic polarization and obtain the expression for electronic polarizability. | **8M** |

## UNIT-V

| | | | |
|---|---|---|---|
| 10. | a) | Define i) Drift velocity and ii) Relaxation time. | **4M** |
| | b) | Obtain an expression for electrical conductivity of a metal on basis of classical free electron theory. | **8M** |
| | | **(OR)** | |
| 11. | a) | Derive Schrodinger's time independent wave equation. | **8M** |
| | b) | Write the physical significance of wave function. | **4M** |



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