AR16

CODE: 16BS1003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, June-2017

ENGINEERING PHYSICS

(Common to CE, EEE & MECH 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 at one place

UNIT-I

1.	a)	What are thin films? Explain the concept of interference in thin films and derive the condition for constructive and destructive interference in the case of reflected light.	8M
	b)	Enumerate any two Applications of Interference	2M
	c)	Calculate the thickness of air film at 10^{th} dark ring in a Newton's rings system viewed normally by a reflected light of wave length 500nm. The diameter of the 10^{th} dark ring is 2mm.	4M

(OR)

2	a)	Distinguish between interference and diffraction	4M
	b)	Discuss the Fraunhofer diffraction at a single slit. Explain how it can be used to determine the slit width.	10M

UNIT-II

3.	a)	Explain the differences between Spontaneous and Stimulated emissions.	4M
	b)	What is Population Inversion?	2M
	c)	Explain the construction and working principle of a Helium-Neon Laser giving its energy level diagram.	8M

(OR)

4.	a)	Derive expression for acceptance angle for an optical fiber. How is it related to numerical aperture?	8M
	b)	Distinguish between step index and graded index optical fibers.	6M

UNIT-III

5. a) Explain the concept of wave –particle duality and obtain an expression for the wavelength of matter waves. 6M
   b) Calculate the wave length of electrons which are accelerated through a potential difference of 1600 Volts. 4M
   c) State Heisenberg's Uncertainty Principle. Discuss its Significance 4M

(OR)

6. a) Find the energy levels of a particle enclosed in a one dimensional potential box of infinite height. 10M
   b) Explain the physical significance of wave function 4M

UNIT-IV

7. a) What is Ferromagnetic Hysteresis? Explain retentivity and coercivity 6M
   b) Find the relative permeability of a ferromagnetic material if a field of strength 220amp/metre produces a magnetization 3300amp/metre in it. 4M
   c) Distinguish between hard and soft magnetic materials 4M

(OR)

8. a) What is ferromagnetism? Explain the properties of ferromagnetic materials 6M
   b) What are Ferrites? Enumerate their applications 4M
   c) Explain the concept of magnetostriction and its applications 4M

UNIT-V

9. a) Explain dielectric loss in dielectric materials. 4M
   b) Explain in detail, the phenomenon of ferroelectric hysteresis. 6M
   c) Define dielectric constant (ε_r) and polarizability (α). 4M

(OR)

10. a) Discuss in detail the various dielectric breakdown mechanisms? 6M
    b) Define polarization vector ($\bar{P}$) and electric susceptibility (χ_e). 4M
    c) Define Ionic polarization and derive expression of Ionic polarizability. 4M

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CODE: 16BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, June-2017

ENGINEERING CHEMISTRY

(Common to ECE, CSE & IT 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 at one place

UNIT-I

1.	a)	Differentiate between Thermoplastics and thermosetting plastics?	**7M**
	b)	Explain the manufacture of cement by any one method?	**7M**
		(OR)	
2.	a)	Differentiate between Addition and condensation polymerization process with very good number of examples?	**7M**
	b)	Discuss Setting and Hardening of cement using various Reactions?	**7M**

UNIT-II

3.	a)	Discuss cold and hot lime soda process of water softening with neat diagrams?	**10M**
	b)	Write the chemical reactions involved in Estimation of water hardness by EDAT?	**4M**
		(OR)	
4.	a)	Three samples of water are collected from Seethapuram (**SP**), Ayodhyapuram(**AP**) and Srirangam (**SG**). 100 mL of the water sample collected at **SP** requires 34 mL of 0.01 M EDTA solution on titration. 100 mL of the water sample collected at **AP** required 48 ml of 0.01 M EDTA solution on titration. 100 mL of the water sample collected at **SG** requires 15 mL of 0.01 M EDTA solution on titration. Discuss the results ?	**7M**
	b)	Explain Ion Exchange process of water softening with neat diagram?	**7M**

UNIT-III

5.	a)	When you look at several older cars that are showing initial signs of rust formation, where do you expect to find the most rust? What does this observation imply about conditions that lead to corrosion.Discuss MECHANISM.	**9M**

b) Explain what type of corrosion occurs when Screw & washer are made of different metals? **5M**

(OR)

6. a) Explain sacrificial anodic protection and impressed current cathode protection with a neat diagram. **10M**
   b) Explain how corrosion can be considered as extractive metallurgy in reverse. **4M**

UNIT-IV

7. a) Explain fractional distillation of refining of petroleum. **7M**
   b) What are the functions of lubricants? **7M**

(OR)

8. a) Explain the synthesis of petrol using Fischer-Tropsch process **7M**
   b) Write a brief note on extreme pressure lubrication? **7M**

UNIT-V

9. a) Draw a fully labelled diagram showing how you could measure the E^0 value for the Mg^{2+}/Mg system using a standard hydrogen electrode. Your diagram should show all the essential conditions for the experiment. (The Mg^{2+}/Mg system means having magnesium metal in contact with Mg^{2+}ions.). How would you modify the experiment to find the E^0 value for the Ag^{+}/Ag system? By considering the values obtained, explain which of the two metals, magnesium or silver, more readily forms positive ions in solution. **10M**
   b) The cost of electricity generated by solar thermal power plants currently is greater than that of electricity produced by burning fossil fuels. Given this economic fact, suggest some strategies that might be used to promote the use of environmentally cleaner electricity from photovoltaics **4M**

(OR)

10. a) Explain construction and working of **10M**
    i) Hydrogen electrode ii) Calomel electrode
    b) Discuss the construction and working of Photovoltaic cell? **4M**

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