AR20

CODE: 20BST107 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October-2022

CHEMISTRY

(Common to CE, EEE & ECE)

Time: 3 Hours **Max Marks: 60**

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)	Define carbonate and non-carbonate hardness of water. List the various disadvantages of hard water for domestic use.	4M
	b)	What is the principle of EDTA method? Describe the estimation of hardness of water by EDTA method.	6M
		(OR)	
2.	a)	Describe the demineralization process of water with the necessary reactions.	6M
	b)	Explain how sterilization of water is carried out by using ozone	4M
		UNIT-II	
3.	a)	Narrate various possible electronic transitions in UV-VIS Spectroscopy.	6M
	b)	Write about Bathochromic shift and Hypsochromic shift.	4M
		(OR)	
4.	a)	Write the importance of 'finger print region' in infrared spectroscopy?	6M
	b)	What causes shielding and deshielding in NMR spectroscopy?	4M
		UNIT-III	
5.	a)	Differentiate between addition and condensation polymerisation with suitable example.	6M
	b)	Define the terms functionality and degree of polymerisation.	4M
		(OR)	
6.	a)	What are the different constituents of compounding of plastics.	6M
	b)	Discuss preparation, properties and uses of PVC	4M
		UNIT-IV	
7.	a)	Write any two differences between electrophiles and nucleophile.	4M
	b)	Compare the mechanism of SN^1 and SN^2 reactions with suitable examples.	6M
		(OR)	
8.	a)	Give the mechanism of Claisen rearrangement.	6M
	b)	Explain why benzene undergoes electrophilic substitutions where alkenes undergo addition reaction.	4M
		UNIT-V	
9.	a)	Explain the mechanism of electrochemical corrosion.	6M
	b)	Write any two factors that influences the rate of corrosion.	4M
		(OR)	
10.	a)	How do you minimize the corrosion by impressed current cathodic protection? Explain with neat diagram.	6M
	b)	Distinguish between galvanizing and tinning.	4M
		UNIT-VI	
11.	a)	Explain the term green chemistry. What are its objectives?	4M
	b)	What is a photovoltaic cell? Explain how it works.	6M
		(OR)	
12.	a)	Describe the construction and working of a alkaline storage battery.	6M
	b)	Write a brief note on super capacitors.	4M

AR20

CODE: 20BST106 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October-2022

ENGINEERING PHYSICS

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60 M**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered in one place

UNIT-I

1.	a)	Derive the differential equation of damped wave motion.	6 M
	b)	Discuss the condition under which the oscillations are over damped	4 M
		(OR)	
2.	a)	Explain resonance and quality factors	6 M
	b)	Discuss over damped oscillations	4 M

UNIT-II

3.	a)	Explain the principle of the superposition theorem	3 M
	b)	Show that the radi of Newton's rings are in the ratio of the square roots of the natural numbers	7 M
		(OR)	
4.	a)	Derive the Fraunhofer Diffraction due to Single Slit	5 M
	b)	Give the theory of Fraunhofer diffraction due to a single slit and obtain the primary and secondary maxima conditions. Using this, obtain the intensity distribution curve.	5 M

UNIT-III

5.	a)	Discuss the characteristics of LASER	4 M
	b)	Distinguish between spontaneous and stimulated emission	6 M
		(OR)	
6.	a)	With the help of suitable diagrams, explain the principle, construction and working of the He-Ne gas laser.	7 M
	b)	Give the applications of LASER	3 M

UNIT-IV

7.	a)	Explain the terms numerical aperture and acceptance angle and derive expressions for them.	8 M
	b)	Discuss the structure of the optical fibre	2 M
		(OR)	
8.	a)	Give the difference between the step-index and graded-index fibre	7 M
	b)	List the applications of optical fiber	3 M

UNIT-V

9.	a)	Explain the terms i) Unit cell ii) Basis iii)Coordination number	3 M
	b)	Discuss the seven crystal system	7 M
		(OR)	
10.	a)	Define the coordination number and packing factor of a crystal.	3 M
	b)	Give the characteristics of the BCC crystal system	7 M

UNIT-VI

11.	a)	Draw the B-H curve for a ferromagnetic material and identify the retentivity and coercive field on the curve	7 M
	b)	Discuss the difference between soft and hard magnetic materials	3 M
		(OR)	
12.	a)	What is the Meissner effect? Explain.	7 M
	b)	List the applications of superconductors	3 M

AR20

CODE: 20BST105 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October-2022

APPLIED PHYSICS

(Common to CSE, IT & AIML)

Time: 3 Hours **Max Marks: 60**

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)	Derive an expression for maxima and minima intensity due to interference of reflected light from surface of a thin film.	7M
	b)	Distinguish between interference and diffraction.	3M
		(OR)	
2.	a)	Discuss the Fraunhoffer diffraction at a single slit. Obtain the conditions for principle maxima and minimum.	7M
	b)	A parallel beam of light ($\lambda = 5890 \times 10^{-8}$ cm) is incident on a thin glass plate (μ=1.5) such that the angle of refraction into the plate is 60^0. Compute the smallest thickness of the glass plate which will appear dark by reflection.	3M

UNIT-II

3.	a)	List out the basic requirements of laser.	4M
	b)	Explain the construction and working of Ruby laser	6M
		(OR)	
4.	a)	Distinguish spontaneous and stimulated emission of radiation.	4M
	b)	What is population inversion, How is it achieved in He-Ne Laser	6M

UNIT-III

5.	a)	Obtain expression for Numerical aperture of an optical fiber	6M
	b)	Compute the numerical aperture, acceptance angle and critical angle of the fiber having a core refractive index n_1 =1.50 and the refractive index of the cladding n_2= 1.45.	4M
		(OR)	
6.	a)	Explain the different types of optical fibres along with the refractive index profile and mode propagation sketches.	7M
	b)	Explain the advantages of optical fibers in communications.	3M

UNIT-IV

7.	a)	Define de-Broglie's Hypothesis . List out the properties of Matter Waves	4M
	b)	Derive expression for Time independent wave equation.	6M
		(OR)	
8.	a)	Obtain expression for Particle in One Dimensional Potential Box	6M
	b)	Explain the physical significance of wave function.	4M

UNIT-V

9.	a)	Derive Gauss law for electric fields.	6M
	b)	List out the applications of Maxwell's equations.	4M
		(OR)	
10.	a)	State and explain Biot - Savart law.	4M
	b)	Describe magnetic force acting on a current carrying coil.	6M

UNIT-VI

11.	a)	Distinguish between intrinsic and extrinsic semiconductor.	4M
	b)	What are drift and diffusion currents , Explain	6M
		(OR)	
12.	a)	State and explain Hall effect.	6M
	b)	The mobility of electrons and holes in an intrinsic semiconductor are 0.38 and $0.16 m^2/V - s$. Find the intrinsic conductivity if $n_i = 2.3 \times 10^{19}/m^3$.	4M

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AR18

CODE: 18BST108 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October-2022

CHEMISTRY

(Common to CE, ME, ECE Branches)

Time: 3 Hours **Max Marks: 60**

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)	Explain the postulates of valency shell electron pair repulsion theory(VSEPR)	8M
	b)	Draw the Molecular Orbital Energy Level diagram of CO	4M
		(OR)	
2.	a)	Write notes on following i) ionization energies ii) electron affinity	6M
	b)	Define hybridisation and explain SP^3d and SP^3d^2 hybridisation with suitable examples	6M

UNIT-II

3.	a)	Write the types of electronic transitions observed in UV-Visible spectroscopy	6M
	b)	Explain the terms i) Chromophore ii) Auxochrome.	6M
		(OR)	
4.	a)	Draw Jablonski diagram and explain fluorescence and phosphorescence	6M
	b)	Explain the principle of IR spectroscopy	6M

UNIT-III

5.	a)	Define corrosion. Explain chemical theory of corrosion.	6M
	b)	Explain the controlling of corrosion by modifying the environment	6M
		(OR)	
6.	a)	Discuss the working principle of reference electrodes namely standard hydrogen electrode and calomel electrodes with a neat sketch	6M
	b)	Define Corrosion and discuss the factors effecting the rate of corrosion	6M

UNIT-IV

7.	a)	Explain the mechanism of Pinacol-pinacolone rearrangement reaction	6M
	b)	Explain Diels-Alder reaction and its mechanism	6M
		(OR)	
8.	a)	Explain the following polymerisation reactions with suitable examples i) addition polymerization ii) condensation polymerisation	8M
	b)	Discuss the application of Ziegler- Natta catalysis with suitable example	4M

UNIT-V

9.	a)	Write a note on renewable & non-renewable energy sources.	6M
	b)	Explain the construction, working and cell reactions of alkaline battery	6M
		(OR)	
10.	a)	Define green chemistry and explain any five principles of green chemistry.	6M
	b)	Discuss the difference between Batteries and Super capacitors.	6M

AR18

CODE: 18BST106 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October-2022

APPLIED PHYSICS

(Common to EEE, CSE, IT Branches)

Time: 3 Hours **Max Marks: 60**

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 radii of Newton's rings proportional to square root of natural numbers	7 M
	b)	In Newton's ring experiment, diameter of 15^{th} dark ring was found to be 0.59 cm and that of 5^{th} ring 0.336 cm. The radius of curvature of the lens is 100 cm. Find wavelength of light.	5 M

(OR)

2.	a)	Explain formation of spectra by plane diffraction grating. Calculate number of possible orders for a plane diffraction grating.	7 M
	b)	How many orders will be visible, if the wavelength of light is 5000 Å. Given that the number of lines per centimetre on the grating is 6655.	5 M

UNIT-II

3.	a)	Derive expression for acceptance angle, acceptance cone and numerical aperture of an optical fiber?	7 M
	b)	The optical fiber has refractive indices of core and cladding are 1.46 and 1.45 respectively. Calculate numerical aperture and fraction difference in refractive index ?	5 M

(OR)

4.	a)	What are the conditions to produce total internal reflection in optical fiber.	4 M
	b)	Discuss the propagation of light in step index fiber and graded index fiber.	8 M

UNIT-III

5.	a)	What are matte waves? Write properties of matter waves. Obtain an expression for matter wave in terms voltage	7 M
	b)	Explain physical significance of wavefunction.	5 M

(OR)

6.	a)	Derive Schrödinger time dependent wave equation	7 M
	b)	Calculate the de Broglie wavelength of an electron whose kinetic energy is 10 eV.	5 M

UNIT-IV

7.	a)	State and explain Gauss law in electrostatics and magnetostatics.	6 M
	b)	Discuss the applications of Maxwell equations	6 M

(OR)

8.	a)	Derive differential form of Maxwell's equations.	8 M
	b)	Explain the concept of displacement current.	4 M

UNIT-V

9.	a)	Explain about n-type and p-type semiconductors. Indicate energy level diagram conduction band, valence band, donor and acceptor levels for n-type and p-type semiconductors.	8 M
	b)	Discuss about indirect bandgap semiconductor	4 M

(OR)

10.	a)	Describe drift and diffusion currents in a semiconductor and derive their expressions.	8 M
	b)	Write a short note on intrinsic semiconductors	4 M

AR16

CODE: 16BS1003 **SET-II**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October, 2022

ENGINEERING PHYSICS

(Common to CE, ME & EEE)

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

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UNIT-I

1.	a	With a ray diagram discuss the theory of thin films and Obtain the conditions for bright and dark fringes in the case of reflected system.	10
	b	A beam of light of wavelength 5800 Å is incident obliquely on a parallel film of refractive index 1.45. The angle of refraction into the film is 60°. Find the minimum thickness of the film which will appear dark by reflection?	4

(OR)

2.	a	Distinguish between Interference and Diffraction.	4
	b	Discuss in detail Fraunhofer diffraction due to single slit with energy distribution Curve.	10

UNIT-II

3.	a	Explain the characteristics of laser beam.	4
	b	Describe the construction and working of Ruby laser with a neat diagram.	10

(OR)

4.	a	Write the advantages of optical fibre in communication system.	6
	b	Derive an expression for acceptance angle and numerical aperture of optical fibre.	8

UNIT-III

5.	a	State Heisenberg's Uncertainty Principle. Discuss its Significance.	6
	b	Derive the Schrödinger time independent wave equations.	8

(OR)

6.	a	With suitable picturization of potential well and imposing boundary conditions, explain the formation of energy levels.	10
	b	Calculate the de- Broglie wavelength of an electron moving with velocity 10^9 m/sec. ($m_e = 9.11 \times 10^{-31}$ Kg).	4

UNIT-IV

7.	a	What is Bohr Magneton? Obtain an Expression for the Bohr Magnetron.	6
	b	Write the properties of dia, Para and Ferromagnetic materials.	8

(OR)

8.	a	What is ferromagnetic hysteresis? Explain retentivity and coercivity with neat diagram.	10
	b	Explain the concept of magnetostriction and its applications.	4

UNIT-V

9.		Discuss in detail the three types polarizations and their dependence on temperature.	14

(OR)

10.	a	Explain in detail, the phenomenon of ferroelectric hysteresis.	8
	b	Explain the structure of Barium Titanate in detail.	6

AR16

CODE: 16BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October-2022

ENGINEERING CHEMISTRY

(Common to ECE, CSE & IT)

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
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UNIT-I

1.	a	Differentiate between thermoplastic and thermosetting plastics	8M
	b	Discuss about compression and injection moulding methods.	6M
		(OR)	
2.	a	Write the classification of cements.	6M
	b	Describe the manufacturing of ordinary Portland cement	8M

UNIT-II

3.	a	With neat sketch discuss lime-soda process of water softening.	8M
	b	Define hardness of water. What are its various units? Write their interconversion.	6M
		(OR)	
4.	a	How can you produce soft water by ion exchange process? Explain.	8M
	b	Explain break point chlorination.	6M

UNIT-III

5.	a	Write the mechanism of chemical corrosion.	6M
	b	Discuss the effect various environmental factors on rate of corrosion.	8M
		(OR)	
6.	a	Discuss (i) stress corrosion (ii) waterline corrosion	8M
	b	Explain impressed current cathodic protection in corrosion control.	6M

UNIT-IV

7.	a	Describe Fischer-Tropschs method of manufacturing synthetic petrol.	6M
	b	Write note on extreme pressure lubrication and thin film lubrication	8M
		(OR)	
8.	a	With a neat sketch explain fractional distillation of crude oil.	6M
	b	Give a detailed account on aniline point and neutralization number.	8M

UNIT-V

9.	a	Discuss the construction and working of SHE.	6M
	b	Explain in detail about concentrated power plants.	8M
		(OR)	
10.	a	What are solar dish and parabolic troughs? Explain their significance.	8M
	b	Define and explain Faradays laws	6M

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CODE: 16BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October-2022

ENGINEERING CHEMISTRY

(Civil Engineering)

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

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2.	a	Write the classification of cements.	6M
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4.	a	How can you produce soft water by ion exchange process? Explain.	8M
	b	Explain break point chlorination.	6M

UNIT-III

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	b	Discuss the effect various environmental factors on rate of corrosion.	8M
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6.	a	Discuss (i) stress corrosion (ii) waterline corrosion	8M
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