AR18

CODE: 18BST106 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2021

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)	Explain how Newton's rings are formed in the reflected light. Derive an expression for the diameters of bright and dark rings.	8M
	b)	Explain the principle of superposition and list the types of interference.	4M
		(OR)	
2.	a)	Discuss in detail Fraunhofer diffraction due to double slit and draw the intensity distribution curve.	8M
	b)	What is meant by diffraction? Explain.	4M

UNIT-II

3.	a)	Draw a schematic layout of step - index and graded - index optical fibre and compare them.	8M
	b)	Calculate the numerical aperture and acceptance angle for an optical fibre with core and cladding refractive indices being 1.48 and 1.45 respectively.	4M
		(OR)	
4.	a)	Define the acceptance angle and numerical aperture. Obtain an expression for the numerical aperture of an optical fibre.	8M
	b)	The cladding of a step-index fibre has a refractive index of 1.40. If the numerical aperture of the fibre is 0.25, calculate the refractive index of the core material.	4M

UNIT-III

5.	a)	State and explain Heisenberg uncertainty principle. Write down the physical significance of wave function.	8M
	b)	State de-Broglie hypothesis and write the equation for wavelength associated with electrons.	4M
		(OR)	
6.	a)	Derive the time independent Schrödinger wave equation for a free particle confined in a one dimensional potential of width L.	8M
	b)	An electron is bound in one dimensional potential box of size 4×10^{-10} m. What will be its minimum energy?	4M

UNIT-IV

7.	a)	Explain Biot-Savart's law. Deduce an expression for the magnetic induction at a point due to an infinite straight conductor carrying current	8M
	b)	An infinitely long conductor carries a current of 10 mA. Find the magnetic field and intensity at a point 10 cm away from it.	4M
		(OR)	
8.	a)	Write Maxwell's equations in differential form.	8M
	b)	State and explain Gauss law of electrostatics.	4M

UNIT-V

9.	a)	Derive an expression for carrier concentration of an n type semiconductor.	8M
	b)	List the differences between and extrinsic and intrinsic semiconductor.	4M
		(OR)	
10.	a)	What is Hall Effect? List the applications of Hall Effect.	8M
	b)	List the differences between direct and indirect band semiconductors.	4M

RA / AR18

CODE: 18BST107 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2021

ENGINEERING PHYSICS

(CE Branch)

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)	What are under damped oscillations? deduce the equation of motion of a under damped harmonic oscillator	8M
	b)	On what factors does damping depend?	4M
		(OR)	
2.	a)	Derive the expression for quality factor in case of forced oscillation.	8M
	b)	Explain the concept of resonance	4M

UNIT-II

3.	a)	Explain Fraunhofer diffraction at a single slit	8M
	b)	Explain Huygen's principle.	4M
		(OR)	
4.	a)	Describe with necessary equation, how you will determine the refractive index of water using Newton's ring apparatus.	8M
	b)	A parallel beam of light is incident normally on a plane grating having 4300 lines/cm. A second order spectral line is found to be deviated through an angle of 300. Determine the wavelength of the spectral line.	4M

UNIT-III

5.	a)	Distinguish between Spontaneous emission and stimulated emission.	6M
	b)	Derive Einstein Coefficients	6M
		(OR)	
6.	a)	Describe the construction and working of a Semiconductor LASER.	8M
	b)	Write the applications of LASER.	4M

UNIT-IV

7.	a)	Distinguish between single mode and multi mode fibers.	6M
	b)	Explain fiber optics in communication with neat sketch.	6M
		(OR)	
8.	a)	What is acceptance angle of an optical fiber? Derive the expression for it.	8M
	b)	A step index fiber has a core of refractive index 1.5 and a cladding of refractive index 1.48. Calculate its critical angle.	4M

UNIT-V

9.	a)	Distinguish between dia, para, ferro and antiferro magnetic materials.	8M
	b)	State and explain Meissner effect.	4M
		(OR)	
10.	a)	What are superconductors? Write its applications.	6M
	b)	What are Ferrites? Write its applications.	6M

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AR18

CODE: 18BST108 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2021

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 valence shell electron pair repulsion theory.	8M
	b)	What is electron affinity? How does it varies in group and periods in periodic table?	4M
		(OR)	
2.	a)	Draw the molecular orbital diagram of O_2 and CO. Predict their magnetic behaviour.	8M
	b)	Explain the sp^3d hybridisation with an example.	4M

UNIT-II

3.	a)	Discuss the possible electronic transitions when energy is absorbed by a molecule in UV region.	8M
	b)	Explain about equivalent and non-equivalent protons in molecule.	4M
		(OR)	
4.	a)	Illustrate about hypsochromic shift and bathochromic shift.	6M
	b)	Summarize the salient features of IR spectroscopy.	6M

UNIT-III

5.	a)	What is EMF series? Discuss its importance.	6M
	b)	Explain the factors influencing the rate of corrosion.	6M
		(OR)	
6.	a)	Illustrate the construction and working of SHE.	6M
	b)	Explain the impressed current cathodic protection method for prevention of corrosion with an example.	6M

UNIT-IV

7.	a)	Explain Zeigler Natta catalysis with suitable example.	6M
	b)	Discuss the bimolecular mechanism involved in nucleophilic substitution reaction.	6M
		(OR)	
8.	a)	What is isomerism? Explain cis-trans isomerism with suitable examples.	6M
	b)	Distinguish between addition and condensation polymerization.	6M

UNIT-V

9.	a)	State and explain any six principles of green chemistry.	6M
	b)	Explain the construction and working of photo voltaic cell.	6M
		(OR)	
10.	a)	Illustrate the construction and working of Pb-Acid battery.	6M
	b)	Discuss the harnessing of solar energy by parabolic trough collector.	6M

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AR16

CODE: 16BS1003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2021

ENGINEERING PHYSICS

(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)	Discuss the theory of Newton's rings with relevant diagrams by reflected light and obtain the expressions for the diameters of bright and dark rings .	10M
	b)	In a Newton's rings experiment, the diameter of the 5^{th} ring is 0.30cm and the diameter of the 15^{th} ring is 0.62cm. find the diameter of the 25^{th} ring.	4M

(OR)

2.	a)	Comparison between Fresnel and Fraunhofer diffraction of light	4M
	b)	Explain in detail Fraunhofer diffraction of light due to a single slit.	10M

UNIT-II

3.	a)	What are the characteristics of laser beam.	4M
	b)	Discuss the construction and working of He-Ne gas laser.	10M

(OR)

4.	a)	Comparison between Step Index and Graded Index fiber.	4M
	b)	Comparison between single mode and multi modefibers	4M
	c)	Write the applications of optical fibers in communication.	6M

UNIT-III

5.	a)	Derive an expression for the wave function and energy of a particle confined in a one dimensional potential box using Schrodinger's wave equation.	10M
	b)	Calculate de Broglie wavelength of an electron accelerated to a potential of 54V.	4M

(OR)

6.	a)	Derive time independent Schrodinger's wave equation.	6M
	b)	What is the physical significance of wave function.	4M
	c)	Find the lowest energy of neutron confined to nucleus of size 10^{-14}m. Mass of neutron $1.67X10^{-27}$kg.	4M

UNIT-IV

7.	a)	What is magnetic material? Distinguish between a hard and a soft magnetic materials.	6M
	b)	Explain the terms i) Magnetic induction and ii) Magnetization. Show that $B=\mu_0(H+M)$.	4M
	c)	The magnetic field in the interior of a certain solenoid has the value of $6.5\times 10^{-4}T$ when solenoid is empty. When it is filled with iron, the field becomes 1.4 T. Find the relative permeability.	4M

(OR)

8.	a)	Discuss the classification of magnetic materials into dia, para and ferro magnetic materials.	8M
	b)	Explain the Domain theory of ferromagnetism.	6M

UNIT-V

9.	a)	Discuss frequency dependency of polarization in a dielectric material	8M
	b)	Write any six applicationsof dielectrics	6M

(OR)

10.	a)	Explain Spontaneous Polarization and variation of dielectric constant with temperature in Barium Titanate Crystal.	8M
	b)	Explain the concept of Piezoelectricity in quartz crystal.	6M

AR16

CODE: 16BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2021

ENGINEERING CHEMISTRY

(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)	Explain various types of polymerization with suitable examples.	8M
	b)	Write a note on any two methods of moulding of plastics.	6M
		(OR)	
2.	a)	What are the different raw materials used in cement? Explain chemical composition of cement.	8M
	b)	Explain hardening of cement with chemical reactions.	6M

UNIT-II

3.	a)	Discuss ion exchange process of softening of hard water.	8M
	b)	Explain how reverse osmosis is useful in desalination?	6M
		(OR)	
4.	a)	Give a detailed account on disinfectioning methods.	8M
	b)	Write the disadvantages of hard water to various industries.	6M

UNIT-III

5.	a)	With suitable equations explain the mechanism of wet corrosion	8M
	b)	What is galvanic series? Write its significance.	6M
		(OR)	
6.	a)	Explain any four factors that influence the rate of corrosion.	8M
	b)	How proper design of machine helps in corrosion control? Explain.	6M

UNIT-IV

7.	a)	Write in detail about fractional distillation of crude oil.	8M
	b)	Define and explain knocking and anti-knocking.	6M
		(OR)	
8.	a)	Discuss the mechanism of thin film and extreme pressure lubrication	8M
	b)	Explain neutralization number and mechanical strength of lubricants.	6M

UNIT-V

9.	a)	Explain the construction and working of calomel electrode.	8M
	b)	What is electrochemical series? Write its salient features.	6M
		(OR)	
10.	a)	Give the working of a solar power plant with neat sketch.	8M
	b)	Give the advantages of solar energy over others.	6M

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AR13

Code: 13BS1005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, February-2021
ENGINEERING CHEMISTRY
(Common to CIVIL, MECH, CSE & IT)

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

PART-A

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

1. a) Write the monomers of Bakelite and nylon.
   b) Which polymer is used in most of the commercial electrical appliances?
   c) What is EDTA? Write its structure.
   d) Define ppm.
   e) Define corrosion and write examples.
   f) What are corrosion inhibitors?
   g) Define cetane number
   h) Write any two properties of lubricants
   i) Give any two applications of nanomaterials.
   j) Define green chemistry.

PART-B

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

UNIT-I

2.	a	What is polymerization? Explain addition and condensation polymerization with suitable examples.	8M
	b	List out various constituents of cement. Write their functions.	4M
		(OR)	
3.	a	Discuss the preparation, properties and uses of Bakelite and Nylon-6,6.	6M
	b	Explain in detail about setting and hardening.	6M

UNIT-II

4.	a	Describe the methods of desalination of brackish water.	8M
	b	Distinguish between zeolite and ion exchange processes.	4M
		(OR)	
5.	a	How can you produce de-ionized water from hard water?	8M
	b	Differentiate between cold and hot LS methods	4M

UNIT-III

6.	a	Summarize galvanic and concentration cell corrosion.	6M
	b	With suitable chemical equations discuss the mechanism of dry corrosion	6M
		(OR)	
7.	a	Explain any six factors effecting rate of corrosion.	8M
	b	In what way environmental modification control corrosion?	4M

UNIT-IV

8.	a	With a neat sketch discuss the synthesis of petrol by Bergius process.	8M
	b	Define a lubricant. Explain the classification of lubricants.	4M
		(OR)	
9.	a	Discuss in detail about hydrodynamic lubrication and extreme pressure lubrication.	6M
	b	What is cracking? Describe moving bed catalytic cracking with a neat diagram.	6M

UNIT-V

10.	a	Outline the causes, consequences and prevention of green house effect.	6M
	b	Give engineering applications of nanomaterials	6M
		(OR)	
11.	a	Discuss various principles of green chemistry	8M
	b	List out any three properties of nanomaterials.	4M