AR18

CODE: 18BST106 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Regular & Supplementary Examinations, December, 2019

APPLIED PHYSICS

(Electronics and Communication Engineering)

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)	Describe the principle and formation of Newton's ring and give a method to determine wavelength of monochromatic light	8M
	b)	In Newton's rings experiment, the diameters of the 4^{th} and 12^{th} dark rings are 0.40 cm and 0.70 cm respectively. Find the diameter of the 20^{th} dark ring.	4M
		(OR)	
2.	a)	What are the differences between Interference and Diffraction	3M
	b)	Discuss the theory of Fraunhofer diffraction due to N slits	9M

UNIT-II

3.	a)	What is Optical fiber? What is the principle involved in its working	5M
	b)	Describe the step index fiber and explain the transmission of light through it	7M
		(OR)	
4.	a)	Draw the block diagram of fiber optic communication system and explain the function of each block	8M
	b)	What are the various applications of optical fibers	4M

UNIT-III

5.	a)	Show that wave length λ associated with an electron of mass m and kinetic energy E is given by $\lambda=h/\sqrt{2mE}$	6M
	b)	Explain the properties and Physical significance of wave function	6M
		(OR)	
6.	a)	Derive the time independent Schrodinger's wave equation for a free particle	8M
	b)	An electron in one dimensional box of size $4x10^{-10}$m. What will be its minimum energy	4M

UNIT-IV

7.	a)	Define and Explain Electric Potential. What are its units	3M
	b)	Derive an expression for electric field intensity due to uniformly charge spherical shell when point lies i) outside the shell and ii) inside the shell	9M
		(OR)	
8.	a)	Write Maxwell's equation in integral form	6M
	b)	Write Maxwell's equation in differential form.	6M

UNIT-V

9.	a)	Show that the intrinsic concentration n_i for a semiconductor is given by $n_i = (N_C N_V)^{1/2} e^{-Eg/2kT}$	8M
	b)	Write a short note : Drift and Diffusion currents	4M
		(OR)	
10.	a)	Explain the term Hall Effect? Derive the relation between Hall voltage and Hall coefficient	8M
	b)	Write any four Hall applications	4M

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AR18

CODE: 18BST107 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Regular & Supplementary Examinations, December, 2019

ENGINEERING PHYSICS

(Common to CE & ME 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)	Derive an expression for equation of motion of damped harmonic oscillator.	10M
	b)	What is quality factor?	2M

(OR)

2.	a)	What are forced vibrations? Give two examples.	8M
	b)	What is Resonance, Mention any two physical phenomena where resonance occurs.	4M

UNIT-II

3.	a)	Describe how you would use Newton's Rings to determine the wavelength of a monochromatic radiation and derive the relevant formula?	8M
	b)	In Newton's rings experiment the diameter of the 15^{th} ring was found to be 0.59cm and that of 5^{th} ring is 0.336cm. The radius of curvature of the lens is 100 cm. Find the wave length of light.	4M

(OR)

4.	a)	Explain Fraunhofer Diffraction due to a single slit.	8M
	b)	Distinguish between interference and diffraction	4M

UNIT-III

5.	a)	Distinguish spontaneous and stimulated emission of radiation.	4M
	b)	With the help of neat diagrams explain the construction and working of Semi conductor laser.	8M

(OR)

6.	a)	Establish the interrelation between the probabilities of spontaneous emission and stimulated emission in terms of Einstein's Coefficients.	8M
	b)	List out the characteristics of lasers.	4M

UNIT-IV

7.	a)	What are the step index fiber and graded index fiber? How does light propagate through step index fiber and graded index fiber?	8M
	b)	An optical fiber has a numerical aperture of 0.20 and a cladding refractive index of 1.59.Find the acceptance angle for the fiber in water which has a refractive index of 1.33.	4M

(OR)

8.	a)	Derive the expression for numerical aperture and acceptance angle.	8M
	b)	The numerical aperture of an optical fiber is 0.39. If the difference in the refractive indices of the material of its core and the cladding is 0.05, calculate the refractive index of the material of the core.	4M

UNIT-V

9.	a)	Draw the B-H curve for a ferromagnetic material and identify the retentivity, coercive field on the curve and explain them.	8M
	b)	Find the relative permeability of a ferromagnetic material if a field of strength 220 amp/metre produces a magnetization 3300 amp/metre in it.	4M

(OR)

10.	a)	Classify superconductors on the basis of Messiner effect	8M
	b)	Distinguish between soft and hard magnetic materials	4M

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AR18

CODE: 18BST108 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Regular & Supplementary Examinations, December, 2019

CHEMISTRY

(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)	Describe the sp^3 and sp^3d^3 types of hybridisation with suitable examples.	6M
	b)	Discuss the VSEPR theory with examples based on the rules proposed by Gillespie	6M
		(OR)	
2.	a)	Explain the MO theory and energy level diagram with reference to O_2.	6M
	b)	Write short notes on the variable oxidation states of d-block elements.	6M

UNIT-II

3.	a)	Define the following with an example: (i) Chromophore (ii) Auxochrome (iii) Hypsochromic shift.	6M
	b)	Give the principle involved in NMR spectroscopy and discuss the factors affecting chemical shift.	6M
		(OR)	
4.	a)	Summarize the various aspects related to the principle and modes involved in IR spectroscopy.	6M
	b)	Compare Fluorescence and Phosphorescence with an energy level diagram.	6M

UNIT-III

5.	a)	How does electrochemical theory explain the process of corrosion?	6M
	b)	Describe the constructional working of calomel electrode.	6M
		(OR)	
6.	a)	What is electrochemical series? Mention its significance.	6M
	b)	Discuss how proper design and modifying the environment can control corrosion.	6M

UNIT-IV

7.	a)	Write about the following: (i) Claisen condensation (ii) Diel's Alder reaction.	6M
	b)	Distinguish addition and condensation polymerisation.	6M
		(OR)	
8.	a)	Describe the SN_1 and SN_2 reaction mechanism with suitable example.	6M
	b)	Classify the polymers based on any three properties.	6M

UNIT-V

9.	a)	Mention the twelve principles of Green chemistry.	6M
	b)	Illustrate the construction and working of photovoltaic cell.	6M
		(OR)	
10.	a)	Classify the various energy sources and mention their significance.	6M
	b)	List out the differences between batteries and super capacitors.	6M

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AR16

CODE: 16BS1003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, DECEMBER, 2019

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)	Explain the concept of coherence. Discuss why two independent sources of light of the same wavelength cannot produce Interference fringes.	4 M
	b)	With ray diagram discuss the theory of thin films and derive the condition for constructive and destructive interference in the case of reflected system.	10 M
		(OR)	
2.	a)	Discuss Fraunhofer single slit diffraction. Draw intensity distribution curves and give conditions for bright and dark fringes in single slit diffraction pattern.	10M
	b)	In Fraunhofer diffraction at a single slit, the first diffraction maxima falls at 15^0 with a slit width of 2.5 μm. Find the wavelength of the light.	4 M

UNIT-II

3.	a)	Distinguish between spontaneous emission and stimulated emission.	4 M
	b)	With the help of suitable diagrams explain the construction and working of He –Ne gas laser	10 M
		(OR)	
4.	a)	Write notes on Step index and Graded index fibers.	6 M
	b)	What are the advantages of optical fiber communication system over the conventional ones?	4 M
	c)	For an optical fiber fractional index change is 0.14 and refractive index of cladding is 1.3. Calculate refractive index of core.	4 M

UNIT-III

5. a) Solve the Schrodinger wave equation for a particle confined in a one dimensional potential of width L and infinite height. Obtain an expression for its energy and wave function. 10 M

   b) An electron is confined to a one dimensional potential box of length 2Å. Calculate the energies corresponding to second and fourth quantum states (in eV). 4 M

(OR)

6. a) Distinguish between Matter waves and EM waves. 4 M

   b) Derive de-Broglie's wavelength for electrons accelerated through a potential difference of 'V' volts. 6 M

   c) Explain the physical significance of wave function. 4 M

UNIT-IV

7. a) What are the characteristics of soft magnetic materials? 4 M

   b) Define the term magnetic susceptibility, magnetic permeability and obtain the relation between them. 6 M

   c) Find the relative permeability of a ferromagnetic material if afield of strength 220 amp/m produces a magnetisation of 3300 amp/m in it. 4 M

(OR)

8. a) Give an account of domain theory of ferromagnetism. 4 M

   b) Explain hysteresis loop observed in ferromagnetic materials. What are hysteresis losses? 10 M

UNIT-V

9. a) What is piezoelectricity? Discuss some important applications of piezoelectrics. 4 M

   b) What is ionic polarization? Derive the expression for ionic polarizability of ionic crystal. 10 M

(OR)

10. a) Show that $D = \varepsilon_0 E + P$ 4 M

    b) What is orientational polarization? Derive an expression for mean dipole moment when a polar material is subjected to an external field. 10 M

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AR16

CODE: 16BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, DECEMBER, 2019

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)	Write any two moulding techniques with a neat diagram	8
	b)	Write a short note on i) Degree of polymerization ii) Functionality	3+3
		(OR)	
2.	a)	Describe the raw material and it chemical composition of Portland cement	7
	b)	Write a short note on i) hardening of cement ii) Puzzalona cement	3+4

UNIT-II

3.	a)	Briefly describe about the treatment methods of water treatment for domestic use	9
	b)	Write the differences between temporary and permanent hardness	5
		(OR)	
4.	a)	Explain how can you determine the total hardness of water by EDTA method?	7
	b)	Write a short note on i) Reverse osmosis ii) Chlorination	3+4

UNIT-III

5.	a)	Define corrosion. Explain the mechanism of chemical corrosion	6
	b)	Write a short note on i) Differential aeration corrosion ii) Stress corrosion	4+4
		(OR)	
6.	a)	What are the factors that affect the rate of corrosion?	7
	b)	Write a brief note on cathodic protections of metal.	7

UNIT-IV

7.	a)	Explain how the fractions produced from crude oil.	5
	b)	Explain with neat diagram, how the synthetic petrol is manufactured by Bergius Process?	9
		(OR)	
8.	a)	Define and state the significance of any three properties of lubricants	8
	b)	Explain Thin film lubrication mechanism of lubricants.	6

UNIT-V

9.	a)	Derive Nernst Equation.	7
	b)	How the potential of electrode is measured with Calomel electrode?	7
		(OR)	
10.	a)	What is global warming? Explain the mechanism, causes, effects and control measures of it.	7
	b)	Explain the construction and working of photovoltaic cell.	7

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AR13

CODE: 13BS1004 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, DECEMBER, 2019

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) Define Interference
   b) Define Diffraction
   c) Define Laser
   d) State the principle of working of optical fiber
   e) Define basis
   f) Define primitive cell
   g) Define magnetic flux
   h) Define dielectric material
   i) Define relaxation time
   j) Define matter waves

PART-B

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

UNIT-I

2. a) Explain Young's double slit experiment and show that fringe width is equal for constructive and destructive interference — 8
   b) List any four differences between Fresnel's diffraction and Frauhofer's diffraction — 4

(OR)

3. a) Using Newton's rings experiment, deduce an expression for radius of curvature of a given plano convex lens — 8
   b) In young's double slit experiment the distance between the slits is 0.5mm and distance of the screen from the light source is 50cm. Find the wavelength of light. — 4

UNIT-II

4. a) Explain the construction and working of He – Ne laser with energy level diagram — 8
   b) List and explain the various components involved in the production of laser — 4

(OR)

5.	a)	Derive an expression for numerical aperture of an optical fiber	8
	b)	Mention any four differences between step index and graded index optical fibers.	4

UNIT-III

6.	a)	Show that Face centred cubic crystal structure is closely packed as compared to simple cubic crystal structure	8
	b)	Draw the planes (100), (110), (111) in a cubic crystal	4
		(OR)	
7.	a)	Define atomic packing factor. Calculate the atomic packing factor of body centred cubic crystal structure	8
	b)	State and explain Bragg's law with a diagram	4

UNIT-IV

8.	a)	Define Bohr magneton. Deduce an expression for Bohr magneton	8
	b)	Explain Piezoelectric materials with examples	4
		(OR)	
9.	a)	Explain Hysteresis curve in ferromagnetic materials.	8
	b)	Derive the relation between D, E and P	4

UNIT-V

10.	a)	Derive an expression for electrical conductivity using free electron theory of metals	8
	b)	Mention any four drawbacks of classical free electron theory	4
		(OR)	
11.	a)	Derive an expression for the energy levels of a particle in one dimensional potential box	8
	b)	Explain the physical significance of wave function (any four points)	4

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AR13

CODE: 13BS1005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, DECEMBER, 2019

ENGINEERING CHEMISTRY
(Common to ECE, EEE)

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

PART-A

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

1. a) What is the role of plasticizers in the compounding of plastics?
   b) Why gypsum is mixed with clinkers in the manufacture of Portland cement?
   c) How temporary hardness is removed?
   d) Mention any two units of hardness.
   e) Define corrosion and give one example.
   f) What is the effect of temperature on corrosion?
   g) Define octane number.
   h) Mention any two solid lubricants.
   i) What are the types of carbon nano tubes?
   j) Give any two principles of green chemistry.

PART-B

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

UNIT-I

2. a) Explain briefly the compression moulding technique with a neat sketch. 4M
   b) Give the preparation, properties and engineering applications of the following. 8M
   i)Bakelite ii) Polyethylene

(OR)

3. a) What are the raw materials of Portland cement? Explain their functions. 4M
   b) Explain in brief the manufacturing of Portland cement by wet process. 8M

UNIT-II

4. a) Discuss temporary and permanent hardness of water. 4M
   b) Give an account on Zeolite process for the external treatment of boiler feed water with a neat diagram. 8M

(OR)

5. a) What is break point chlorination? 4M
   b) What is brackish water? Describe Reverse Osmosis method for desalination of brackish water with a neat sketch. 8M

UNIT-III

6. a) Explain the mechanism of wet or electro chemical corrosion. 8M
   b) Write a note on sacrificial anodic protection method. 4M

(OR)

7. a) How does the nature of metal influence the rate of corrosion? 4M
   b) Write a brief note on the following types of corrosion 8M
   i)Galvanic corrosion ii) Concentration cell corrosion

UNIT-IV

8. a) Explain Fisher – Tropsch method for synthesis of petrol with neat diagram. 8M
   b) What is knocking? Mention some anti-knocking agents. 4M

(OR)

9. a) Write a note on thick film lubrication. 5M
   b) Give the classification of lubricants with suitable examples. 7M

UNIT-V

10. a) Explain how solar energy is converted into electrical energy by photo voltaic cell. 7M
    b) Give any five principles of green chemistry. 5M

(OR)

11. a) Write a note on carbon nano tubes. 4M
    b) Give any four engineering applications of nano materials. 4M
    c) Explain briefly about concentrated solar power plant. 4M

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