AR18

CODE: 18BST108 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular/Supplementary Examinations, November-2020

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)	List out the postulates of VSEPR theory	6M
	b)	Draw the MO energy level diagram for O_2 molecule	6M
		(OR)	
2.	a)	Explain the following with an example a) sp^3 hybridization b) sp hybridization	8M
	b)	Define a) Electronegativity b) Elecropositivity	4M

UNIT-II

3.	a)	Outline the types of electronic transitions in electronic spectroscopy.	8M
	b)	What are the IR values of a) Carbonyl b) Alcohol c) Nitrile d) Amino groups	4M
		(OR)	
4.	a)	Explain the phenomenon of fluorescence and Phosphorescence using jablonski diagram.	6M
	b)	Define chemical shift. Explain in detail about chemical shift.	6M

UNIT-III

5.	a)	What is electrochemical series? Mention its significance.	6M
	b)	Write a short notes on a) Impressed current cathodic protection b) Sacrificial anodic protection method	6M
		(OR)	
6.	a)	What is electrochemical corrosion? Outline the mechanism of Electrochemical corrosion.	8M
	b)	Explain the working principle of calomel electrode along with equations	4M

UNIT-IV

7.	a)	Explain the mechanism of free radical addition reaction using an example.	8M
	b)	Define and give examples for a) Electrophile b) Nucleophile	4M
		(OR)	
8.	a)	What is Zieglar – Natta catalysis? Write its mechanism.	6M
	b)	Outline the mechanism of Pinacol – Pinacolone rearrangement.	6M

UNIT-V

9.	a)	What is green Chemistry? List out any six principles of green chemistry.	8M
	b)	Outline the types of energy resources.	4M
		(OR)	
10.	a)	Explain the working of an alkaline battery along with chemical equations.	8M
	b)	Compare the battery and supercapacitor	4M

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CODE: 18BST106 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular/Supplementary Examinations, November-2020

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) Derive expression for width of the bright and dark interference fringes fringe in the Young's experiment. (8M)
   b) In a Newton's rings experiment, the diameter of the 5^{th} dark ring is 0.3cm and the diameter of the 25^{th} dark rings is 0.8cm. If the radius of curvature of the plano-convex lens is 100cm find the wavelength of light used. (4M)

(OR)

2. a) Discuss the Fraunhofer diffraction due to N-parallel slits (diffraction grating) and obtain the conditions for principal maxima and minima. Represent the intensity distribution on the screen. (9M)
   b) A Plane transmission grating having 4250 lines per cm is illuminated with sodium light normally. In second order spectrum the spectral lines deviated by 30^0 are observed. Find the wavelength of the spectral line (3M)

UNIT-II

3. a) What are the conditions for Total Internal Reflection of light? Derive the expression for numerical aperture of the optic fibre? (9M)
   b) Calculate the numerical aperture for an optic fibre. Given the refractive indices of core and cladding are 1.563 and 1.498 respectively. (3M)

(OR)

4. Using a block diagram arrangement, explain in detail the working of a fibre optic communication system? Mention the advantages of the optic fibre communication system over the conventional ones. (12M)

UNIT-III

5. a) State the Heisenberg's uncertainty principle. Obtain the expression for de Broglie wavelength of an electron accelerated by a potential of V volts. (8M)
   b) Explain the physical significance of wave function. (4M)

(OR)

6. a) Solve the Schrodinger wave equation for a particle confined in a one dimensional potential box of width L and infinite height. Obtain the expression for its energy. (8M)
   b) Calculate the energy of the ground state and the first excited state for an electron in a confined in a potential box of width $1A^0$. (4M)

UNIT-IV

7. a) State and explain the Gauss law in electrostatics (8M)
   b) State the Faradays law of electromagnetic induction. Give its mathematical representation. (4M)

(OR)

8. a) Write the integral and differential forms of Maxwell equations. (8M)
   b) State and explain the Ampere's circuital law. (4M)

UNIT-V

9. a) For an intrinsic semiconductor, derive the expression for carrier concentration, and the Fermi energy level. (8M)
   b) Using the energy band diagram, explain the direct band gap semiconductor. (4M)

(OR)

10. a) State and explain the Hall effect in semiconductors and discuss its importance. (9M)
    b) The Hall coefficient of an n-type semiconductor specimen is 3.66×10^{-4} m^3/C. Find the carrier concentration. (3M)

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CODE: 18BST107 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, November-2020

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) Define the following terms a) Periodic motion b) Oscillatory motion and c) Linear harmonic oscillations with examples for each. 8M
   b) A simple harmonic motion is represented by x = 0.1sin (1000t + 0.10) where x and t are in meters. Find the following quantities a) amplitude b) Angular frequency c) Period of oscillation and d) Frequency. 4M

(OR)

2. a) Explain damping. On what factors does it depend? How is the natural frequency affected by damping? 8M
   b) Define the following a) Resonance b) Damped oscillations c) Undamped oscillations 4M

UNIT-II

3. a) Discuss the formation of Newton's rings by reflected light and obtain the expression for the radius of n^{th} dark ring in the case of reflected light. 8M
   b) In a Newton's rings set up, the diameter of the 4^{th} ring was found to be 0.4 cm and that of the 24^{th} ring was 0.8 cm. The radius of curvature of the plano-convex lens is 100 cm. Calculate the wavelength of the light used. 4M

(OR)

4. a) Explain how a plane diffraction grating produces the spectrum of the given light. 6M
   b) List any three differences between interference and diffraction. A slit of width 1.5 mm is illuminated by a light of wavelength 500 nm and diffraction pattern is observed on a screen 2 m away. Calculate the width of the central maximum. 6M

UNIT-III

5. a) Expand LASER and Explain how a LASER is different from ordinary light sources. 6M
   b) Explain how lasing action can be achieved in a LASER. 6M

(OR)

6. a) List any two industrial and medical applications of LASER. 4M
   b) With a suitable energy level diagram explain construction and working of Nd-YAG LASER. 8M

UNIT-IV

7. a) Explain the working of monomode and multimode optical fibres. For long distance communication why optical fibre is preferred and why? 8M
   b) For a multimode step index fibre with a glass core (n_1=1.5) and a fused quartz cladding (n_2=1.46), determine the critical angle, acceptance angle and numerical aperture. The source to fibre medium is air. 4M

(OR)

8. a) Provide a detailed description of an optical fibre based communication system using a block diagram. 8M
   b) The cladding of the step index fibre has a refractive index of 1.40. If numerical aperture of the fibre is 0.25, calculate the refractive index of the core material. 4M

UNIT-V

9. a) List the differences between ferromagnetic and ferrimagnetic materials. 6M
   b) The magnetisation with in a bar of some metal alloy is 1.2 x 10^6 A/m at an H field of 200 A/m. Compute the following: a) the magnetic susceptibility, b) the permeability and c) the magnetic flux density with in this material. d) What types of magnetism would you suggest as being displayed by this material? 6M

(OR)

10. a) How much current can a Lead wire, 1mm in diameter, carry in its superconducting state at 4.2 K? Given T_c for Pb is 7.2K and $B_c(0)$=0.0803Wb/m^2. 5M
    b) List the differences between Type I and Type II superconductors also sketch the curves. 7M

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