# AR18

**CODE: 18BST107** **SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**I B.Tech I Semester Supplementary Examinations, January, 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) | Determine the equation of motion of damped oscillation and explain the case of overdamped oscillation with an example. | 8M |
| | b) | What are free oscillations? Express their equation of motion. | 4M |
| | | **(OR)** | |
| 2. | a) | Obtain the differential equation of motion of a forced oscillator. | 6M |
| | b) | What is amplitude resonance. Give example. | 6M |

## UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Define Huygen's principle. Explain Young's double slit experiment and determine the conditions for constructive and destructive interferences. | 8M |
| | b) | In Newton ring's experiment the diameters of $5^{th}$ and $15^{th}$ rings are 0.336cm and 0.59cm respectively. Find the wavelength of light if radius of curvature of lens is 100cm. | 4M |
| | | **(OR)** | |
| 4. | a) | Explain the intensity distribution due to diffraction at single slit with necessary mathematical theory. | 9M |
| | b) | What is diffraction grating? | 3M |

## UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | Explain stimulated emission and give the characteristics of a Laser beam. | 4M |
| | b) | Derive the Einstein relations for lasing action. | 8M |
| | | **(OR)** | |
| 6. | a) | Explain the construction and working of He-Ne Laser with neat diagrams. | 9M |
| | b) | Give any three applications of Laser | 3M |

## UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Define Total internal reflection and explain how light is communicated through optical fibre with a neat diagram. | 6M |
| | b) | Define Numerical aperture. Calculate the numerical aperture and acceptance angle for an optical fibre whose core and cladding has refractive index of 1.59 and 1.40 respectively. | 6M |
| | | **(OR)** | |
| 8. | a) | Explain the classification of optical fibres basing on their refractive index profile. | 8M |
| | b) | Explain the advantage of using optical fibres in communication systems | 4M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | What are ferromagnetic materials. Explain Weiss theory of ferromagnetism. | 8M |
| | b) | Give some applications of ferrites. | 4M |
| | | **(OR)** | |
| 10. | a) | Diamagnetism is essential property of superconductors. Explain. | 8M |
| | b) | Give any four applications of superconductors. | 4M |

# AR18

**CODE: 18BST108** **SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**I B.Tech I Semester Supplementary Examinations, January, 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) | Explain the following with examples. i) $sp^2$ hybridization ii) $sp^3d^2$ hybridization | 6M |
| | b) | Write the salient features of Molecular orbital theory. Draw and explain Molecular orbital diagram of CO | 6M |
| | | **(OR)** | |
| 2. | a) | Explain VSEPR theory with examples. Write its Drawbacks. | 6M |
| | b) | Explain i) ionization energy ii) electron affinity (iii) Electonegativity. How these vary left to right across a period and top to bottom in a group. | 6M |

## UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Write a note on (i) Chromophore (ii)Auxochrome | 6M |
| | b) | What is principle involved in NMR spectroscopy? Explain the terms i) chemical shift ii) coupling constant. | 6M |
| | | **(OR)** | |
| 4. | a) | Explain fluorescence and phospherescence by using Jablonski's Diagram | 8M |
| | b) | Explain the importance of finger print region in infrared spectroscopy. | 4M |

## UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | What is EMF of the cell? Write the formula for calculating EMF of the cell. | 4M |
| | b) | Describe the construction and working of i) NHE ii) Calomel electrode | 8M |
| | | **(OR)** | |
| 6. | a) | What is corrosion? Explain electrochemical theory of corrosion. | 6M |
| | b) | Write the principle involved in cathodic protection method .Explain the process of sacrificial anodic protection method. | 6M |

## UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Explain $SN^1$ and $SN^2$ mechanisms with examples | 8M |
| | b) | Explain Pinacol-pinacalone rearrangement. | 4M |
| | | **(OR)** | |
| 8. | a) | Write the classification of polymers. | 5M |
| | b) | Write a note on Zeiglar Natta catalysis. | 7M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Write a note on renewable & non-renewable energy sources. | 6M |
| | b) | Explain the principle and method involved in convert solar energy into electricity using photovoltaic cell. | 6M |
| | | **(OR)** | |
| 10. | a) | Explain construction , working and cell reactions of Alkaline Battery | 6M |
| | b) | Write a note on supercapacitors. | 6M |



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# AR18

**CODE: 18BST106** **SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**I B.Tech I Semester Supplementary Examinations, January, 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) | What do you mean by principle of superposition and interference of light? | 4M |
| | b) | Explain the formation of Newtons rings under reflected light with neat diagrams. | 8M |
| | | **(OR)** | |
| 2. | a) | Distinguish between interference and diffraction. | 4M |
| | b) | Explain Fraunhofer diffraction due to double slit. | 8M |

## UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Derive an expression for the numerical aperture of step index fibers. | 6M |
| | b) | Explain the principle and construction of optical fibers. | 6M |
| | | **(OR)** | |
| 4. | a) | Distinguish between step index and graded index fibers. | 6M |
| | b) | Write a note on fiber optic communication system. | 6M |

## UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | Write a note on De-Broglie hypothesis and derive the wave length of matter waves $\lambda = \frac{h}{\sqrt{2meV}}$ | 6M |
| | b) | Explain Heisenberg's Uncertainty Principle and its significance. | 6M |
| | | **(OR)** | |
| 6. | a) | Derive Schrodinger's Time independent wave equation. | 8M |
| | b) | Explain Planck's Hypothesis. | 4M |

## UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Write the Concept of Electric Field and Point Charge in Electric Field. | 4M |
| | b) | Explain Gauss Law and it's Applications. | 8M |
| | | **(OR)** | |
| 8. | a) | Explain Ampere'sLaw and Biot-Savart Law. | 4M |
| | b) | Write Maxwell's Equations and their Applications. | 8M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Write about Intrinsic and Extrinsic Semi conductors. | 4M |
| | b) | Explain the dependence of Fermi Level on Carrier Concentration and temperature. | 8M |
| | | **(OR)** | |
| 10. | a) | Explain the terms Mobility and Resistivity. | 4M |
| | b) | Write a note on Hall Effect and its applications. | 8M |



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