# Amrut Sevabhavi Sanstha, Parbhani.
## Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
### Department of Physics
### Teaching Plan Session:- 2017-18

Name :-  Mr. Sharique S. Shaikh    Class:-B.Sc. I$^{st}$ Year /Sem. I  Subject:- Physics
Paper:- (1S)  Mechanics ,Matter, waves & Oscillation

| Sr. No. | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July | Unit- I | *Kepler's law's of planetary motion | 01 | |
| | | | *Newton's law's of Gravitation , acceleration due to gravity | 01 | |
| | | | * variation with altitude & depth | 02 | |
| | | | * Gravitational field & potential | 01 | 10 |
| | | | * Gauss's theorem | 01 | |
| | | | *Gravitational potential & intensity due to solid sphere at a point (inside) | 02 | |
| | | | * Gravitational potential & intensity due to solid sphere at a point (outside) | 02 | |
| 2 | Aug. | Unit :-II | * Motion of Rigid body | 01 | |
| | | | * rotational motion , moment of inertia | 01 | |
| | | | * Principle of Perpendicular axis | 01 | |
| | | | * Principle of Parallel axis | 01 | |
| | | | * Radius of Gyration | 01 | |
| | | | * M.I of Ring ,Disc, hollow & solid sphere ,cylinder , & Bar about diff. axis | 04 | 12 |
| | | | * Linear momentum (conservation) | 01 | |
| | | | * Angular momentum (conservation) | 01 | |
| | | | * Numerical | 01 | |
| 3 | Aug./Sep. | Unit : III Simple Harmonic Motion | * Linear & Angular S.H.M | 01 | |
| | | | * Differential equation & solutions | 02 | |
| | | | * Displacement , velocity & acceleration | 01 | |
| | | | * Kinetic & Potential energy | 01 | |
| | | | * Simple pendulum | 01 | |
| | | | *Compound pendulum | 01 | 12 |
| | | | * Kater's  Reversible pendulum | 01 | |
| | | | * Spring & Mass system | 01 | |
| | | | * Vibration of Magnet | 01 | |
| | | | *Bifilar oscillation | 01 | |
| | | | *Damped & forced harmonic oscillations | 01 | |
| 4 | Sep. | Unit:-IV SHM | * Superposition of two S.H.M of same freq. along same line | 01 | |
| | | | *  Interference | 01 | |
| | | | * Superposition of two mutually perpendicular S.H.M of same freq. | 01 | 12 |

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|---|---|---|---|---|---|
| | | | * Lissajous figures | 01 | |
| | | | * Standing waves , Newton's formula | 01 01 | |
| | | | * Velocity of waves by Kundt's tube | 02 | |
| | | | * Velocity of Transverse waves stretched | 02 | |
| | | | * Harmonics , Overtone | | |
| | | | * Production & detection of Ultrasonic waves It's application | | |
| 5 | Oct. | Unit:-V Elasticity | * Introduction of Elasticity | 01 | |
| | | | * Hooke's law of Elasticity | 01 | |
| | | | * Three elastic constants | 01 | 11 |
| | | | * Relation between Y, ŋ , K | 01 | |
| | | | * Bending of beam & Bending moment | 01 | |
| | | | * Cantilever | 01 | |
| | | | * Depression of centrally loaded beam | 01 | |
| | | | * Twisting couple | 01 | |
| | | | * Torsion of pendulum | 01 | |
| | | | * Maxwell's needle | 01 | |
| | | | * Numerical | | |
| 6 | Oct. | Unit-VI Kinematics of Fluids | * Streamline & Turbulent flow | 01 | |
| | | | * Viscous Drag | 01 | |
| | | | * coefficient of viscosity | 01 | |
| | | | * Equation of continuity | 01 | |
| | | | *Euler's equation | 01 | 11 |
| | | | *Bernoulli's theorem | 01 | |
| | | | *Poiseulle's equation | 01 | |
| | | | *Reynolds's number , Terminal velocity | 01 01 | |
| | | | *Stoke's Law , Variation of viscosity with temp. | 01 | |
| | | | *Surface Tension , Angle of contact | 01 | |
| | | | *Wetting , Jager's method | | |

In-Charge Teach                                               Head
                                                                    Dept. of Physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2017 - 18
Name :-  Mr. Sharique S. Shaikh    Class:**-**B.Sc. I$^{st}$ Year /Sem. II  Subject:- Physics
Paper:- (2S)  K .T , Thermodynamics & Electric Current

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit- I | *Kinetic theory of gases (assumptions) | 01 | |
| | | | *Deduction of Boyle's law, Interpretation of temp. | 01 | |
| | | | *Estimation of R.M.S ,Avogadro's & | 01 | 12 |
| | | | speed of molecule | 01 | |
| | | | *Degrees of freedom | 01 | |
| | | | * Equipartition of energy | 01 | |
| | | | *Specific heat of monoatomic gas, extension to diatomic & triatomic | 01 | |
| | | | *Real gas- Van-der Wall's equation of state | 01 | |
| | | | * Comparison with expt. PV curves. | 01 | |
| | | | * the critical constant, nature of Vander Wall's forces | 01 | |
| | | | *Molecular collision , mean free path, Brownian motion & collision cross section | 01 | |
| | | | *Transport of mass, momentum& energy | 01 | |
| | | | * Dependence on Temp. * Pressure | | |
| 2 | Jan. | Unit :-II Laws of thermodynamics | *The Zeroth law, P-V indicator diagram, work done by & on the system | 01 | |
| | | | * First law of thermodynamics' internal energy as a state function & other application | 02 | |
| | | | * reversible and irreversible changes | 01 | 10 |
| | | | *Carnot's cycle & it's efficiency for perfect gas | 01 | |

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|---|---|---|---|---|---|
| | | | * The second law of thermodynamics, version of it | 01 | |
| | | | * Carnot's theorem, Entropy, S-T diagram | 01 01 | |
| | | | *Principle of increase of entropy | | |
| | | | * The thermodynamic scale of temp. it's identity | 01 | |
| | | | *Impossibility of attaining the absolute zero, Third law of thermodynamics | | |
| 3 | Jan./Feb | Unit:-III Liquefaction of Gases | * Joule Thomson effect | 01 | |
| | | | * Joule's Coefficient, Boyle's & inversion temp. | 01 | |
| | | | * Principle of Regenerative cooling | 01 | |
| | | | * Cascade cooling | 01 | |
| | | | * Liquefaction of hydrogen & Helium | 02 01 | 14 |
| | | | *Thermodynamic relationship. | 02 | |
| | | | * Thermodynamic variables | 01 | |
| | | | * Maxwell's general relationship | 01 | |
| | | | * application to Joule Thomson cooling & adiabatic cooling in general system | 01 01 | |
| | | | * Clausius Clapeyorn equation | | |
| | | | *Thermodynamic Potential & equilibrium of thermo dynamical system | 01 | |
| | | | * Relation with thermo dynamical variables | | |
| 4 | Feb | Unit:-IV | * E as an accelerating field | 01 | |
| | | | * Electron gun , case of discharge tube | 01 01 | |
| | | | * Linear accelerator | 01 | |
| | | | * E as a deflecting field | 01 | |
| | | | * Transverse magnetic field | 01 | 11 |
| | | | Mass spectrograph, velocity selector | 01 | |
| | | | * Curvature of tracks for energy determination of nuclear particles | 02 01 | |
| | | | * Principle of Cyclotrons | 01 | |
| | | | * Mutually perpendicular E & B fields | | |
| | | | * Velocity selector, it's resolution | | |
| 5 | Mar. | Unit:-V Network Theorem | * Thevi9nin's theorem | 01 | |
| | | | * Superposition theorem | 01 | |
| | | | * Maximum power transfer theorem, some application | 01 | |
| | | | * Ballistic galvanometer | 01 | |
| | | | * Application of B. G | 01 | |
| | | | * Determination of capacitance & high resistance by method f leakage Varying currents:- | 02 | 12 |
| | | | * Steady currents, current density J | 01 | |
| | | | * Non –steady current & continuity | 01 | |

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| | | | equation | 01 | |
| | | | * Kirchhoff's law & analysis of multi-loop circuit | 02 | |
| | | | * Rise & decay of currents in LR, CR circuit & transients in LCR circuit | | |
| 6 | Mar./Apr. | Unit-VI Alternating currents | * A.C currents , * complex number and their application in solving A.C circuits using j-operator * pure R,L,C & their combination * Reactance and impedance * series and parallel resonance*Q – factor , power factor * self and mutual inductance* theory of transformer | 01 02 01 01 01 01 01 01 | 09 |

Head
Dept. of Physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2017-18
Name :- Mr. Sharique S. Shaikh   Class:**-**B.Sc. II$^{nd}$ Year /Sem. III   Subject:- Physics
Paper:- (3S) Solid state, Relativity & Geophysics

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July/Aug. | Unit-I Mathematical background and Electrostatics | *Gradient, divergence & curl of a vector field , Physical significance <br> * Line surface & volume integral <br> * Gauss's divergence theorem <br> * Stoke's theorem <br> * work done on charge in electrostatic field <br> * Flux of a electric field <br> *Lorentz force equation (B) <br> * Ampere force law <br> * Ampere force law and its application | 03 <br><br> 02 <br> 02 <br> 01 <br> 01 <br><br> 01 <br> 01 <br> 01 <br> 01 | 13 |
| 2 | July/Aug. | Unit:-II Magneto statics and Maxwell's equation | * Faraday's law <br> * Integral and Differential form <br> *Displacement current and Maxwell's equation <br> * Wave equation satisfy by E and B <br> *Plane electromagnetic wave in vacuum <br> * Poynting vector and Theorem | 01 <br> 02 <br> 02 <br><br> 02 <br> 02 <br> 02 <br> 01 | 12 |

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|---|---|---|---|---|---|
| 3 | Aug./Sep | Unit- III Solid state Electronics Devices I | * Introduction to Semiconductors | 01 | |
| | | | * Charge carrier and electrical conduction ; Doping | 02 | |
| | | | * Extrinsic semiconductors | 01 | |
| | | | * Fermi level and Energy level dia. | 01 | 12 |
| | | | * Drift current in semiconductor | 01 | |
| | | | * Conductivity , Mobility | 01 | |
| | | | * Hall effect | 01 | |
| | | | * Hall coefficient | 01 | |
| | | | *Semiconductor Diode and it's biasing | 01 | |
| | | | * LED | 01 | |
| | | | * Varactor diode | 01 | |
| 4 | . Aug./Sep | Unit:-IV Solis state Electronics Devices II | * Working of BJT | 01 | |
| | | | * Current gain $\acute{\alpha}$ , $\beta$ and their relation | 01 | |
| | | | * Chara. in CB , CE modes | 01 | |
| | | | *JFET construction and working | 01 | |
| | | | * Chara. Of FET | 01 | |
| | | | *Basic concept of Difference Amplifier | 01 | |
| | | | * IC-OP AMP | 01 | 13 |
| | | | *Electrical parameter of OP-Amp | 01 | |
| | | | * Inverting and non- Inverting modes | 01 | |
| | | | * OP-AMP as Adder | 01 | |
| | | | * OP-AMP as Subtract or | 01 | |
| | | | * OP-AMP as Differentiator | 01 | |
| | | | * OP-AMP as Integrator | 01 | |
| 5 | Sep./Oct | Unit:-V Special Theory of Relativity | * Postulates for the special theory of relativity | 01 | |
| | | | * Lorentz Transformations | 01 | |
| | | | * Time Dilation | 01 | |
| | | | * Velocity Addition Theorem | 02 | 10 |
| | | | * Length contraction, | 01 | |
| | | | * Relativity of mass | 02 | |
| | | | * Mass energy relation | 01 | |
| | | | * Numerical | 01 | |
| 6 | Sep./Oct | Unit :- VI Atmosphere and Geophysics | *Structure of Earth ; Crust , Mantle & Core | 01 | |
| | | | *Part of the Earth – As a planet Atmosphere | 01 | |
| | | | * Lithosphere | 01 | |
| | | | * Hydrosphere composition | 01 | |
| | | | * Earthquakes causes | 01 | 14 |
| | | | *Types ,Scale of Intensity, Recording | 02 | |
| | | | *Radiation in the Atmosphere | 01 | |
| | | | *Propagation of Energy through vacuum | 01 | |
| | | | * Intensity , scattering absorption & Reflection | 02 | |
| | | | * Moisture and Clouds (mechanism) | 01 | |
| | | | | 02 | |

| | | | *Cloud produced by mixing and cooling | | |
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In-Charge Teacher                                                                 Head
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Physics

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Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2017-18
Name :- Mr. Sharique S. shaikh     Class:**-**B.Sc. II$^{nd}$ Year /Sem. IV   Subject:- Physics
Paper:- 4S Laser, Fiber optic , Renewable source, Geometrical optic, Polarization

| Sr. No. | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan. | Unit-I Geometrical optic and interference | * Cardinal points of an system | 01 | 12 |
| | | | * Equivalent focal length of coaxial lens system | 02 | |
| | | | * Principle of superposition (light) | 01 | |
| | | | * Thin films | 03 | |
| | | | * Expression for fringe width | 01 | |
| | | | * Newton's ring | 04 | |
| 2 | Dec./Jan. | Unit:-II Diffraction of light | * Fresnel diffraction | 01 | 14 |
| | | | *Fraunhofer diffraction | 01 | |
| | | | * Diff. bet$^{n}$. F-F diffraction | 01 | |
| | | | *Fresnel assumption , half period zone | 01 | |
| | | | * Zone plate construction | 01 | |
| | | | *comparison of zone plate with convex lens | 01 | |
| | | | * Fraunhofer diff. due to double slit | 01 | |
| | | | * Plane diff. grating | 01 | |
| | | | * Elementary theory of grating | 01 | |
| | | | *Maximum number of orders | 01 | |

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|---|---|---|---|---|---|
| | | | available with grating | 01 | |
| | | | *Determination of wavelength of light | 01 | |
| | | | *Resolution of images | 01 | |
| | | | *Rayleigh's criteria for resolution | 01 | |
| | | | *Resolving power of grating | | |
| 3 | Feb./Mar. | Unit:-III Polarization of light | * Concept of polarization | 01 | |
| | | | * Optic axis | 01 | |
| | | | * Double refraction , Brewster's law | 01 | |
| | | | * Positive and Negative crystal | 01 | |
| | | | * Phase retardation plate ,Half and Quarter | 02 | 11 |
| | | | * Nicol prism , Polarizer and Analyzer | 01 | |
| | | | *Plane , circularly and Elliptically polarized light | 02 | |
| | | | *Half shade polarimeter | 01 | |
| | | | *Blue colour of the sky | 01 | |
| 4 | Feb./Mar. | Unit:-IV Laser | *Absorption , Spontaneous and stimulated emission | 01 | |
| | | | * Population inversion , pumping | 01 | |
| | | | * MASER | 01 | |
| | | | *Chara. of laser , laser system | 01 | |
| | | | * Three and four level laser system. | 01 | |
| | | | | 01 | |
| | | | * Ruby and He-Ne laser | 01 | 08 |
| | | | *Holography & Recording and reprod. | 01 | |
| | | | * Semiconductor laser | | |
| 5 | April | Unit:-V Fiber optics | * Total internal reflection | 01 | |
| | | | * Structure of optical fiber | 01 | |
| | | | * Classification of optical fiber | 01 | |
| | | | * Propagation of light in optical fiber | 01 | |
| | | | * Acceptance angle and numerical apt. | 01 | 09 |
| | | | *Dispersion and Fiber losses | 02 | |
| | | | * Fiber optic communication | 01 | |
| | | | * Advantages of optical fiber | 01 | |
| 6 | April | Unit–VI Renewable energy sources | *Solar energy , wind energy, ocean en. | 01 | |
| | | | *Geothermal energy , hydrogen energy | 01 | |
| | | | *Fuel cell , Biomass energy | 01 | |
| | | | *Solar energy and its availability | 01 | |
| | | | *Seasonal variation , solar constant, spt | 01 | |
| | | | *Measurement of solar radiation | 01 | 12 |
| | | | * Solar energy storage | 02 | |
| | | | *Solar photovoltaic system, PV cell | 01 | |
| | | | | 01 | |
| | | | | 02 | |

| | | | *Thin film photovoltaic cell<br>* solar PV panel and Application | | |
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Department of Physics
Teaching Plan Session:- 2017-18
Name :- Mr. Sharique S. Shaikh    Class:**-**B.Sc. III$^{rd}$ Year /Sem. V   Subject:- Physics
Paper:-5S-Quantum mechanics, Atomic spectroscopy ,Nuclear physics , hybrid parameters.

| Sr. No. | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July | Unit-I Origin of Quantum Mechanics | *Historical background, Failure of classical theory in explaining | 01 | 14 |
| | | | *Black body radiation & Photoelectric effect | 01 | |
| | | | * Compton effect qualitative analysis | 02 | |
| | | | | 01 | |
| | | | * Assumption of Plank's quantum theory | 01 | |
| | | | | 01 | |
| | | | * Wave Particle Duality | 01 | |
| | | | * De-Broglie Hypothesis | 02 | |
| | | | * Davisson Germer expt. | | |
| | | | *Concept of Wave packet, Phase velocity , Group velocity relation | 01 | |
| | | | | 01 | |
| | | | | 02 | |
| | | | * Heisenberg's uncertainty | | |

| | | | principal<br>* Different forms<br>* Thought expt.Gamma ray microscope | | |
|---|---|---|---|---|---|
| 2 | July/Aug. | Unit :- II  The Schrodinger equation and its applications | * Wave function and its physical significance<br>* Schrodinger time dependent equation<br>* Separation in time dependent and time independent parts<br>* Operators in quantum Mechanics<br>* Eigen functions and Eigen values<br>* Particle in one dimensional and three dimensional box (Energy eigen values)<br>* Qualitative analysis of potential barrier Tunneling effect)<br>* Simple Harmonic Oscillator (Qualitative analysis of Zero point | 01<br>01<br>01<br>01<br>02<br>02<br>02<br>02 | 12 |
| 3 | Aug./Sep | Unit- III Atomic and Molecular Spectroscopy | *Vector Atom Model: Quantum Numbers,<br>*Stern- Gerlach experiment;<br>*selection rules, l-s and j-j coupling<br>*Types of spectra – Emission & absorption spectra.<br>*X-rays: Continuous X-ray spectrum, *Duane and Hunt's law,<br> *characteristic X-ray spectra, *Mosley's law<br>*Raman Effect**:** stoke's and anti-stoke's lines,<br>*Quantum theory of Raman effect, Experimental Arrangement for Raman Spectroscopy. | 01<br>02<br>01<br>01<br>01<br>01<br>01<br>01<br>01<br>01 | 11 |
| 4 | Aug./Sept. | Unit:-IV Nuclear Physics | *Detection of charged particles;<br>*G. M. counter,<br>*Binding energy and Mass defect, stability of nuclei<br>*Alpha Decay: Range of Alpha particles, *Geiger - Nuttal law and Gamow's explanation of alpha decay (qualitative)*Beta decay: Types and Pauli's Neutrino Hypothesis<br>*Nuclear Fission, Nuclear fusion (concepts only),<br>*Nuclear reactors. | 01<br>02<br>02<br>01<br>02<br>02<br>02<br>01 | 13 |

| 5 | Sep./Oct. | Unit:-V Hybrid parameters | *Hybrid parameters  *low frequency equivalent of CE amplifier & its analysis., *Bias stability & thermal runway qual. *General principles of amplifier classification, *RC coupled amplifier, *Equivalent circuits & gain at low, medium & high frequency (qualitative), *Gain-frequency response. *Noise & distortion in electronic circuits. | 01 02  02 01  01 02  01 02 | 12 |
| 6 | Sep./Oct | Unit :- VI Feedback in amplifiers | *Feedback in amplifiers- Negative feedback, *Advantages of negative feedback,  *positive feedback. *Phase shift, and Wein bridge  *Hartley & Colpits Oscillators. *Multi-vibrators – astable, monostable & bistable. | 01  01 01 02 02 03 | 10 |

In-Charge Teacher                                                                          Head
                                                                                   Dept. of physics

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Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2017-18
Name :- Mr. Sharique S. Shaikh  Class:**-**B.Sc. IIIrd Year /Sem. VI   Subject:- Physics
Paper:-  (6S) Statistical mechanics & solid state physics.

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit-I Statistical mechanics | *Phase space , Unit cell<br>*Microstates and Macro states<br>*Energy states, Density of Energy states<br>*Probability and most probable distribution<br>*Boltzman entropy relation<br>*Maxwell-Boltzman relation<br>*Molecular speed distribution<br>* r.m.s. speed and most probable velocity | 01<br>01<br>01<br>02<br>01<br>01<br>01<br>01 | 09 |
| 2 | Dec./Jan | Unit :- II Bose-Einstein statistics | *Distinguishable& Indistinguishable particles<br>* Concept of boson and fermions<br>* Bose-Einstein statistics<br>* Black body radiation<br>*Fermi-Dirac distribution<br>* Fermi function<br>* Fermi energy<br>*Fermi temp. | 02<br>01<br>02<br>01<br>01<br>01<br>01<br>01 | 10 |
| 3 | Jan. | Unit:-III Crystallography | *Crystalline and Amorphous materials<br>* Unit cell<br>* Miller indices<br>*Types of lattice<br>* Coordination number<br>* Diffraction of lattice parameter<br>* Diffraction of X-rays by crystal<br>*Bragg's law<br>*Reciprocal lattice<br>*Defects in solids | 01<br>01<br>01<br>01<br>01<br>01<br>01<br>01<br>01<br>02 | 11 |
| 4 | Jan./Feb | Unit:-IV Electrical properties of material | * Motion of electron<br>* Electrical conductivity<br>* Expn. For electrical conductivity and ohm's law<br>* Fermi energy and density of states<br>* Electron in periodic potential<br>* Bloch theorem<br>*Energy band , energy gap<br>* Free electron model<br>*Conductor's ,insulator's, semiconductor's | 01<br>01<br>02<br>01<br>01<br>01<br>01<br>01<br>01 | 10 |
| 5 | Feb./Mar | Unit:-V Magnetic properties of materials | * Atomic magnetic moment<br>*Magnetization vector (M)<br>* Magnetic susceptibility<br>* Diamagnetism, Paramagnetic, Ferromagnetism | 01<br>01<br>01<br>01<br><br>01 | 13 |

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| | | | * Dia. Para-,and ferromagnetic materials | 02 | |
| | | | * Langevin's theory of diamagnetism | 02 | |
| | | | * Langevin's theory of Para magnetism | 02 | |
| | | | * Quantum mechanical treatment of Para magnetism | 01 | |
| | | | *Curie-Weiss's law | 01 | |
| | | | *Hysteresis and energy loss | | |
| 6 | Feb./Mar. | Unit–VI Superconductivity and Nanotechnology | *Superconductivity | 01 | |
| | | | *Critical temp. and critical magnetic field | 01 | |
| | | | *Meissner effect *Type I and Type II Superconductor. | 01 01 | |
| | | | *BCS Theory, cooper pair | | 12 |
| | | | *Application of superconductor's | 02 01 | |
| | | | *Effect of reduction of dim. of physical properties | 01 | |
| | | | *History of nanotechnology | 01 | |
| | | | *Quantum size effect | 01 | |
| | | | *Application of Nano materials | 01 | |

Head
Dept. of physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :-  Mr. Sharique S. Shaikh    Class:**-**B.Sc. Ist Year /Sem. I  Subject:- Physics
Paper:- (1S)  Mechanics ,Matter, waves & Oscillation

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July | Unit- I | *Kepler's law's of planetary motion | 01 | |
| | | | *Newton's law's of Gravitation , | 01 | |
| | | | acceleration due to gravity | 02 | |
| | | | * variation with altitude & | 01 | 10 |

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|---|---|---|---|---|---|
| | | | depth | 01 | |
| | | | * Gravitational field & potential | 02 | |
| | | | * Gauss's theorem | 02 | |
| | | | *Gravitational potential & intensity due to solid sphere at a point (inside) | | |
| | | | * Gravitational potential & intensity due to solid sphere at a point (outside) | | |
| 2 | Aug. | Unit :-II | * Motion of Rigid body | 01 | 12 |
| | | | * rotational motion , moment of inertia | 01 | |
| | | | * Principle of Perpendicular axis | 01 | |
| | | | * Principle of Parallel axis | 01 | |
| | | | * Radius of Gyration | 01 | |
| | | | * M.I of Ring ,Disc, hollow & solid | 04 | |
| | | | sphere ,cylinder , & Bar about diff. axis | 01 | |
| | | | * Linear momentum (conservation) | 01 | |
| | | | * Angular momentum (conservation) | 01 | |
| | | | * Numerical | | |
| 3 | Aug./Sep. | Unit : III  Simple Harmonic Motion | * Linear & Angular S.H.M | 01 | 12 |
| | | | * Differential equation & solutions | 02 | |
| | | | * Displacement , velocity & acceleration | 01 | |
| | | | * Kinetic & Potential energy | 01 | |
| | | | * Simple pendulum | 01 | |
| | | | *Compound pendulum | 01 | |
| | | | * Kater's Reversible pendulum | 01 | |
| | | | * Spring & Mass system | 01 | |

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|---|---|---|---|---|---|
| | | | * Vibration of Magnet | 01 | |
| | | | *Bifilar oscillation | 01 | |
| | | | *Damped & forced harmonic oscillations | | |
| 4 | Sep. | Unit:-IV SHM | * Superposition of two S.H.M of same freq. along same line | 01 | 12 |
| | | | * Interference | 01 | |
| | | | * Superposition of two mutually perpendicular S.H.M of same freq. | 01 | |
| | | | | 01 | |
| | | | | 01 | |
| | | | * Lissajous figures | 01 | |
| | | | * Standing waves , Newton's formula | 01 | |
| | | | * Velocity of waves by Kundt's tube | 01 | |
| | | | * Velocity of Transverse waves stretched | 02 | |
| | | | * Harmonics , Overtone | 02 | |
| | | | * Production & detection of Ultrasonic waves It's application | | |
| 5 | Oct. | Unit:-V Elasticity | * Introduction of Elasticity | 01 | 11 |
| | | | * Hooke's law of Elasticity | 01 | |
| | | | * Three elastic constants | 01 | |
| | | | * Relation between Y, $\eta$ , K | 01 | |
| | | | * Bending of beam & Bending moment | 01 | |
| | | | * Cantilever | 01 | |
| | | | * Depression of centrally loaded beam | 01 | |
| | | | * Twisting couple | 01 | |
| | | | | 01 | |
| | | | | 01 | |

| | | | * Torsion of pendulum | 01 | |
| --- | --- | --- | --- | --- | --- |
| | | | * Maxwell's needle | 01 | |
| | | | * Numerical | | |
| 6 | Oct. | Unit-VI Kinematics of Fluids | * Streamline & Turbulent flow | 01 | |
| | | | * Viscous Drag | 01 | |
| | | | * coefficient of viscosity | 01 | |
| | | | * Equation of continuity | 01 | |
| | | | *Euler's equation | 01 | 11 |
| | | | *Bernoulli's theorem | 01 | |
| | | | *Poiseulle's equation | 01 | |
| | | | *Reynolds's number , Terminal velocity | 01 | |
| | | | *Stoke's Law , Variation of viscosity | 01 | |
| | | | with temp. | 01 | |
| | | | *Surface Tension , Angle of contact | 01 | |
| | | | *Wetting , Jager's method | | |

In-Charge Teach                                                                          Head
                                                                                                      Dept.    of
Physics

## Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
### Department of Physics
Teaching Plan Session:- 2018-19

Name :-  Mr. Sharique S. Shaikh    Class:**-**B.Sc. Ist Year /Sem. II  Subject:- Physics
Paper:- (2S)  K .T , Thermodynamics & Electric Current

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit- I | *Kinetic theory of gases (assumptions) | 01 | |
| | | | *Deduction of Boyle's law, Interpretation of temp. | 01 | |
| | | | *Estimation of R.M.S ,Avogadro's & | 01 | 12 |
| | | | speed of molecule | 01 | |
| | | | *Degrees of freedom | 01 | |
| | | | * Equipartition of energy | 01 | |
| | | | *Specific heat of monoatomic gas, | 01 | |
| | | | extension to diatomic & triatomic | 01 | |
| | | | *Real gas- Van-der Wall's equation of state | 01 | |
| | | | * Comparison with expt. PV curves. | 01 | |
| | | | * the critical constant, nature of Vander Wall's forces | 01 | |
| | | | *Molecular collision , mean free path, Brownian motion & collision cross section | 01 | |
| | | | *Transport of mass, momentum& | | |
| | | | energy | | |
| | | | * Dependence on Temp. * Pressure | | |
| 2 | Jan. | Unit :-II Laws of thermodynamics | *The Zeroth law, P-V indicator diagram, work done by & on the system | 01 | |
| | | | * First law of thermodynamics' internal energy as a state function & other application | 02 | |
| | | | * reversible and irreversible changes | 01 | 10 |
| | | | *Carnot's cycle & it's efficiency for perfect gas | 01 | |
| | | | * The second law of thermodynamics, version of it | 01 | |
| | | | * Carnot's theorem, Entropy, S-T | 01 | |
| | | | | 01 | |
| | | | | 01 | |
| | | | | 01 | |
| | | | | 01 | |

| | | | diagram<br>*Principle of increase of entropy<br>* The thermodynamic scale of temp. it's identity<br>*Impossibility of attaining the absolute zero, Third law of thermodynamics | | |
|---|---|---|---|---|---|
| 3 | Jan./Feb | Unit:-III<br>Liquefaction of Gases | * Joule Thomson effect<br>* Joule's Coefficient, Boyle's & inversion temp.<br>* Principle of Regenerative cooling<br> * Cascade cooling<br>* Liquefaction of hydrogen & Helium<br>*Thermodynamic relationship.<br>* Thermodynamic variables<br>* Maxwell's general relationship<br>* application to Joule Thomson cooling & adiabatic cooling in general system<br>* Clausius Clapeyorn equation<br>*Thermodynamic Potential & equilibrium of thermo dynamical system<br>* Relation with thermo dynamical variables | 01<br>01<br><br>01<br>01<br>02<br>01<br>02<br>01<br>01<br><br>01<br>01<br><br>01 | 14 |
| 4 | Feb | Unit:-IV | * E as an accelerating field<br>* Electron gun , case of discharge tube<br>* Linear accelerator<br>* E as a deflecting field<br>* Transverse magnetic field<br>* Mass spectrograph, velocity selector<br>* Curvature of tracks for energy<br>determination of nuclear particles<br>* Principle of Cyclotrons<br>* Mutually perpendicular E & B fields<br>* Velocity selector, it's resolution | 01<br>01<br>01<br>01<br>01<br>01<br>01<br><br>02<br>01<br>01 | 11 |
| 5 | Mar. | Unit:-V<br>Network Theorem | * Thevi9nin's theorem<br>* Superposition theorem<br>* Maximum power transfer theorem, some application<br>* Ballistic galvanometer<br>* Application of B. G<br>* Determination of | 01<br>01<br>01<br><br>01<br>01<br>02 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | capacitance & high resistance by method f leakage<br> Varying currents:-<br>* Steady currents, current density J<br>* Non –steady current & continuity equation<br>* Kirchhoff's law & analysis of multi-loop circuit<br>* Rise & decay of currents in LR, CR circuit & transients in LCR circuit | 01<br>01<br><br>01<br><br>02 | 12 |
| 6 | Mar./Apr. | Unit-VI Alternating currents | * A.C currents ,<br>* complex number and their application in solving A.C circuits using j- operator<br>* pure R,L,C & their combination<br>* Reactance and impedance<br>* series and parallel resonance<br>*Q – factor , power factor<br>* self and mutual inductance<br>* theory of transformer | 01<br>02<br><br>01<br>01<br>01<br>01<br>01<br>01 | 09 |

Head
Dept.
of Physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Ku.Kanhe Mam    Class:**-**B.Sc. IInd Year /Sem. III   Subject:- Physics
Paper:- (3S) Solid state, Relativity & Geophysics

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July/Aug. | Unit-I Mathematical background and Electrostatics | *Gradient, divergence & curl of a vector field , Physical significance | 03 | 13 |
| | | | * Line surface & volume integral | 02 | |
| | | | * Gauss's divergence theorem | 02 | |
| | | | | 01 | |
| | | | * Stoke's theorem | 01 | |
| | | | * work done on charge in electrostatic field | 01 | |
| | | | * Flux of a electric field | 01 | |
| | | | *Lorentz force equation (B) | 01 | |
| | | | * Ampere force law | 01 | |
| | | | * Ampere force law and its application | 01 | |
| 2 | Aug./Sep | Unit:-II Magneto statics and Maxwell's equation | * Faraday's law | 01 | 12 |
| | | | * Integral and Differential form | 02 | |
| | | | *Displacement current and Maxwell's equation | 02 | |
| | | | * Wave equation satisfy by E and B | 02 | |
| | | | *Plane electromagnetic wave in vacuum | 02 | |
| | | | * Poynting vector and | 02 | |
| | | | | 01 | |

| | | | Theorem | | |
|---|---|---|---|---|---|
| 3 | Sep./Oct. | Unit :- VI Atmosphere and Geophysics | *Structure of Earth ; Crust , Mantle & Core | 01 | |
| | | | *Part of the Earth – As a planet Atmosphere | 01 | |
| | | | * Lithosphere | 01 | |
| | | | * Hydrosphere composition | 01 | |
| | | | | 01 | 14 |
| | | | * Earthquakes causes | 02 | |
| | | | *Types ,Scale of Intensity, Recording | 01 | |
| | | | | 01 | |
| | | | *Radiation in the Atmosphere | | |
| | | | | 02 | |
| | | | *Propagation of Energy through vacuum | | |
| | | | | 01 | |
| | | | * Intensity , scattering absorption & Reflection | 02 | |
| | | | * Moisture and Clouds (mechanism) | | |
| | | | *Cloud produced by mixing and cooling | | |

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Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Mr. Sharique S. Shaikh   Class:**-**B.Sc. II$^{nd}$ Year /Sem. III   Subject:- Physics
Paper:- (3S) Solid state, Relativity & Geophysics

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 4 | July/Aug. | Unit- III Solid state Electronics Devices I | * Introduction to Semiconductors | 01 | |
| | | | | 02 | |
| | | . | * Charge carrier and electrical conduction ; Doping | | |
| | | | | 01 | |
| | | | * Extrinsic semiconductors | 01 | 12 |
| | | | * Fermi level and Energy level dia. | 01 | |
| | | | | 01 | |
| | | | * Drift current in | 01 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | semiconductor | 01 | |
| | | | * Conductivity , Mobility | 01 | |
| | | | * Hall effect | | |
| | | | * Hall coefficient | 01 | |
| | | | *Semiconductor Diode and it's biasing | 01 | |
| | | | * LED | | |
| | | | * Varactor diode | | |
| 5 | Aug./Sep | Unit:-IV Solis state Electronics Devices II | * Working of BJT | 01 | |
| | | | * Current gain $\acute{\alpha}$ , $\beta$ and their relation | 01 | |
| | | | * Chara. in CB , CE modes | 01 | |
| | | | *JFET construction and working | 01 | |
| | | | * Chara. Of FET | 01 | |
| | | | | 01 | |
| | | | *Basic concept of Difference Amplifier | 01 | 13 |
| | | | * IC-OP AMP | 01 | |
| | | | *Electrical parameter of OP-Amp | 01 | |
| | | | * Inverting and non- Inverting modes | 01 | |
| | | | * OP-AMP as Adder | 01 | |
| | | | * OP-AMP as Subtract or | 01 | |
| | | | * OP-AMP as Differentiator | 01 | |
| | | | * OP-AMP as Integrator | 01 | |
| 6 | . Sep./Oct | Unit:-V Special Theory of Relativity | * Postulates for the special theory of relativity | 01 | |
| | | | * Lorentz Transformations | 01 | |
| | | | * Time Dilation | 01 | |
| | | | * Velocity Addition Theorem | 02 | 10 |
| | | | * Length contraction, | 01 | |
| | | | * Relativity of mass | 02 | |
| | | | * Mass energy relation | 01 | |
| | | | * Numerical | 01 | |

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Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Mr. Sharique S. shaikh    Class:**-**B.Sc. IInd Year /Sem. IV   Subject:- Physics
Paper:- 4S Laser, Fiber optic , Renewable source, Geometrical optic, Polarization

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Jan | Unit-I Geometrical optic and interference | * Cardinal points of an system<br>* Equivalent focal length of coaxial lens system<br>* Principle of superposition (light)<br>* Thin films<br>* Expression for fringe width<br>* Newton's ring | 01<br>02<br><br>01<br>03<br>01<br>04 | 12 |
| 2 | Feb./Mar. | Unit:-II Diffraction of light | * Fresnel diffraction<br>*Fraunhofer diffraction<br>* Diff. bet$^n$. F-F diffraction<br>*Fresnel assumption , half period zone<br>* Zone plate construction<br>*comparison of zone plate with convex lens<br>* Fraunhofer diff. due to double slit<br>* Plane diff. grating<br>* Elementary theory of grating<br>*Maximum number of orders available with grating<br>*Determination of wavelength of light<br>*Resolution of images<br>*Rayleigh's criteria for resolution<br>*Resolving power of grating | 01<br>01<br>01<br>01<br><br>01<br>01<br><br>01<br>01<br>01<br>01<br><br>01<br>01<br>01<br>01 | 14 |
| 3 | Mar./Apr. | Unit:-III Polarization of light | * Concept of polarization<br>* Optic axis<br>* Double refraction , Brewster's law<br>* Positive and Negative crystal<br>* Phase retardation plate ,Half and Quarter<br>* Nicol prism , Polarizer and Analyzer<br>*Plane , circularly and Elliptically polarized light<br>*Half shade polarimeter<br>*Blue colour of the sky | 01<br>01<br>01<br>01<br>02<br><br>01<br>02<br><br>01<br>01 | 11 |

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Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Ku. Kanhe Mam    Class:**-**B.Sc. II$^{nd}$ Year /Sem. IV   Subject:- Physics
Paper:- 4S Laser, Fiber optic , Renewable source, Geometrical optic, Polarization

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 4 | Jan. | Unit:-IV Laser | *Absorption , Spontaneous and stimulated emission | 01 | |
| | | | | 01 | |
| | | | * Population inversion , pumping | 01 | |
| | | | | 01 | |
| | | | * MASER | 01 | |
| | | | *Chara. of laser , laser system | 01 | |
| | | | | 01 | 08 |
| | | | * Three and four level laser system. | 01 | |
| | | | * Ruby and He-Ne laser | | |
| | | | *Holography & Recording and reprod. | | |
| | | | * Semiconductor laser | | |
| 5 | Feb./Mar | Unit:-V Fiber optics | * Total internal reflection | 01 | |
| | | | * Structure of optical fiber | 01 | |
| | | | * Classification of optical fiber | 01 | |
| | | | | 01 | |
| | | | * Propagation of light in optical fiber | 01 | 09 |
| | | | | 02 | |
| | | | * Acceptance angle and numerical apt. | 01 | |
| | | | | 01 | |
| | | | *Dispersion and Fiber losses | | |
| | | | * Fiber optic communication | | |
| | | | * Advantages of optical fiber | | |
| 6 | Mar./Apr. | Unit–VI Renewable energy sources | *Solar energy , wind energy, ocean en. | 01 | |
| | | | | 01 | |
| | | | *Geothermal energy , hydrogen energy | 01 | |
| | | | | 01 | |
| | | | *Fuel cell , Biomass energy | 01 | |
| | | | *Solar energy and its availability | 01 | 12 |
| | | | | 02 | |
| | | | *Seasonal variation , solar constant, spt | 01 | |
| | | | | 01 | |
| | | | *Measurement of solar radiation | 02 | |
| | | | * Solar energy storage | | |
| | | | *Solar photovoltaic system, | | |

| | | | PV cell<br>*Thin film photovoltaic cell<br>* solar PV panel and Application | | |
|---|---|---|---|---|---|

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Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Ku. Kanhe Mam      Class:**-**B.Sc. III$^{rd}$ Year /Sem. V   Subject:- Physics
Paper:-5S-Quantum mechanics, Atomic spectroscopy ,Nuclear physics , hybrid parameters.

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July/Aug. | Unit :- II  The Schrodinger equation and its applications | * Wave function and its physical significance | 01 | 12 |
| | | | * Schrodinger time dependent equation | 01 | |
| | | | * Separation in time dependent and time independent parts | 01 | |
| | | | | 01 | |
| | | | * Operators in quantum Mechanics | 02 | |
| | | | | 02 | |
| | | | * Eigen functions and Eigen values | 02 | |
| | | | * Particle in one dimensional and three dimensional box (Energy eigen values) | 02 | |
| | | | * Qualitative analysis of potential barrier Tunneling effect) | | |
| | | | * Simple Harmonic Oscillator (Qualitative analysis of Zero point ) | | |
| 2 | Aug./Sep | Unit- III Atomic and Molecular Spectroscopy | *Vector Atom Model: Quantum Numbers, | 01 | 11 |
| | | | *Stern- Gerlach experiment; | 02 | |
| | | | | 01 | |
| | | | *selection rules, l-s and j-j coupling | 01 | |
| | | | *Types of spectra – Emission & absorption | 01 | |
| | | | | 01 | |

| | | | spectra. | 01 | |
| | | | *X-rays: Continuous X-ray spectrum, *Duane and Hunt's law, | 01 | |
| | | | | 01 | |
| | | | *characteristic X-ray spectra, | 01 | |
| | | | *Mosley's law *Raman Effect: stoke's and anti-stoke's lines, *Quantum theory of Raman effect, Experimental Arrangement for Raman Spectroscopy. | | |
| 3 | Sep./Oct. | Unit:-IV Nuclear Physics | *Detection of charged particles; | 01 | |
| | | | *G. M. counter, | 02 | |
| | | | *Binding energy and Mass defect, stability of nuclei | 02 | |
| | | | *Alpha Decay: Range of Alpha particles, *Geiger - Nuttal law and Gamow's explanation of alpha decay (qualitative)*Beta decay: Types and Pauli's Neutrino Hypothesis | 01 | 13 |
| | | | | 02 | |
| | | | | 02 | |
| | | | | 02 | |
| | | | *Nuclear Fission, Nuclear fusion (concepts only), *Nuclear reactors. | 01 | |

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Amrut Sevabhavi Sanstha, Parbhani.
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Mr. Sharique S. Shaikh  Class:-B.Sc. IIIrd Year /Sem. V   Subject:- Physics
Paper:-5S-Quantum mechanics, Atomic spectroscopy ,Nuclear physics , hybrid parameters.

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July/Aug | Unit-I Origin of Quantum Mechanics | *Historical background, Failure of classical theory in explaining | 01 | |
| | | | | 01 | |
| | | | *Black body radiation & Photoelectric effect | 02 | 14 |
| | | | * Compton effect qualitative analysis | 01 | |
| | | | | 01 | |
| | | | * Assumption of Plank's quantum theory | 01 | |
| | | | | 01 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | * Wave Particle Duality<br>* De-Broglie Hypothesis<br>* Davisson Germer expt.<br>*Concept of Wave packet, Phase velocity , Group velocity relation<br>* Heisenberg's uncertainty principal<br>* Different forms<br>* Thought expt.Gamma ray microscope | 02<br><br>01<br>01<br>02 | |
| 2 | Aug./Sep. | Unit:-V Hybrid parameters | *Hybrid parameters<br> *low frequency equivalent of CE amplifier & its analysis.,<br>*Bias stability & thermal runway qual.<br>*General principles of amplifier classification,<br>*RC coupled amplifier,<br>*Equivalent circuits & gain at low, medium & high frequency (qualitative),<br>*Gain-frequency response.<br>*Noise & distortion in electronic circuits. | 01<br>02<br><br>02<br>01<br><br>01<br>02<br><br>01<br>02 | 12 |
| 3 | Sep./Oct | Unit :- VI Feedback in amplifiers | *Feedback in amplifiers- Negative feedback,<br>*Advantages of negative feedback,<br> *positive feedback.<br>*Phase shift, and Wein bridge<br> *Hartley & Colpits Oscillators.<br>*Multi-vibrators – astable, monostable & bistable. | 01<br><br>01<br>01<br>02<br>02<br>03 | 10 |

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Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Ku. Kanhe Mam  Class:**-**B.Sc. III$^{rd}$ Year /Sem. VI   Subject:- Physics
Paper:-  (6S) Statistical mechanics & solid state physics.

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit-I Statistical mechanics | *Phase space , Unit cell <br> *Microstates and Macro states <br> *Energy states, Density of Energy states <br> *Probability and most probable distribution <br> *Boltzman entropy relation <br> *Maxwell-Boltzman relation <br> *Molecular speed distribution <br> * r.m.s. speed and most probable velocity | 01 <br> 01 <br> 01 <br><br> 02 <br><br> 01 <br> 01 <br> 01 <br> 01 | 09 |
| 2 | Feb. | Unit :- II Bose-Einstein statistics | *Distinguishable& Indistinguishable particles <br> * Concept of boson and fermions <br> * Bose-Einstein statistics <br> * Black body radiation <br> *Fermi-Dirac distribution <br> * Fermi function <br> * Fermi energy <br> *Fermi temp. | 02 <br><br> 01 <br> 02 <br> 01 <br> 01 <br> 01 <br> 01 <br> 01 | 10 |
| 3 | Mar./Apr. | Unit:-III Crystallography | *Crystalline and Amorphous materials <br> * Unit cell <br> * Miller indices <br> *Types of lattice <br> * Coordination number <br> * Diffraction of lattice parameter <br> * Diffraction of X-rays by crystal <br> *Bragg's law <br> *Reciprocal lattice <br> *Defects in solids | 01 <br><br> 01 <br> 01 <br> 01 <br> 01 <br> 01 <br> 01 <br> 01 <br> 01 <br> 02 | 11 |

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Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2018-19
Name :- Mr. Sharique S. Shaikh   Class:**-**B.Sc. III$^{rd}$ Year /Sem. VI   Subject:- Physics
Paper:-  (6S) Statistical mechanics & solid state physics.

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 4 | Dec./Jan | Unit:-IV  Electrical properties of material | * Motion of electron | 01 | 10 |
| | | | * Electrical conductivity | 01 | |
| | | | | 02 | |
| | | | * Expn. For electrical conductivity and ohm's law | 01 | |
| | | | * Fermi energy and density of states | 01 | |
| | | | | 01 | |
| | | | * Electron in periodic potential | 01 | |
| | | | * Bloch theorem | 01 | |
| | | | *Energy band , energy gap | 01 | |
| | | | * Free electron model | | |
| | | | *Conductor's ,insulator's,    semiconductor's | | |
| 5 | Feb. | Unit:-V  Magnetic properties of materials | * Atomic magnetic moment | 01 | 13 |
| | | | *Magnetization vector (M) | 01 | |
| | | | | 01 | |
| | | | | 01 | |
| | | | * Magnetic susceptibility | | |
| | | | * Diamagnetism, Paramagnetic, Ferromagnetism | 01 | |
| | | | * Dia. Para-,and ferromagnetic materials | 02 | |
| | | | * Langevin's theory of diamagnetism | 02 | |
| | | | * Langevin's theory of Para magnetism | 02 | |
| | | | * Quantum mechanical treatment of Para magnetism | 01 | |
| | | | *Curie-Weiss's law | 01 | |
| | | | *Hysteresis and energy loss | | |

| 6 | Mar./Apr. | Unit–VI Superconductivity and Nanotechnology | *Superconductivity | 01 | |
| | | | *Critical temp. and critical magnetic field | 01 | |
| | | | | 01 | |
| | | | *Meissner effect | 01 | |
| | | | *Type I and Type II Superconductor. | 02 | 12 |
| | | | | 01 | |
| | | | | 01 | |
| | | | *BCS Theory, cooper pair | 01 | |
| | | | *Application of superconductor's | 01 | |
| | | | | 01 | |
| | | | *Effect of reduction of dim. of physical properties | | |
| | | | *History of nanotechnology | | |
| | | | *Quantum size effect | | |
| | | | *Application of Nano materials | | |

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Dept. of physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2019-20
Name :-  Mr. Sharique S. Shaikh    Class:-B.Sc. Iˢᵗ Year /Sem. I  Subject:- Physics
Paper:- (1S)  Mechanics ,Matter, waves & Oscillation

| Sr. No. | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July | Unit- I | *Kepler's law's of planetary motion | 01 | |
| | | | *Newton's law's of Gravitation , acceleration due to gravity | 01 | |
| | | | * variation with altitude & depth | 02 | |
| | | | * Gravitational field & potential | 01 | 10 |
| | | | * Gauss's theorem | 01 | |
| | | | *Gravitational potential & intensity due to solid sphere at a point (inside) | 02 | |
| | | | * Gravitational potential & intensity due to solid sphere at a point (outside) | 02 | |
| 2 | Aug. | Unit :-II | * Motion of Rigid body | 01 | |
| | | | * rotational motion , moment of inertia | 01 | |
| | | | * Principle of Perpendicular axis | 01 | |
| | | | * Principle of Parallel axis | 01 | |
| | | | * Radius of Gyration | 01 | |
| | | | * M.I of Ring ,Disc, hollow & solid sphere ,cylinder , & Bar about diff. axis | 04 | 12 |
| | | | * Linear momentum  (conservation) | 01 | |
| | | | * Angular momentum (conservation) | 01 | |

| | | | * Numerical | 01 | |
|---|---|---|---|---|---|
| 3 | Aug./Sep. | Unit : III Simple Harmonic Motion | * Linear & Angular S.H.M | 01 | 12 |
| | | | * Differential equation & solutions | 02 | |
| | | | * Displacement , velocity & acceleration | 01 | |
| | | | * Kinetic & Potential energy | 01 | |
| | | | * Simple pendulum | 01 | |
| | | | *Compound pendulum | 01 | |
| | | | * Kater's Reversible pendulum | 01 | |
| | | | * Spring & Mass system | 01 | |
| | | | * Vibration of Magnet | 01 | |
| | | | *Bifilar oscillation | 01 | |
| | | | *Damped & forced harmonic oscillations | 01 | |
| 4 | Sep. | Unit:-IV SHM | * Superposition of two S.H.M of same freq. along same line | 01 | 12 |
| | | | * Interference | 01 | |
| | | | * Superposition of two mutually perpendicular S.H.M of same freq. | 01 | |
| | | | | 01 | |
| | | | * Lissajous figures | 01 | |
| | | | * Standing waves , Newton's formula | 01 | |
| | | | * Velocity of waves by Kundt's tube | 01 | |
| | | | * Velocity of Transverse waves stretched | 01 | |
| | | | | 02 | |
| | | | * Harmonics , Overtone | 02 | |
| | | | * Production & detection of Ultrasonic waves It's application | | |
| 5 | Oct. | Unit:-V Elasticity | * Introduction of Elasticity | 01 | 11 |
| | | | * Hooke's law of Elasticity | 01 | |
| | | | * Three elastic constants | 01 | |
| | | | * Relation between Y, ŋ , K | 01 | |
| | | | * Bending of beam & Bending moment | 01 | |
| | | | * Cantilever | 01 | |
| | | | * Depression of centrally loaded beam | 01 | |
| | | | * Twisting couple | 01 | |
| | | | * Torsion of pendulum | 01 | |
| | | | * Maxwell's needle | 01 | |
| | | | * Numerical | 01 | |
| 6 | Oct. | Unit-VI Kinematics of Fluids | * Streamline & Turbulent flow | 01 | 11 |
| | | | * Viscous Drag | 01 | |
| | | | * coefficient of viscosity | 01 | |
| | | | * Equation of continuity | 01 | |
| | | | *Euler's equation | 01 | |
| | | | *Bernoulli's theorem | 01 | |
| | | | *Poiseulle's equation | 01 | |
| | | | *Reynolds's number , Terminal velocity | 01 | |
| | | | *Stoke's Law , Variation of viscosity with temp. | 01 | |
| | | | *Surface Tension , Angle of contact | 01 | |
| | | | *Wetting , Jager's method | 01 | |

In-Charge Teach          Head
                   Dept. of Physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2019-20
Name :-  Mr. Sharique S. Shaikh    Class:-B.Sc. Ist Year /Sem. II  Subject:- Physics
Paper:- (2S)  K .T , Thermodynamics & Electric Current

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit- I | *Kinetic theory of gases (assumptions) | 01 | |
| | | | *Deduction of Boyle's law, Interpretation of temp. | 01 | |
| | | | *Estimation of R.M.S ,Avogadro's & speed of molecule | 01 | 12 |
| | | | *Degrees of freedom | 01 | |
| | | | * Equipartition of energy | 01 | |
| | | | *Specific heat of monoatomic gas, extension to diatomic & triatomic | 01 | |
| | | | *Real gas- Van-der Wall's equation of state | 01 | |
| | | | * Comparison with expt. PV curves. | 01 | |
| | | | * the critical constant, nature of Vander Wall's forces | 01 | |
| | | | *Molecular collision , mean free path, Brownian motion & collision cross section | 01 | |
| | | | *Transport of mass, momentum& energy | 01 | |
| | | | * Dependence on Temp. * Pressure | 01 | |

| | | | | | |
|---|---|---|---|---|---|
| 2 | Jan. | Unit :-II Laws of thermodynamic | *The Zeroth law, P-V indicator diagram, work done by & on the system | 01 | |
| | | | * First law of thermodynamics' internal energy as a state function & other application | 02 | |
| | | | * reversible and irreversible changes | 01 | |
| | | | *Carnot's cycle & it's effiency for perfect gas | 01 | 10 |
| | | | * The second law of thermodynamics, version of it | 01 | |
| | | | * Carnot's theorem, Entropy, S-T diagram | 01 | |
| | | | *Principle of increase of entropy | 01 | |
| | | | * The thermodynamic scale of temp. it's identity | 01 | |
| | | | *Impossibility of attaining the absolute zero, Third law of thermodynamics | 01 | |
| 3 | Jan./Feb | Unit:-III Liquefaction of Gases | * Joule Thomson effect | 01 | |
| | | | * Joule's Coefficient, Boyle's & inversion temp. | 01 | |
| | | | * Principle of Regenerative cooling | 01 | |
| | | | * Cascade cooling | 01 | |
| | | | * Liquefaction of hydrogen & Helium | 02 | |
| | | | *Thermodynamic relationship. | 01 | 14 |
| | | | * Thermodynamic variables | 02 | |
| | | | * Maxwell's general relationship | 01 | |
| | | | * application to Joule Thomson cooling & adiabatic cooling in general system | 01 | |
| | | | * Clausius Clapeyorn equation | 01 | |
| | | | *Thermodynamic Potential & equilibrium of thermo dynamical system | 01 | |
| | | | * Relation with thermo dynamical variables | 01 | |
| 4 | Feb | Unit:-IV | * E as an accelerating field | 01 | |
| | | | * Electron gun , case of discharge tube | 01 | |
| | | | * Linear accelerator | 01 | |
| | | | * E as a deflecting field | 01 | |
| | | | * Transverse magnetic field | 01 | |
| | | | Mass spectrograph, velocity selector | 01 | 11 |
| | | | * Curvature of tracks for energy determination of nuclear particles | 01 | |
| | | | * Principle of Cyclotrons | 02 | |
| | | | * Mutually perpendicular E & B fields | 01 | |
| | | | * Velocity selector, it's resolution | 01 | |
| 5 | Mar. | Unit:-V Network Theorem | * Thevi9nin's theorem | 01 | |
| | | | * Superposition theorem | 01 | |
| | | | * Maximum power transfer theorem, some application | 01 | |
| | | | * Ballistic galvanometer | 01 | |
| | | | * Application of B. G | 01 | |
| | | | * Determination of capacitance & high resistance by method f leakage | 02 | |
| | | | Varying currents:- | | 12 |

| | | | * Steady currents, current density J | 01 | |
| | | | * Non –steady current & continuity equation | 01 | |
| | | | * Kirchhoff's law & analysis of multi-loop circuit | 01 | |
| | | | * Rise & decay of currents in LR, CR circuit & transients in LCR circuit | 02 | |
| 6 | Mar./Apr. | Unit-VI Alternating currents | * A.C currents , * complex number and their application in solving A.C circuits using j- operator * pure R,L,C & their combination * Reactance and impedance * series and parallel resonance*Q – factor , power factor * self and mutual inductance* theory of transformer | 01<br>02<br>01<br>01<br>01<br>01<br>01<br>01 | 09 |

Head

Dept. of Physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2019-20
Name :- Mr. Sharique S. Shaikh   Class:-B.Sc. IInd Year /Sem. III   Subject:- Physics
Paper:- (3S) Solid state, Relativity & Geophysics

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July/Aug. | Unit-I Mathematical background and Electrostatics | *Gradient, divergence & curl of a vector field , Physical significance | 03 | 13 |
| | | | * Line surface & volume integral | 02 | |
| | | | * Gauss's divergence theorem | 02 | |
| | | | * Stoke's theorem | 01 | |
| | | | * work done on charge in electrostatic field | 01 | |
| | | | * Flux of a electric field | 01 | |
| | | | *Lorentz force equation (B) | 01 | |
| | | | * Ampere force law | 01 | |
| | | | * Ampere force law and its application | 01 | |
| 2 | July/Aug. | Unit:-II Magneto statics and Maxwell's equation | * Faraday's law | 01 | 12 |
| | | | * Integral and Differential form | 02 | |
| | | | *Displacement current and Maxwell's equation | 02 | |
| | | | * Wave equation satisfy by E and B | 02 | |
| | | | *Plane electromagnetic wave in vacuum | 02 | |
| | | | * Poynting vector and Theorem | 01 | |

| 3 | Aug./Sep | Unit- III Solid state Electronics Devices I | * Introduction to Semiconductors | 01 | |
|---|---|---|---|---|---|
| | | | * Charge carrier and electrical conduction ; Doping | 02 | |
| | | | * Extrinsic semiconductors | 01 | |
| | | | * Fermi level and Energy level dia. | 01 | 12 |
| | | | * Drift current in semiconductor | 01 | |
| | | | * Conductivity , Mobility | 01 | |
| | | | * Hall effect | 01 | |
| | | | * Hall coefficient | 01 | |
| | | | *Semiconductor Diode and it's biasing | 01 | |
| | | | * LED | 01 | |
| | | | * Varactor diode | 01 | |
| 4 | . Aug./Sep | Unit:-IV Solis state Electronics Devices II | * Working of BJT | 01 | |
| | | | * Current gain ά , β and their relation | 01 | |
| | | | * Chara. in CB , CE modes | 01 | |
| | | | *JFET construction and working | 01 | |
| | | | * Chara. Of FET | 01 | |
| | | | *Basic concept of Difference Amplifier | 01 | |
| | | | * IC-OP AMP | 01 | 13 |
| | | | *Electrical parameter of OP-Amp | 01 | |
| | | | * Inverting and non- Inverting modes | 01 | |
| | | | * OP-AMP as Adder | 01 | |
| | | | * OP-AMP as Subtract or | 01 | |
| | | | * OP-AMP as Differentiator | 01 | |
| | | | * OP-AMP as Integrator | 01 | |
| 5 | Sep./Oct | Unit:-V Special Theory of Relativity | * Postulates for the special theory of relativity | 01 | |
| | | | * Lorentz Transformations | 01 | |
| | | | * Time Dilation | 01 | |
| | | | * Velocity Addition Theorem | 02 | 10 |
| | | | * Length contraction, | 01 | |
| | | | * Relativity of mass | 02 | |
| | | | * Mass energy relation | 01 | |
| | | | * Numerical | 01 | |
| 6 | Sep./Oct | Unit :- VI Atmosphere and Geophysics | *Structure of Earth ; Crust , Mantle & Core | 01 | |
| | | | *Part of the Earth – As a planet Atmosphere | 01 | |
| | | | * Lithosphere | 01 | |
| | | | * Hydrosphere composition | 01 | |
| | | | * Earthquakes causes | 01 | 14 |
| | | | *Types ,Scale of Intensity, Recording | 02 | |
| | | | *Radiation in the Atmosphere | 01 | |
| | | | *Propagation of Energy through vacuum | 01 | |
| | | | * Intensity , scattering absorption & Reflection | 02 | |
| | | | * Moisture and Clouds (mechanism) | 01 | |
| | | | *Cloud produced by mixing and cooling | 02 | |

In-Charge Teacher

Head
Dept. of Physics

Amrut Sevabhavi Sanstha, Parbhani.
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2019-20
Name :- Mr. Sharique S. shaikh     Class:-B.Sc. II$^{nd}$ Year /Sem. IV   Subject:- Physics
Paper:- 4S Laser, Fiber optic , Renewable source, Geometrical optic, Polarization

| Sr. No. | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan. | Unit-I Geometrical optic and interference | * Cardinal points of an system | 01 | |
| | | | * Equivalent focal length of coaxial lens system | 02 | |
| | | | * Principle of superposition (light) | 01 | |
| | | | * Thin films | 03 | 12 |
| | | | * Expression for fringe width | 01 | |
| | | | * Newton's ring | 04 | |
| 2 | Dec./Jan. | Unit:-II Diffraction of light | * Fresnel diffraction | 01 | |
| | | | *Fraunhofer diffraction | 01 | |
| | | | * Diff. bet$^n$. F-F diffraction | 01 | |
| | | | *Fresnel assumption , half period zone | 01 | |
| | | | * Zone plate construction | 01 | 14 |
| | | | *comparison of zone plate with convex lens | 01 | |
| | | | * Fraunhofer diff. due to double slit | 01 | |
| | | | * Plane diff. grating | 01 | |
| | | | * Elementary theory of grating | 01 | |
| | | | *Maximum number of orders available with grating | 01 | |
| | | | *Determination of wavelength of light | 01 | |
| | | | *Resolution of images | 01 | |
| | | | *Rayleigh's criteria for resolution | 01 | |

| | | | *Resolving power of grating | | |
|---|---|---|---|---|---|
| 3 | Feb./Mar. | Unit:-III Polarization of light | * Concept of polarization | 01 | |
| | | | * Optic axis | 01 | |
| | | | * Double refraction , Brewster's law | 01 | |
| | | | * Positive and Negative crystal | 01 | |
| | | | * Phase retardation plate ,Half and Quarter | 02 | 11 |
| | | | * Nicol prism , Polarizer and Analyzer | 01 | |
| | | | *Plane , circularly and Elliptically polarized light | 02 | |
| | | | *Half shade polarimeter | 01 | |
| | | | *Blue colour of the sky | 01 | |
| 4 | Feb./Mar. | Unit:-IV Laser | *Absorption , Spontaneous and stimulated emission | 01 | |
| | | | * Population inversion , pumping | 01 | |
| | | | * MASER | 01 | |
| | | | *Chara. of laser , laser system | 01 | |
| | | | * Three and four level laser system. | 01 | |
| | | | * Ruby and He-Ne laser | 01 | |
| | | | *Holography & Recording and reprod. | 01 | 08 |
| | | | * Semiconductor laser | 01 | |
| 5 | April | Unit:-V Fiber optics | * Total internal reflection | 01 | |
| | | | * Structure of optical fiber | 01 | |
| | | | * Classification of optical fiber | 01 | |
| | | | * Propagation of light in optical fiber | 01 | |
| | | | * Acceptance angle and numerical apt. | 01 | 09 |
| | | | *Dispersion and Fiber losses | 02 | |
| | | | * Fiber optic communication | 01 | |
| | | | * Advantages of optical fiber | 01 | |
| 6 | April | Unit–VI Renewable energy sources | *Solar energy , wind energy, ocean en. | 01 | |
| | | | *Geothermal energy , hydrogen energy | 01 | |
| | | | *Fuel cell , Biomass energy | 01 | |
| | | | *Solar energy and its availability | 01 | |
| | | | *Seasonal variation , solar constant, spt | 01 | |
| | | | *Measurement of solar radiation | 01 | 12 |
| | | | * Solar energy storage | 02 | |
| | | | *Solar photovoltaic system, PV cell | 01 | |
| | | | *Thin film photovoltaic cell | 01 | |
| | | | * solar PV panel and Application | 02 | |

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2019-20
Name :- Mr. Sharique S. Shaikh     Class:-B.Sc. III$^{rd}$ Year /Sem. V   Subject:- Physics
Paper:-5S-Quantum mechanics, Atomic spectroscopy ,Nuclear physics , hybrid parameters.

| Sr. No. | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July | Unit-I Origin of Quantum Mechanics | *Historical background, Failure of classical theory in explaining | 01 | 14 |
| | | | *Black body radiation & Photoelectric effect | 01 | |
| | | | * Compton effect qualitative analysis | 02 | |
| | | | * Assumption of Plank's quantum theory | 01 | |
| | | | | 01 | |
| | | | * Wave Particle Duality | 01 | |
| | | | * De-Broglie Hypothesis | 01 | |
| | | | * Davisson Germer expt. | 02 | |
| | | | *Concept of Wave packet, Phase velocity , Group velocity relation | 01 | |
| | | | * Heisenberg's uncertainty principal | 01 | |
| | | | * Different forms | 02 | |
| | | | * Thought expt.Gamma ray microscope | | |
| 2 | July/Aug. | Unit :- II The Schrodinger equation and its applications | * Wave function and its physical significance | 01 | 12 |
| | | | * Schrodinger time dependent equation | 01 | |
| | | | | 01 | |
| | | | * Separation in time dependent and time independent parts | 01 | |
| | | | * Operators in quantum Mechanics | 02 | |
| | | | * Eigen functions and Eigen values | 02 | |
| | | | * Particle in one dimensional and | | |

| | | | | | |
|---|---|---|---|---|---|
| | | | three dimensional box (Energy eigen values) | 02 | |
| | | | * Qualitative analysis of potential barrier Tunneling effect) | 02 | |
| | | | * Simple Harmonic Oscillator (Qualitative analysis of Zero point | | |
| 3 | Aug./Sep | Unit- III Atomic and Molecular Spectroscopy | *Vector Atom Model: Quantum Numbers, | 01 | |
| | | | *Stern- Gerlach experiment; | 02 | |
| | | | *selection rules, l-s and j-j coupling | 01 | |
| | | | *Types of spectra – Emission & absorption spectra. | 01 | 11 |
| | | | *X-rays: Continuous X-ray spectrum, | 01 | |
| | | | *Duane and Hunt's law, | 01 | |
| | | | *characteristic X-ray spectra, | 01 | |
| | | | *Mosley's law | 01 | |
| | | | *Raman Effect: stoke's and anti-stoke's lines, | 01 | |
| | | | *Quantum theory of Raman effect, Experimental Arrangement for Raman Spectroscopy. | 01 | |
| 4 | Aug./Sept. | Unit:-IV Nuclear Physics | *Detection of charged particles; | 01 | |
| | | | *G. M. counter, | 02 | |
| | | | *Binding energy and Mass defect, stability of nuclei | 02 | |
| | | | *Alpha Decay: Range of Alpha particles, *Geiger - Nuttal law and Gamow's explanation of alpha decay | 01 | |
| | | | (qualitative)*Beta decay: Types and Pauli's Neutrino Hypothesis | 02 | 13 |
| | | | *Nuclear Fission, Nuclear fusion (concepts only), | 02 | |
| | | | *Nuclear reactors. | 02 | |
| | | | | 01 | |
| 5 | Sep./Oct. | Unit:-V Hybrid parameters | *Hybrid parameters | 01 | |
| | | | *low frequency equivalent of CE amplifier & its analysis., | 02 | |
| | | | *Bias stability & thermal runway qual. | 02 | |
| | | | *General principles of amplifier classification, | 01 | 12 |
| | | | *RC coupled amplifier, | 01 | |
| | | | *Equivalent circuits & gain at low, medium & high frequency (qualitative), | 02 | |
| | | | *Gain-frequency response. | 01 | |
| | | | *Noise & distortion in electronic circuits. | 02 | |

| 6 | Sep./Oct | Unit :- VI Feedback in amplifiers | *Feedback in amplifiers- Negative feedback, | 01 | |
|---|---|---|---|---|---|
| | | | *Advantages of negative feedback, | 01 | |
| | | | *positive feedback. | 01 | 10 |
| | | | *Phase shift, and Wein bridge | 02 | |
| | | | *Hartley & Colpits Oscillators. | 02 | |
| | | | *Multi-vibrators – astable, monostable & bistable. | 03 | |

In-Charge Teacher

Head
Dept. of physics

Amrut Sevabhavi Sanstha, Parbhani.
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2019-20
Name :- Mr. Sharique S. Shaikh  Class:-B.Sc. III$^{rd}$ Year /Sem. VI  Subject:- Physics
Paper:-  (6S) Statistical mechanics & solid state physics.

| Sr. No. | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit-I Statistical mechanics | *Phase space , Unit cell | 01 | |
| | | | *Microstates and Macro states | 01 | |
| | | | *Energy states, Density of Energy states | 01 | |
| | | | *Probability and most probable distribution | 02 | 09 |
| | | | *Boltzman entropy relation | 01 | |
| | | | *Maxwell-Boltzman relation | 01 | |
| | | | *Molecular speed distribution | 01 | |
| | | | * r.m.s. speed and most probable velocity | 01 | |
| 2 | Dec./Jan | Unit :- II Bose-Einstein statistics | *Distinguishable& Indistinguishable particles | 02 | |
| | | | * Concept of boson and fermions | 01 | |
| | | | | 02 | 10 |
| | | | * Bose-Einstein statistics | 01 | |
| | | | * Black body radiation | 01 | |

| | | | *Fermi-Dirac distribution | 01 | |
|---|---|---|---|---|---|
| | | | * Fermi function | 01 | |
| | | | * Fermi energy | 01 | |
| | | | *Fermi temp. | | |
| 3 | Jan. | Unit:-III Crystallography | *Crystalline and Amorphous materials | 01 | 11 |
| | | | * Unit cell | 01 | |
| | | | * Miller indices | 01 | |
| | | | *Types of lattice | 01 | |
| | | | * Coordination number | 01 | |
| | | | * Diffraction of lattice parameter | 01 | |
| | | | | 01 | |
| | | | * Diffraction of X-rays by crystal | 01 | |
| | | | | 01 | |
| | | | *Bragg's law | 02 | |
| | | | *Reciprocal lattice | | |
| | | | *Defects in solids | | |
| 4 | Jan./Feb | Unit:-IV Electrical properties of material | * Motion of electron | 01 | 10 |
| | | | * Electrical conductivity | 01 | |
| | | | * Expn. For electrical conductivity and ohm's law | 02 | |
| | | | * Fermi energy and density of states | 01 | |
| | | | * Electron in periodic potential | 01 | |
| | | | * Bloch theorem | 01 | |
| | | | *Energy band , energy gap | 01 | |
| | | | * Free electron model | 01 | |
| | | | *Conductor's ,insulator's, semiconductor's | 01 | |
| 5 | Feb./Mar | Unit:-V Magnetic properties of materials | * Atomic magnetic moment | 01 | 13 |
| | | | *Magnetization vector (M) | 01 | |
| | | | * Magnetic susceptibility | 01 | |
| | | | * Diamagnetism, Paramagnetic, Ferromagnetism | 01 | |
| | | | * Dia. Para-,and ferromagnetic materials | 01 | |
| | | | * Langevin's theory of diamagnetism | 02 | |
| | | | * Langevin's theory of Para magnetism | 02 | |
| | | | * Quantum mechanical treatment of Para magnetism | 02 | |
| | | | *Curie-Weiss's law | 01 | |
| | | | *Hysteresis and energy loss | 01 | |
| 6 | Feb./Mar. | Unit–VI Superconductivity and Nanotechnology | *Superconductivity | 01 | 12 |
| | | | *Critical temp. and critical magnetic field | 01 | |
| | | | *Meissner effect *Type I and Type II Superconductor. | 01 | |
| | | | | 01 | |
| | | | *BCS Theory, cooper pair | | |
| | | | *Application of superconductor's | 02 | |
| | | | | 01 | |
| | | | *Effect of reduction of dim. of physical properties | 01 | |
| | | | *History of nanotechnology | 01 | |

| | | | *Quantum size effect | 01 | |
| | | | *Application of Nano materials | 01 | |
| | | | | | |

Head
Dept. of physics

Amrut Sevabhavi Sanstha, Parbhani.
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2021-22
Name :-  Mr. Sharique S. Shaikh    Class:-B.Sc. I$^{st}$ Year /Sem. I  Subject:- Physics
Paper:- (1S)  Mechanics ,Matter, waves & Oscillation

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July | Unit- I | *Kepler's law's of planetary motion<br>*Newton's law's of Gravitation ,<br>acceleration due to gravity<br>* variation with altitude & depth<br>* Gravitational field & potential<br>* Gauss's theorem<br>*Gravitational potential & intensity due to solid sphere at a point (inside)<br>* Gravitational potential & intensity due to solid sphere at a point (outside) | 01<br>01<br><br>02<br>01<br>01<br>02<br><br>02 | 10 |
| 2 | Aug. | Unit :-II | * Motion of Rigid body<br>* rotational motion ,<br>moment of inertia<br>* Principle of Perpendicular axis<br>* Principle of Parallel axis | 01<br>01<br>01<br>01<br>01<br>04 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | * Radius of Gyration | | 12 |
| | | | * M.I of Ring ,Disc, hollow & solid | 01 | |
| | | | sphere ,cylinder , & Bar about diff. axis | 01 | |
| | | | | 01 | |
| | | | * Linear momentum (conservation) | | |
| | | | * Angular momentum (conservation) | | |
| | | | * Numerical | | |
| 3 | Aug./Sep. | Unit : III Simple Harmonic Motion | * Linear & Angular S.H.M | 01 | 12 |
| | | | * Differential equation & solutions | 02 | |
| | | | * Displacement , velocity & acceleration | 01 | |
| | | | * Kinetic & Potential energy | 01 | |
| | | | * Simple pendulum | 01 | |
| | | | *Compound pendulum | 01 | |
| | | | * Kater's Reversible pendulum | 01 | |
| | | | * Spring & Mass system | 01 | |
| | | | * Vibration of Magnet | 01 | |
| | | | *Bifilar oscillation | 01 | |
| | | | *Damped & forced harmonic oscillations | 01 | |
| 4 | Sep. | Unit:-IV SHM | * Superposition of two S.H.M of same freq. along same line | 01 | 12 |
| | | | * Interference | 01 | |
| | | | * Superposition of two mutually perpendicular S.H.M of same freq. | 01 | |
| | | | | 01 | |
| | | | * Lissajous figures | 01 | |
| | | | * Standing waves , Newton's formula | 01 | |
| | | | * Velocity of waves by Kundt's tube | 01 | |
| | | | * Velocity of Transverse waves stretched | 01 | |
| | | | * Harmonics , Overtone | 02 | |
| | | | * Production & detection of Ultrasonic waves It's application | 02 | |
| 5 | Oct. | Unit:-V Elasticity | * Introduction of Elasticity | 01 | 11 |
| | | | * Hooke's law of Elasticity | 01 | |
| | | | * Three elastic constants | 01 | |
| | | | * Relation between Y, ŋ , K | 01 | |
| | | | * Bending of beam & Bending moment | 01 | |
| | | | | 01 | |
| | | | * Cantilever | 01 | |
| | | | * Depression of centrally loaded beam | 01 | |
| | | | | 01 | |
| | | | * Twisting couple | 01 | |

| 6 | Oct. | Unit-VI Kinematics of Fluids | * Streamline & Turbulent flow | 01 | |
| | | | * Viscous Drag | 01 | |
| | | | * coefficient of viscosity | 01 | |
| | | | * Equation of continuity | 01 | |
| | | | *Euler's equation | 01 | 11 |
| | | | *Bernoulli's theorem | 01 | |
| | | | *Poiseulle's equation | 01 | |
| | | | *Reynolds's number , Terminal velocity | 01 | |
| | | | *Stoke's Law , Variation of viscosity | 01 | |
| | | | with temp. | 01 | |
| | | | *Surface Tension , Angle of contact | | |
| | | | *Wetting , Jager's method | | |

*(First row continues from previous page:)*

| | | | * Torsion of pendulum | 01 | |
| | | | * Maxwell's needle | | |
| | | | * Numerical | | |

In-Charge Teach

Head
Dept. of
Physics

Amrut Sevabhavi Sanstha, Parbhani**.**
Late Ku. Durga K. Banmeru Science College,Lonar Dist-Buldhana.
Department of Physics
Teaching Plan Session:- 2021-22
Name :-  Mr. Sharique S. Shaikh    Class:**-**B.Sc. Ist Year /Sem. II  Subject:- Physics
Paper:- (2S)  K .T , Thermodynamics & Electric Current

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit- I | *Kinetic theory of gases (assumptions) | 01 | |
| | | | | 01 | |
| | | | *Deduction of Boyle's law, Interpretation of | 01 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | temp. | | 12 |
| | | | *Estimation of R.M.S ,Avogadro's & | 01 01 | |
| | | | speed of molecule | 01 | |
| | | | *Degrees of freedom | | |
| | | | * Equipartition of energy | 01 | |
| | | | *Specific heat of monoatomic gas, | 01 | |
| | | | extension to diatomic & triatomic | 01 | |
| | | | *Real gas- Van-der Wall's equation of state | 01 | |
| | | | * Comparison with expt. PV curves. | 01 | |
| | | | * the critical constant, nature of Vander Wall's forces | 01 | |
| | | | *Molecular collision , mean free path, Brownian motion & collision cross section | | |
| | | | *Transport of mass, momentum& | | |
| | | | energy | | |
| | | | * Dependence on Temp. * Pressure | | |
| 2 | Jan. | Unit :-II Laws of thermodynamic | *The Zeroth law, P-V indicator diagram, work done by & on the system | 01 | |
| | | | * First law of thermodynamics' internal energy as a state | 02 | |
| | | | function & other application | 01 01 | 10 |
| | | | * reversible and irreversible changes | 01 | |
| | | | *Carnot's cycle & it's efficiency for perfect gas | 01 | |
| | | | * The second law of thermodynamics, version of it | 01 01 | |
| | | | * Carnot's theorem, Entropy, S-T | 01 | |
| | | | diagram | | |
| | | | *Principle of increase of entropy | | |
| | | | * The thermodynamic scale of temp. it's identity | | |
| | | | *Impossibility of attaining the absolute zero, Third law of thermodynamics | | |
| 3 | Jan./Feb | Unit:-III Liquefaction of | * Joule Thomson effect | 01 | |
| | | | * Joule's Coefficient, | 01 | |

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|---|---|---|---|---|---|
| | | Gases | Boyle's & inversion temp. | 01 | |
| | | | * Principle of Regenerative cooling | 01 | |
| | | | | 02 | |
| | | | * Cascade cooling | 01 | 14 |
| | | | * Liquefaction of hydrogen & Helium | 02 | |
| | | | | 01 | |
| | | | *Thermodynamic relationship. | 01 | |
| | | | * Thermodynamic variables | 01 | |
| | | | | 01 | |
| | | | * Maxwell's general relationship | | |
| | | | | 01 | |
| | | | * application to Joule Thomson cooling & adiabatic cooling in general system | | |
| | | | * Clausius Clapeyorn equation | | |
| | | | *Thermodynamic Potential & equilibrium of thermo dynamical system | | |
| | | | * Relation with thermo dynamical variables | | |
| 4 | Feb | Unit:-IV | * E as an accelerating field | 01 | |
| | | | | 01 | |
| | | | * Electron gun , case of discharge tube | 01 | |
| | | | | 01 | |
| | | | * Linear accelerator | 01 | |
| | | | * E as a deflecting field | 01 | 11 |
| | | | * Transverse magnetic field | 01 | |
| | | | Mass spectrograph, velocity selector | 02 | |
| | | | | 01 | |
| | | | * Curvature of tracks for energy | 01 | |
| | | | determination of nuclear particles | | |
| | | | * Principle of Cyclotrons | | |
| | | | * Mutually perpendicular E & B fields | | |
| | | | * Velocity selector, it's resolution | | |
| 5 | Mar. | Unit:-V Network Theorem | * Thevi9nin's theorem | 01 | |
| | | | * Superposition theorem | 01 | |
| | | | * Maximum power transfer theorem, some application | 01 | |
| | | | | 01 | |
| | | | * Ballistic galvanometer | 01 | |
| | | | * Application of B. G | 02 | |
| | | | * Determination of capacitance & high resistance by method f | | 12 |
| | | | | 01 | |

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|---|---|---|---|---|---|
| | | | leakage Varying currents:- | 01 | |
| | | | * Steady currents, current density J | 01 | |
| | | | * Non –steady current & continuity equation | 02 | |
| | | | * Kirchhoff's law & analysis of multi-loop circuit | | |
| | | | * Rise & decay of currents in LR, CR circuit & transients in LCR circuit | | |
| 6 | Mar./Apr. | Unit-VI Alternating currents | * A.C currents , * complex number and their application in solving A.C circuits using j- operator * pure R,L,C & their combination * Reactance and impedance * series and parallel resonance*Q – factor , power factor * self and mutual inductance* theory of transformer | 01 02 01 01 01 01 01 01 | 09 |

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Department of Physics
Teaching Plan Session:- 2021-22
Name :- Mr. Sharique S. Shaikh   Class:**-**B.Sc. II$^{nd}$ Year /Sem. III   Subject:- Physics
Paper:- (3S) Solid state, Relativity & Geophysics

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July/Aug. | Unit-I Mathematical background and Electrostatics | *Gradient, divergence & curl of a vector field , Physical significance | 03 | 13 |
| | | | * Line surface & volume integral | 02 | |
| | | | * Gauss's divergence theorem | 02 | |
| | | | * Stoke's theorem | 01 | |
| | | | * work done on charge in electrostatic field | 01 | |
| | | | * Flux of a electric field | 01 | |
| | | | *Lorentz force equation (B) | 01 | |
| | | | | 01 | |
| | | | | 01 | |
| | | | | 01 | |

| | | | * Ampere force law<br>* Ampere force law and its application | | |
|---|---|---|---|---|---|
| 2 | July/Aug. | Unit:-II Magneto statics and Maxwell's equation | * Faraday's law<br>* Integral and Differential form<br>*Displacement current and Maxwell's equation<br>* Wave equation satisfy by E and B<br>*Plane electromagnetic wave in vacuum<br>* Poynting vector and Theorem | 01<br>02<br>02<br><br>02<br>02<br>02<br>01 | 12 |
| 3 | Aug./Sep | Unit- III Solid state Electronics Devices I | * Introduction to Semiconductors<br>* Charge carrier and electrical conduction ; Doping<br>* Extrinsic semiconductors<br>* Fermi level and Energy level dia.<br>* Drift current in semiconductor<br>* Conductivity , Mobility<br>* Hall effect<br>* Hall coefficient<br>*Semiconductor Diode and it's biasing<br>* LED<br>* Varactor diode | 01<br>02<br><br>01<br>01<br>01<br>01<br>01<br>01<br><br>01<br>01 | 12 |
| 4 | .<br>Aug./Sep | Unit:-IV Solis state Electronics Devices II | * Working of BJT<br>* Current gain ά , β and their relation<br>* Chara. in CB , CE modes<br>*JFET construction and working<br>* Chara. Of FET<br>*Basic concept of Difference Amplifier<br>* IC-OP AMP<br>*Electrical parameter of OP-Amp<br>* Inverting and non-Inverting modes<br>* OP-AMP as Adder<br>* OP-AMP as Subtract or<br>* OP-AMP as Differentiator<br>* OP-AMP as Integrator | 01<br>01<br>01<br>01<br>01<br>01<br><br>01<br>01<br>01<br>01<br>01<br>01<br>01 | 13 |
| 5 | Sep./Oct | Unit:-V Special Theory of Relativity | * Postulates for the special theory of relativity<br>* Lorentz Transformations<br>* Time Dilation | 01<br><br>01<br>01 | |

| | | | *      Velocity     Addition Theorem | 02 01 | 10 |
|---|---|---|---|---|---|
| | | | * Length contraction, | 02 | |
| | | | * Relativity of mass | 01 | |
| | | | * Mass energy relation | 01 | |
| | | | * Numerical | | |
| 6 | Sep./Oct | Unit  :-  VI Atmosphere and Geophysics | *Structure of Earth ; Crust , Mantle & Core | 01 | |
| | | | *Part of the Earth – As a planet Atmosphere | 01 | |
| | | | * Lithosphere | 01 | |
| | | | *          Hydrosphere composition | 01 01 | 14 |
| | | | * Earthquakes causes | 02 | |
| | | | *Types ,Scale of Intensity, Recording | 01 01 | |
| | | | *Radiation     in     the Atmosphere | 02 | |
| | | | *Propagation of Energy through vacuum | 01 | |
| | | | *  Intensity , scattering absorption & Reflection | 02 | |
| | | | * Moisture and Clouds (mechanism) | | |
| | | | *Cloud produced by mixing and cooling | | |

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Department of Physics

# Teaching Plan Session:- 2021-22

Name :- Mr. Sharique S. shaikh    Class:-B.Sc. IInd Year /Sem. IV   Subject:- Physics

Paper:- 4S Laser, Fiber optic , Renewable source, Geometrical optic, Polarization

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | Dec./Jan. | Unit-I Geometrical optic and interference | * Cardinal points of an system <br> * Equivalent focal length of coaxial lens system <br> * Principle of superposition (light) <br> * Thin films <br> * Expression for fringe width <br> * Newton's ring | 01 <br> 02 <br><br> 01 <br> 03 <br> 01 <br> 04 | 12 |
| 2 | Dec./Jan. | Unit:-II Diffraction of light | * Fresnel diffraction <br> *Fraunhofer diffraction <br> * Diff. bet$^n$. F-F diffraction <br> *Fresnel assumption , half period zone <br> * Zone plate construction <br> *comparison of zone plate with convex lens <br> * Fraunhofer diff. due to double slit <br> * Plane diff. grating <br> * Elementary theory of grating <br> *Maximum number of orders available with grating <br> *Determination of wavelength of light <br> *Resolution of images <br> *Rayleigh's criteria for resolution <br> *Resolving power of grating | 01 <br> 01 <br> 01 <br> 01 <br><br> 01 <br> 01 <br><br> 01 <br> 01 <br> 01 <br> 01 <br><br> 01 <br> 01 <br> 01 <br> 01 | 14 |
| 3 | Feb./Mar. | Unit:-III Polarization of light | * Concept of polarization <br> * Optic axis <br> * Double refraction , Brewster's law <br> * Positive and Negative crystal <br> * Phase retardation plate ,Half and Quarter <br> * Nicol prism , Polarizer and Analyzer <br> *Plane , circularly and Elliptically polarized light <br> *Half shade polarimeter <br> *Blue colour of the sky | 01 <br> 01 <br> 01 <br> 01 <br> 02 <br><br> 01 <br> 02 <br><br> 01 <br> 01 | 11 |

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|---|---|---|---|---|---|
| 4 | Feb./Mar. | Unit:-IV Laser | *Absorption , Spontaneous and stimulated emission | 01 | |
| | | | * Population inversion , pumping | 01 | |
| | | | * MASER | 01 | |
| | | | *Chara. of laser , laser system | 01 | |
| | | | * Three and four level laser system. | 01 | |
| | | | * Ruby and He-Ne laser | 01 | 08 |
| | | | *Holography & Recording and reprod. | 01 | |
| | | | * Semiconductor laser | 01 | |
| | | | | 01 | |
| 5 | April | Unit:-V Fiber optics | * Total internal reflection | 01 | |
| | | | * Structure of optical fiber | 01 | |
| | | | * Classification of optical fiber | 01 | |
| | | | * Propagation of light in optical fiber | 01 | |
| | | | * Acceptance angle and numerical apt. | 01 | 09 |
| | | | *Dispersion and Fiber losses | 02 | |
| | | | * Fiber optic communication | 01 | |
| | | | * Advantages of optical fiber | 01 | |
| 6 | April | Unit–VI Renewable energy sources | *Solar energy , wind energy, ocean en. | 01 | |
| | | | *Geothermal energy , hydrogen energy | 01 | |
| | | | *Fuel cell , Biomass energy | 01 | |
| | | | *Solar energy and its availability | 01 | |
| | | | *Seasonal variation , solar constant, spt | 01 | |
| | | | *Measurement of solar radiation | 01 | 12 |
| | | | * Solar energy storage | 02 | |
| | | | *Solar photovoltaic system, PV cell | 01 | |
| | | | *Thin film photovoltaic cell | 01 | |
| | | | * solar PV panel and Application | 02 | |

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Department of Physics
Teaching Plan Session:- 2021-22
Name :- Mr. Sharique S. Shaikh     Class:-B.Sc. IIIrd Year /Sem. V   Subject:- Physics
Paper:-5S-Quantum mechanics, Atomic spectroscopy ,Nuclear physics , hybrid parameters.

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|
| 1 | July | Unit-I Origin of Quantum Mechanics | *Historical background, Failure of classical theory in explaining | 01 | 14 |
| | | | *Black body radiation & Photoelectric effect | 01 | |
| | | | * Compton effect qualitative analysis | 02 | |
| | | | * Assumption of Plank's quantum theory | 01 | |
| | | | * Wave Particle Duality | 01 | |
| | | | * De-Broglie Hypothesis | 01 | |
| | | | * Davisson Germer expt. | 01 | |
| | | | *Concept of Wave packet, Phase velocity , Group velocity relation | 02 | |
| | | | * Heisenberg's uncertainty principal | 01 | |
| | | | * Different forms | 01 | |
| | | | * Thought expt.Gamma ray microscope | 02 | |
| 2 | July/Aug. | Unit :- II The Schrodinger equation and its applications | * Wave function and its physical significance | 01 | 12 |
| | | | * Schrodinger time dependent equation | 01 | |
| | | | * Separation in time dependent and time independent parts | 01 | |
| | | | * Operators in quantum Mechanics | 01 | |
| | | | * Eigen functions and Eigen values | 02 | |
| | | | * Particle in one dimensional and three dimensional box (Energy | 02 | |

| | | | eigen values) * Qualitative analysis of potential barrier Tunneling effect) * Simple Harmonic Oscillator (Qualitative analysis of Zero point | | |
|---|---|---|---|---|---|
| 3 | Aug./Sep | Unit- III Atomic and Molecular Spectroscopy | *Vector Atom Model: Quantum Numbers, *Stern- Gerlach experiment; *selection rules, l-s and j-j coupling *Types of spectra – Emission & absorption spectra. *X-rays: Continuous X-ray spectrum, *Duane and Hunt's law, *characteristic X-ray spectra, *Mosley's law *Raman Effect: stoke's and anti-stoke's lines, *Quantum theory of Raman effect, Experimental Arrangement for Raman Spectroscopy. | 01 02 01 01 01 01 01 01 01 01 | 11 |
| 4 | Aug./Sept. | Unit:-IV Nuclear Physics | *Detection of charged particles; *G. M. counter, *Binding energy and Mass defect, stability of nuclei *Alpha Decay: Range of Alpha particles, *Geiger - Nuttal law and Gamow's explanation of alpha decay (qualitative)*Beta decay: Types and Pauli's Neutrino Hypothesis *Nuclear Fission, Nuclear fusion (concepts only), *Nuclear reactors. | 01 02 02 01 02 02 02 01 | 13 |
| 5 | Sep./Oct. | Unit:-V Hybrid parameters | *Hybrid parameters *low frequency equivalent of CE amplifier & its analysis., *Bias stability & thermal runway qual. *General principles of amplifier classification, *RC coupled amplifier, | 01 02 02 01 01 02 | 12 |

| 6 | Sep./Oct | Unit :- VI Feedback in amplifiers | *Feedback in amplifiers- Negative feedback, *Advantages of negative feedback, *positive feedback. *Phase shift, and Wein bridge *Hartley & Colpits Oscillators. *Multi-vibrators – astable, monostable & bistable. | 01<br><br>01<br>01<br>02<br>02<br>03 | 10 |

    In-Charge                                                            Teacher

Head

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Name :- Mr. Sharique S. Shaikh  Class:**-**B.Sc. III$^{rd}$ Year /Sem. VI   Subject:- Physics
Paper:-  (6S) Statistical mechanics & solid state physics.

| Sr. No | Month | Name of Unit | Topics | Required Lect. | Total Lect. |
|---|---|---|---|---|---|

| | | Unit-I Statistical mechanics | *Phase space , Unit cell | 01 | |
|---|---|---|---|---|---|
| 1 | Dec./Jan | Unit-I Statistical mechanics | *Phase space , Unit cell | 01 | 09 |
| | | | *Microstates and Macro states | 01 | |
| | | | *Energy states, Density of Energy states | 02 | |
| | | | *Probability and most probable distribution | 01 | |
| | | | *Boltzman entropy relation | 01 | |
| | | | *Maxwell-Boltzman relation | 01 | |
| | | | *Molecular speed distribution | 01 | |
| | | | * r.m.s. speed and most probable velocity | 01 | |
| 2 | Dec./Jan | Unit :- II Bose-Einstein statistics | *Distinguishable& Indistinguishable particles | 02 | 10 |
| | | | * Concept of boson and fermions | 01 | |
| | | | * Bose-Einstein statistics | 02 | |
| | | | * Black body radiation | 01 | |
| | | | *Fermi-Dirac distribution | 01 | |
| | | | * Fermi function | 01 | |
| | | | * Fermi energy | 01 | |
| | | | *Fermi temp. | 01 | |
| 3 | Jan. | Unit:-III Crystallography | *Crystalline and Amorphous materials | 01 | 11 |
| | | | * Unit cell | 01 | |
| | | | * Miller indices | 01 | |
| | | | *Types of lattice | 01 | |
| | | | * Coordination number | 01 | |
| | | | * Diffraction of lattice parameter | 01 | |
| | | | * Diffraction of X-rays by crystal | 01 | |
| | | | *Bragg's law | 01 | |
| | | | *Reciprocal lattice | 01 | |
| | | | *Defects in solids | 02 | |

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|---|---|---|---|---|---|
| 4 | Jan./Feb | Unit:-IV Electrical properties of material | * Motion of electron<br>* Electrical conductivity<br>* Expn. For electrical conductivity and ohm's law<br>* Fermi energy and density of states<br>* Electron in periodic potential<br>* Bloch theorem<br>*Energy band , energy gap<br>* Free electron model<br>*Conductor's ,insulator's, semiconductor's | 01<br>01<br>02<br><br>01<br><br>01<br>01<br>01<br>01<br>01 | 10 |
| 5 | Feb./Mar | Unit:-V Magnetic properties of materials | * Atomic magnetic moment<br>*Magnetization vector (M)<br>* Magnetic susceptibility<br>* Diamagnetism, Paramagnetic, Ferromagnetism<br>* Dia. Para-,and ferromagnetic materials<br>* Langevin's theory of diamagnetism<br>* Langevin's theory of Para magnetism<br>* Quantum mechanical treatment of Para magnetism<br>*Curie-Weiss's law<br>*Hysteresis and energy loss | 01<br>01<br>01<br>01<br><br>01<br><br>02<br><br>02<br><br>02<br><br>01<br>01 | 13 |
| 6 | Feb./Mar. | Unit–VI Superconductivity and Nanotechnology | *Superconductivity<br>*Critical temp. and critical magnetic field<br>*Meissner effect<br>*Type I and Type II Superconductor.<br>*BCS Theory, cooper pair<br>*Application of superconductor's<br>*Effect of reduction of dim. of physical properties<br>*History of | 01<br>01<br><br>01<br>01<br><br>02<br>01<br>01<br><br>01<br>01<br>01 | 12 |

| | | | nanotechnology<br>*Quantum size effect<br>*Application of Nano<br>materials | | |
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