**GBN GOVT POLYTECHNIC NILOKHERI**

**Electrical Engineering Department**

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| **Sh. Rajesh Kumar** | |
| **Electrical Engineering** | |
| **1st Sem** | |
| **PRINCIPLES OF ELECTRICAL ENGINEERING** | |
| **Sept2022 to 16 jan2023** | |
| **Week** | **Topics** | |
| **1st** | **Introduction, vision ,mission co etc** | |
| **Electrical Fundamentals**  **1.1 Nature of Electricity, Charge, free electrons, Electric potential and potential**  **difference,** | |
| **Electric current, Electrical Energy, Electrical power and their unit.** | |
| **Resistance: Definition, Unit, Laws of resistance, conductivity and resistivity, Effect of**  **temperature on resistance,** | |
| **2nd** | **Temperature coefficient of resistance, Types of resistance**  **& their applications, Color coding of resistance** | |
| **Rating and wattages of Electrical appliances, heating effect of Electrical current.**  **Introduction to Capacitors, capacitance,** | |
| **Variable capacitor, Factors affecting** | |
|  | |
| **3rd** | **Capacitance of a capacitor.**  **Capacitance of parallel plate capacitor** | |
| **Grouping of capacitors: capacitors in series, parallel, series-parallel.** | |
| **Energy stored in capacitor, Charging and discharging of a capacitor.** | |
| **Revision** | |
| **4th** | **DC Circuits**  **Ohm's law with practical implementation.** | |
| **Definition of DC circuit,** | |
| **types of DC circuits: series circuit, parallel circuit, series-**  **parallel circuit** | |
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| **5th** | **Concept of voltage source & current source, connections and their conversions.** | |
| **Wheatstone Bridge. Kirchhoff’s Laws-KVL and KCL.** | |
| **Star – Delta connections and their conversion/seminar** | |
| **Revision/assignment** | |
| **6th** | **Electrostatics & Magnetostatics**  **Concepts of Electrostatics, Coulomb’s law.**  **Concept of magnetism, Magnetic field, Magnetic lines of force** | |
| **Definition of Electromagnetism, magnetic effect of electric current** | |
| **Direction of magnetic field and current: right hand rule, right hand cork screw rule.** | |
| **Magnetic field due to circular coil, solenoid,** | |
| **7th** | **Sessional test** | |
| **Current carrying conductors in a magnetic field and methods to find its direction,**  **applications.** | |
| **revision** | |
| **Revision assignment and review of test** | |
| **8th** | **review of test** | |
| **Force between two parallel current carrying conductors** | |
| **Analogy between electric**  **and magnetic circuit. Definition of Magnetic circuit,** | |
| **Terms related to magnetic**  **circuits: magneto-motive force (MMF), flux, magnetic flux density, reluctance,**  **permeability, field intensity, relation between magnetic flux density, permeability,**  **field intensity.** | |
| **9th** | **Electro-Magnetic Induction**  **Determination of Ampere Turns, Series & parallel magnetic circuits, Concept of**  **magnetic leakage, useful flux & Air Gap.** | |
| **Magnetic curve (B-H curve) - cause of Hysteresis, Hysteresis loss, significance of**  **Hysteresis loss, magnetic hysteresis loop for hard and soft magnetic materials.** | |
| **Faraday’s laws of electro-magnetic induction.** | |
| **Revision** | |
| **10th** | **Direction of Induced emf and current: Lenz’s law, Fleming’s right Hand rule** | |
| **E.M.F induced in a conductor: Dynamically induced emf, Statically induced emf: Self-**  **induced emf and Mutual induced emf, Expression for self-inductance, mutual**  **inductance** | |
| **Energy stored in an Inductor.** | |
| **Eddy currents, Eddy current losses.**  **Assignment** | |
| **11th** | **Sessional test** | |
| **Review of test** | |
| **Intro to Batteries** | |
| **Electrolysis,** | |
| **12th** | **Faradays law of electrolysis,** | |
| **important terms related to electrolysis,**  **electroplating.** | |
| **5.2 Concept of Cell: definition, emf of cell,** | |
| **revision** | |
| **13th** | **internal resistance of cell, terminal potential of**  **cell, types of cell (primary and secondary cell),** | |
| **grouping of cell (series grouping, parallel**  **grouping,** | |
| **series-parallel grouping** | |
| **revision** | |
| **14th** | **Revision/Problem solution** | |
| **Concept of Battery: Definition, types of battery like Lead-Acid,** | |
| **Nickel-Cadmium,**  **Lithium ion batteries with their Construction, working principle and applications.** | |
| **revision** | |
| **15th** | **Charging methods of storage battery and charging indications.** | |
| **Characteristics of battery: voltage, capacity, efficiency** | |
| **revision** | |
| **seminar** | |
| **16th** | **Care and maintenance of battery**  **Introduction to maintenance free batteries.**  **Disposal of batteries** | |
| **sessional** | |
| **Revision/Review/Test of old HSBTE Papers** | |
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