**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** |
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| **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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