

32144 - AUTOTRONICS

DETAILED SYLLABUS

I BASIC ELECTRICITY & MAGNETISM

Definitions – charge, current, electromotive force, voltage, potential difference, inductance and capacitance. Explanations of electricity, properties of conductors, insulators and semiconductors, conventional theory of current flow & electron theory of current flow, Kirchoff's law & Ohm's law, resistance & resistivity of conductors, pulsating & pure direct currents, sinusoidal & non- sinusoidal alternating currents, peak average, RMS value of AC, frequency, wavelength, amplitude, time period, single phase & three phase AC power & power factor. Explanations of parallel(shunt) & series circuits involving source & loads, open & short circuits, importance of earthing on chassis in automotive wiring, Magnetism, magnetic flux density, magnetic field intensity, electromagnetic induction, Flemings' left hand & right hand rules, electromagnetic permeability, electromagnetic reluctance, application of electromagnetism in an automobile.

II BATTERY & IGNITION SYSTEMS

Automobile electrical systems- generator, storage & distribution systems, starting system, ignition system, lighting system & accessories. Battery- lead acid battery- construction & working, battery rating, battery testing and battery charging methods. Requirements of ignition system, types of ignition system in engine, principles of working battery coil ignition with mechanical distributor, CB point controlled magneto ignition system, Electronic battery coil ignition systems & magneto ignition system through electrical circuit diagrams, difference between battery coil & magneto coil ignition systems Spark plug – types, characteristics & materials, importance of ignition timing, setting ignition timing, needs & types of advance mechanism centrifuge – vacuum advance mechanism.

III ELECTRICAL MACHINES (GENERATORS, ALTERNATOR, REGULATOR & STARTING MOTOR)

Generator – Purposes – Construction – Field winding – Armature winding – Commutator – Brushes – Brush gears – Testing – Field winding – Armature Growler testing – Brush – spring tension – Under cutting – Skimming commutator – Brush bedding. Alternator – Purpose – Construction – Body – Stator winding, Rotor winding, Slip rings – Brush - Advantages of alternator – trouble shooting in the alternator and armature. Regulator: Need for the regulator, Cut out or reverse cut out relay, Constant current and voltage regulator – compensated voltage regulator – trouble shooting in

For Syllabus, Notes, Question Papers, Question Banks & Many More

regulator – dynamo – principle. Starting motor – Need – Working Principle – Construction – Body – Field coil – Armature windings – Poles – Commutator and brush gears – Solenoid switch. Starting motor drive mechanism – Bendix – Over running clutch type drive & coaxial drive mechanism in the heavy vehicles – complete electrical circuits of heavy duty starting motor – First contact and second contact closing – Troubles – Causes & remedies – Electric Starting circuits in two wheelers.

IV LIGHTING, LAMP, HORN, GAUGE & WIRING

Lighting - Purpose and construction of each lamp holder bulbs – Head lamps – Head Lamp Beam setting and adjustments – Halogen lamps – Sealed beam, dip switch – Beam indicator – Fog lamp – Park lamp – Rear number plate lamp – Door Lamp – Pillar Lamp – Roof Lamp – Roof light – Fluorescent lamp in transport vehicles – brake light – Brake light switch – traffic indicators (Resistance & Transistor type) panel lamps. Horn – Construction – Working – Hum relay – Horn circuit, horn turning, Troubleshooting. Gauges – Fuel gauge – Oil pressure gauge – Coiling water temperature gauge – Ammeter charging indicator. Radio – Interface – Suppressors – Audio System – Wind screen wipers – Construction – Working – Trouble shooting Pneumatic type wind screen wipers. Wiring – Single pole – Double pole – Cable size color code – wiring harness – Cable connection – fuses – Circuit breakers – Window glass panel operating system.

V BASIC ELECTRONICS & COMPUTER APPLICATIONS IN AUTOMOBILE

Semi conductor & semi conductor materials (Intrinsic & extrinsic), P type & N type semiconductors, junction diode, forward & reverse bias, knee voltage, maximum forward current, reverse breakdown voltage, Zener diodes, transistors(NPN & PNP), Half wave & full wave rectifier, Logic gates- OR, AND, NOT, NAND, EXOR & EXNOR. Microprocessor control systems: Concept of CPU and computer memory used in automobiles. Sensors: pressure sensor, throttle position sensor, fuel flow sensor, thermistor sensor, oxygen sensor, speed sensors, knock detecting sensors solenoid and stepper motor. Electronic dashboard instruments - Onboard diagnosis system, security and warning system – ECU – principle and working of ECU.

Text Book

- 1 Automotive electrical equipments, P.L.Kohli, Tata McGraw hill publications
- 2 Automobile Electrical and Electronics Systems, Tom Denton, Arnold, London