FURTHER DETAILS REGARDING MAIN TOPICS OF PROGRAMME No. 05/2020 (Item No: 20, 21, 22)

Category Number : 102/17, 334/19, 321/19

Module I

Fundamentals of Electricity

Voltage, Current, Resistance, Energy, Power-Definitions and Units, Ohm's law – Statement, Simple problems related to Ohm's law, Power and Energy, Resistance in series and Parallel -Simple problems. Kirchhoff's laws – KCL and KVL.

Module II

Electrostatics and Electromagnetism

Laws of Electrostatics, Permittivity, Electric Flux, Flux Density, Potential, Potential Difference – equations and simple problems, Lightning Phenomenon, Potential Gradient, Dielectrical Strength, Capacitors in series and parallel, Energy stored in a Capacitor, Coulomb's law, Permeability, Magnetic Flux, Flux density, Reluctance, mmf, Faraday's law of Electromagnetic Induction, Lenz's Law. Self Inductance, Mutual Inductance, Energy stored in an inductor, Fleming's Laws

Module III

Fundamentals of AC Systems

Generation of ac voltage, Equation of voltage, Basic terms – amplitude, frequency, cycle, time period, average value, instantaneous value, rms value, form factor, peak factor – equations and related simple problems, ac through resistance, inductance and capacitance, star and delta connections in 3 phase ac systems – line and phase relationship in star and delta systems.

Module IV

Measurements and measuring instruments

Various types of electrical measuring instruments – Voltmeter, Ammeter, Energy Meter, Wattmeter, Single phase and Three phase power measurement, measurement of resistance, Inductance and Capacitance, Power factor meter, Synchroscope, TOD meter, CRO, Insulation megger and earth megger, multimeter, CT and PT.

Module V

Safety, First Aid, Batteries and Solar Cell

Basic safety requirements, electric shock-requirement for avoiding shock, first aid, installation, care and maintenance of batteries and solar cells, determination of total number of cells required for a given power requirements.

Module VI

Wiring Accessories

Various wiring systems

Wires-single strand and multistrand, current ratings. Fuses-cartridge and HRC. Switches - SPST, SPDT, TPTT, ICDP, ICTP, Toggle switch, Limit switch, safety devices- MCB, ELCB, RCCB, electrical illumination, Earthing – Pipe and Plate earthing.

Module VII

DC Machines

DC generator – construction, working, classification, emf equation, wave and lap windings, characteristics, simple problems

DC motor - construction, working, types, emf equation, torque-simple problems, various starters, speed control, testing, MG set.

Module VIII

AC Machines

Transformer-construction, principle, types, emf equation, transformation ratio, losses and efficiency, all day efficiency-simple problems

Three phase induction motor-principle, construction, types, slip, torque, losses, efficiency, power stages, speed control, three phase motor starters

Alternators-construction, principle, emf equation, losses and efficiency,

Three phase synchronous motor.

Single phase and FHP motors-single phase induction motor, universal motor, ac series motor, servomotor, stepper motor, split phase motor

Module IX

Digital Electronics

Number systems, logic gates-AND, OR, NOT, NAND, NOR, De-morgan's theorems, half adder, full adder, flip-flops, shift registers, counters, ADC, DAC, soldering Techniques

Module X

Power Electronics

Half wave and full wave rectifiers with and without filters, UJT relaxations oscillator, FET, JFET, Triac, Diac, IGBT, SCR, operation and maintenance of inverter, regulated dc power supply, battery charger, UPS.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper