TENTATIVE SYLLABUS FOR KERALA WATER AUTHORITY - OPERATOR

PART I : MOTOR MECHANIC

ENGINES

Basic terminology: Engine-types of engines – 2 stroke – 4 stroke – petrol engine – diesel engine and engine parts – cylinder – piston – connecting rod – crank shaft – inlet and exhaust valves –cam shaft

Cooling system: types of cooling (air cooling and water cooling systems)-thermo syphon system – pump circulation - parts-anti freeze solution

Lubrication system: types of lubrication system- petroil system – splash system – pressure system – dry sump system - parts - lubricants –properties of lubricants –SAE, API rating

Fuels and combustion: fuels and types of fuels- knock rating – calorific value-volatility – gum content – sulphur content - aromatic content – detonation – pre ignition – post ignition – diesel knock – combustion of fuels – combustion requirements

Petrol fuel system: functions - types of fuel system – gravity feed pump system – pump system – fuel tank – pumps –types of pumps –carburetor – types of carburetor – MPFI system – super charger – ECU

Diesel fuel system: functions – parts – injection pumps - fuel injector – injection system- testing – difference between petrol and diesel engines – turbo charger – inter cooler – other fuel systems

Ignition system: functions – types – battery ignition – magneto ignition – various components – fuel advance – vacuum advance

Emission controls: closed crank case ventilation –fuel tank and carburetor ventilation – air injection system – catalytic convertor

CHASSIS

Chassis construction: types of chassis – functions of frame – frame cross sections – loads

Clutches: Necessity of clutch in a automobile- different types of clutches - friction clutches, cone clutch, Single plate - multi coil & diaphragm spring clutches, multi plate clutch, centrifugal clutches, electromagnetic clutches, hydraulic clutches - torque capacity of clutches- clutch facing – materials - clutch adjustments - over running clutches - necessity and field of application - locking devices

Gear box: functions – types – sliding mesh gear box – constant mesh gear box – synchro mesh gear box –epicyclic gear box - gear ratio – selector mechanism – transfer case - troubles and rectification

Automatic transmission: semi automatic transmission – fully automatic transmission

Drive line: propeller shaft – slip joint – universal joint – variable velocity joint – hooke's joint –constant velocity joints - defects – final drive – rear axle – hotch kiss drive – torque tube

Suspension system: functions – bouncing – pitching – rolling – sprung weight – unsprung weight – leaf spring – coil spring – torsion bar – shock absorber – independent suspension system – wish bone – mac pherson strut - air suspension

Front axle: types – Elliot – reverse Elliot – lamoine – reverse lamoine – stub axle assembly

Steering system: steering geometry – camber – castor – king pin inclination – included angle – toe in toe out – steering mechanism- wheel alignment – Ackerman steering system – rack and pinion system – steering gear boxes - under steer – over steer – parts – steering adjustments

Wheels and tyres: types – disc wheels – wire wheels – alloy wheels – tyres – functions –tubed type – tubeless type – cross ply tyre – radial ply – belted bias – tyre materials

Brakes: types –– drum brake –disc brake – mechanical brake – hydraulic brake – components of a hy-

draulic brake system - master cylinder – tandem master cylinder – wheel cylinder – servo brake – engine exhaust brake – air brake – components of an air brake system – power brake – brake bleeding – hand brake - ABS – brake fading – troubles and rectification

Safety features and accessories: ABS, air bag, stability control, center locking system, seat belt, self re-straint seat belt, child restraint system, crumble zone

AUTO – ELECTRICAL SYSTEM

Battery: types – lead acid battery – nickel cadmium- lithium ion - container – battery plate – separator – cell cover – cell connector – electrolyte – testing – trouble and rectification

Charging system: dynamo - alternator –rectification – cut out relay – ammeter

Starting system: working – bendix drive – standard – follow through – over running clutch drive – solenoid switch – testing

Lighting system: head lights – aiming of head lights – parking lights – brake light – indicator – wiper – horn – horn relay – speedometer - odometer

Heating and air conditioning: heating system – petrol heater – hot water meter – air conditioning - central locking system

PART II : ELECTRICAL

Fundamentals of Electricity: Voltage, Current, Resistance,Property of 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.

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, coefficient of coupling, Energy stored in an inductor, Fleming's left and right hand rule.

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.

Measurements and measuring instruments: Various types of electrical measuring instruments – Indication type and Deflecting types, Voltmeter, Ammeter, Energy Meter,Wattmeter, Single phase and Three phase power measurement- different methods, measurement of resistance, Inductance and Capacitance, Power factor meter, Synchroscope, TOD meter, CRO, Insulation megger and earth megger, multimeter, Instrument transformers- CT and PT

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.

Wiring Accessories: Various wiring systems- domestic and industrial. 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 1 and Plate earthing.

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. 3 point and 4 point Starters.

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. DOL, Star delta, Auto transformer starter.

Illumination and Basic Electronics Illumination: Laws of illumination, Type of lamp, Domestic appliances. Semiconductor – P type, N Type, classification of Diode, Rectifier, Transistor

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ക്ലാസ്സുകൾ **NOV 29, 2020** മുതൽ

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EARNEST
ACADEMY

വ്യക്തമായ ദിശയിൽ
കൃത്യമായ പരിശീലനം

⇒ ലൈവ് ഇന്ററാക്ടിവ് ക്ലാസ്സുകൾ

⇒ ജോലിചെയ്യുന്നവർക്ക് അനുയോജ്യമായ സമയക്രമം (ക്ലാസുകൾ 7 PM മുതൽ).

⇒ കൃത്യസമയങ്ങളിൽ ഫീഡ്ബാക്ക് വാങ്ങാൻ പ്രത്യേക ബാച്ച് കോഓർഡിനേറ്റർ.

⇒ മുൻവർഷങ്ങളിലെ ചോദ്യോത്തരങ്ങൾ ചർച്ച ചെയ്യാൻ പ്രത്യേക സെഷനുകൾ.

⇒ മോക് ടെസ്റ്റുകൾ അടങ്ങുന്ന നിരന്തരമായ ഓൺലൈൻ പരീക്ഷകൾ.

⇒ ബാച്ചിലെ ഓരോരുത്തർക്കും വ്യക്തിപരമായ പരിഗണന.