

**DETAILED SYLLABUS FOR THE POST OF
OPERATOR GRADE III
IN APEX SOCIETIES OF CO-OPERATIVE SECTOR IN KERALA/
KERALA STATE CO-OPERATIVE FEDERATION FOR FISHERIES
DEVELOPMENT LIMITED(MATSYAFED)
CATEGORY NO.591/2024,592/2024**

FITTER

MODULE – I **(10 Marks)**

Safety - Importance of safety, general safety, personal safety, machine safety precautions. Personal protective equipments and its applications.

First Aid - Importance of first aid, basic first aid, ABC of first aid, aim of first aid, methods of giving first aid to the victim.

Fire – Fire triangle, class of fire, fire extinguisher, type of fire extinguisher, fire extinguisher recommended for each class of fire.

Handling of waste material – Waste material, list of waste material, methods of waste disposal.

Shop floor maintenance – Benefits of shop floor maintenance, introduction to 5 S concept, its applications and benefits.

MODULE – II **(10 Marks)**

Units – Units of linear and angular measurements, SI, CGS, MKS, FPS units, fundamental units and supplementary units, Unit conversions.

Linear measuring tools – outside calliper, inside calliper, steel rule, depth gauge, vernier calliper, vernier height gauge, micrometers – constructional features, working principle, least count, applications, care and maintenance

Angular measuring tools – bevel gauge, universal bevel gauge, bevel protractor, combination set, vernier bevel protractor – constructional features, working principle, least count, applications, care and maintenance.

Sine bar, slip gauge and dial test indicator – constructional features, working principle, applications, care and maintenance.

MODULE – III **(10 Marks)**

Hand tools – File, hack saw & blade, chisel, punch, hammer, jenny calliper, divider, tap & tap wrench, die & die stock, drill bit, reamer, scriber – type, use, constructional features, specifications, care and maintenance.

Gauges – Feeler gauge, SWG, screw pitch gauge, snap gauges, limit gauges, radius gauge, telescopic gauge, small hole gauge – use, constructional features, care and maintenance.

Marking media – White wash, Prussian blue, copper sulphate, cellulose lacquer – type, applications, preparation, advantages & disadvantages.

Holding and Supporting devices – Bench vice, machine vice, pipe vice, hand vice, pin vice, tool makers vice, V-block, parallel block, surface plate, angle

plate, marking off table – type, use, constructional features, specifications, care and maintenance.

MODULE – IV

(10 Marks)

Engineering materials – metals & non metals

Metals – ferrous metals – pig iron, wrought iron, cast iron, plain carbon steel – ore, manufacturing process, properties, uses, melting points.

Non ferrous metals – copper, aluminium, tin, lead, zinc – ore, manufacturing process, properties, uses, melting points.

Furnaces – cupola furnace, blast furnace – other making process of metals.

Heat treatment process – hardening, tempering, annealing, normalizing, case hardening – process, applications, important temperatures points.

Importance of safety and general precautions observed in welding shop

Welding – principle of welding, types of welding – forge welding, arc welding,

Gas welding, method of operation, tools and equipments used for welding – arc

Welding equipments, gas welding plant, gases used in gas welding, types of Flames, types of joints in welding.

Soldering – Soldering iron – type, specification, uses, Solder – soft solder, hard solder, composition of various type of solder and their applications, Heating media of soldering iron, flux type, selection and applications

Rivets – Type, size and selection for various works, method of riveting

MECHANICAL

MODULE – V

(10 Marks)

Introduction to Engine: Description of internal & external combustion Engines, Classification of IC engines, Principle & working of 2&4-stroke diesel engine, compression ignition Engine (C.I), Principle of Spark Ignition Engine(SI), Differentiate between 2-Stroke and 4 stroke, C.I Engine and S.I Engine

Petrol Engine Basics: 4-stroke spark-ignition Engines- Basic 4-stroke Principles. Spark-ignition Engine components- Basic Engine components, Engine Cams & camshaft, Engine Power transfer, Scavenging, Counter weights, Piston Components.

Intake & exhaust systems –Electronic fuel injection Systems, Exhaust systems.
Intake system components, Air cleaners, Carburettor air Cleaners, EFI air cleaners, Intake manifolds, Intake air Heating.
Gasoline Fuel Systems:Description of Gasoline fuel, Gasoline fuel characteristics, Controlling fuel burn, Stoichiometric ratio, Air, density, Fuel supply system

MODULE – VI **(10 Marks)**

Power Transmission – Belt drive, chain drive, gear drive
Belt drive – types of belt, size, specification, material, selection of type of belt, advantages and disadvantages of belt drive, calculation of length of belt and slip.
Chain drive – Types of chain, types of sprocket, specification of chain and sprocket, advantages and disadvantages of chain drive.
Gear drive – Type of gear, parts of gear, type of gear drives, specifications, advantages and disadvantages of gear drive, calculation of gear drive.
Other elements in power transmission – pulleys, shaft, bearing, clutches, keys, pins – type, specification, uses.
Lubrications – methods of lubrication, lubricants used, method of application, uses.

MODULE – VII **(10 Marks)**

Limit, Fit, Tolerance – interchangeability, necessity in engineering field, definition BIS, definition and type of limit, terminology of limits and fits, basic size, actual size, deviation, high and low limits of size, zero line, tolerance zone.
Different standard systems of fits and limits, British standard systems, BIS systems.
Methods of expressing tolerance as per BIS.
Fit – definition, type – clearance, transition, interference – description of each.
Limit systems – hole basis and shaft basis systems.
Fundamental deviations and fundamental tolerance.
Thread – Types of thread, features of thread, applications of thread, thread cutting operations.

ELECTRICAL

MODULE – VIII **(10 Marks)**

Fundamentals of electricity, definitions, units & effects of electric current.
Conductors and insulators.
Conducting materials and their comparison.

MODULE – IX **(10 Marks)**

Ohm's Law; Simple electrical circuits and problems-Kirchoff's Laws and applications.
Series and parallel circuits - Open and short circuits in series and parallel networks

Laws of Resistance and various types of resistors.- Wheatstone bridge; principle and its applications.

Effect of variation of temperature on resistance. Different methods of measuring the values of resistance. Series and parallel combinations of resistors.

MODULE – X **(10 Marks)**

Conventional and nonconventional sources of energy and their comparison.

Power generation by thermal and hydel power plants

Various ways of electrical power generation by non-conventional methods.

Power generation by solar and wind energy.

Principle and operation of solar panel.

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
