

**DETAILED SYLLABUS FOR THE POST OF MOULDER IN KERALA
STATE WATER TRANSPORT DEPARTMENT) - Direct Recruitment**

(Cat.No: 094/2023)

MODULE - I (7 mark)

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.

Road Safety - Kinds of road signs, marking lines on road, police signals, traffic light signals, collision causes.

Computer and internet - Computer, parts, basic applications, and basic terms related to computer and internet

MODULE - II(8 mark)

Engineering Materials- Classification- Metals, Non-metals, Ceramics, Composite materials.

Mechanical Properties of Engineering materials - Strength, hardness, ductility, malleability, Elasticity, Plasticity, Toughness, Creep, resilience, Fatigue, stiffness.

Foundry Tools & Equipments- Hand tools, moulding boxes, Moulding Machines, melting equipments, Pouring, shakeout & finishing equipments, Inspection & testing equipments.

Furnaces- Different types of foundry furnaces- Induction furnace, Crucible furnace, Cupola Furnace, Electric arc furnace

Different types of iron- Pig iron, wrought iron, steel, cast iron (carbon percentage and applications)

Steel- Different types: Carbon Steels-Low carbon steels, medium carbon steels, High carbon steels, Alloy steels, Stainless steels, Tool steels.

Iron-carbon equilibrium diagram- Concept & features

MODULE - III (9 mark)

Moulding Sand- Classification of moulding sand- natural moulding sand, Synthetic moulding sand, green sand, dry sand, loam sand, facing sand, Backing sand, parting sand, core sand. Composition of moulding sand- Their ingredients and use.

Properties of Moulding Sand-Porosity, Plasticity, Adhesiveness, Refractoriness, Cohesiveness, Collapsibility. Moulding sand preparation.

Moulding sand testing-Various types of moulding sand tests -Moisture content test, Clay content test, Grain fitness test, Permeability test, Strength test, Refractoriness test, Mould hardness test

Heat treatment of casting-Annealing, Normalizing, Quenching, Tempering

Cast Iron- Different types of cast iron: Gray Cast Iron, White Cast Iron ,Ductile Cast Iron , Malleable Cast Iron(Composition, properties and application).

Manufacturing of cast iron- Cupola Furnace
(construction and process)

Grinding wheel- Specification, Type of Abrasives, grain size, Type of Bond, Grade of the Wheel, factors considering while selecting the Grinding wheel.

MODULE - IV (9 mark)

Pattern-Definition, Functions of patterns,

Types of patterns- Solid pattern, Split pattern, Match plate pattern, loose piece pattern, gated pattern, sweep pattern, Segmented pattern, Shell pattern, Master pattern, Skelton pattern, follow board pattern.

Pattern materials- wood, metals, plasters, waxes, plastics & rubbers. Colour coding of patterns.

Pattern Allowances- Shrinkage allowance, Draft allowance, Machining allowance, Distortion allowance, Rapping allowance

Cores- Use of cores, core prints, Chaplets, chills-types of chills, importance of chills

MODULE - V (8 mark)

Moulding process- Classification- According to the method used- Bench moulding, Floor moulding, Pit moulding, Sweep moulding, Machine moulding

According to the mould materials used- Sand moulding, ceramic moulding, plaster moulding, metallic moulding

Pouring & feeding in casting- methods of pouring process

Gating system- Purpose of a gating system, Elements of a gating system-Pouring basin, Sprue, Sprue base, Skim bob, runner, gates, riser- functions of a riser.

MODULE - VI (9 mark)

Casting process- Type-Sand mould casting, die casting, gravity die casting, pressure die casting

Special casting process- Slush casting, centrifugal casting, plaster mould casting, shell mould casting, Investment casting

Casting defects- Mismatch, blow holes, scab, fins & flashes, shrinkage, inclusion, hot tears, gas porosity, misrun, warpage,

Cleaning of castings- Removal of dry sand cores, removal of gates, fins & unwanted projections, removal adhering sand & metal oxide. Surface cleaning of castings: Blasting- Sand blasting, shot blasting.

Trade Basics (30 Marks)

Module -1 : Safety and forging tools (30 marks)

- Safety - (PPE, basic first aid, fire extinguisher) (3 Marks)
- Fuels used in forge shop (2 Marks)
- Anvil (3 Marks)
- Swage block (2 Marks)
- Tongs (2 Marks)
- Hammers (2 Marks)
- Chisels (2 Marks)
- Sawing - (method of sawing, frames and blade) (2 Marks)
- Centre punches and dot punch (2 Marks)
- Measuring and marking tools used in forging (3 Marks)
- Files classification (2 Marks)
- Selection of Files for proper work (2 Marks)
- Equipment and tools used in Fitting shop. (Vice, marking Tools, measuring tools- steel rule, brass rule, callipers). (3 Marks)

General Knowledge, Current Affairs and Renaissance in Kerala (Total : 20 Marks)

General Knowledge

(10 Marks)

Facts about India

Geography of India - Physical features - Climate - Soils - Rivers - Famous sites - etc.

Demography - Economic and social development - Poverty alleviation - Economy and planning - etc.

History of India - Period from 1857 to 1947 - National movement

Facts about Kerala

Geographical Facts - Physical features - Climate - Soils - Rivers - Famous sites - etc.

Renaissance in Kerala

(5 Marks)

Important Events/Movements/Leaders

Brahmananda Swami Sivayogi, Chattampi Swami, Sree Narayana Guru, Vagbhatananda, Thycaud Ayya, Ayya Vaikundar, Poikayil Yohannan (Kumara Guru), Ayyankali, Pandit Karuppan, Mannathu Padmanabhan, V. T. Bhattathirippad, Dr. Palpu, Kumaranasan, Vakkom Moulavi, Blessed Kuriakose Elias Chavara, Etc.

Current Affairs

(5 Marks)

Important world, national and regional events related to the political and scientific fields, sports, cinema and literature etc.

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.

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