

**Detailed Syllabus for the Post of Junior Instructor-Pump Operator Cum  
Mechanic In Industrial Training Department - Cat no:660/2023**

<b>Module</b>	<b>Topics</b>	<b>Number of questions</b>
1	Occupational safety,First aid,safe handling and periodic testing of lifting equipment,energy conservation opportunities,marking materials,measuring instruments,vernier caliper,micrometer,dial bore gauge,vaccum gauge,thread pitch gauge, Fastners-different types of screws,nuts,studs and bolt, gaskets	10
2	Hacksaw, File- , parts of a file, specification, Grade, shape, different type of cut and uses., OFF-hand grinding with sander, bench and pedestal grinders,. Limits, Fits &Tolerances: - Definition of limits, fits &tolerances with examples used in components Drilling machine - Description and study of Bench type Drilling machine, electrical Drilling machine, drill holding devices, Work Holding devices, Drill bits. Taps and Dies: Hand Taps and wrenches, Calculation of Tap drill sizes for metric and inch taps. Different type of Die and Die stock. Screw extractors. Hand Reamers - Different Type of hand reamers, Drill size for reaming, Lapping, Lapping abrasives, type of Laps	10
3	Basic electricity, Electricity principles, Ground connections, Ohm's law, Voltage, Current, Resistance, Power, Energy. Voltmeter, ammeter, Ohmmeter Basic electricity, Electricity principles, Ground connections,ohms law,Lead acid battery,transformer	10
4	Introduction to welding and Heat Treatment Welding processes - Principles of Arc welding, brief description, classification and applications. Manual Metal Arc welding -principles, power sources, electrodes, welding parameters, edge preparation & fit up and welding techniques; Oxy - Acetylene welding - principles, equipment, welding parameters, edge preparation & fit up and welding techniques; Heat Treatment Process- Introduction, Definition of heat treatment, Definition of Annealing, Normalizing, Hardening and tempering. Case hardening, Nitriding, Induction hardening and Flame Hardening process used in components with examples.Non destructive testing-liquid penterant testing and magnetic particle testing	10
5	Pascal law,Gear Pump-Internal & External, Description and function of air Reciprocating Compressor. FRL,Pump Industry in India - leading manufacturers, development in Pump Industry, trends, new product Principle of Compression-ignition engine, differentiate between 4- stroke and 2 strokes, C.I engine and S.I Engine. Different type of starting and stopping method of Diesel Engine. Technical terms used in engine, Engine specification	10

6	over others. Filters and oil coolers- their description functions and method to overhaul for efficient functioning Troubleshooting: Causes and remedy for Engine Not starting - Mechanical & Electrical causes, High fuel consumption, Engine overheating, Low Power Generation, Excessive oil consumption, Low/High Engine consumption, Low/High Engine Oil Pressure, Engine Noise	10
7	Types of belt drives, velocity ratio of belt drive. Horsepower transmitted by belt. Ratio & driving tension in a belt. Parallel & cross belt drive, open & cross belt drive, angular belt drive. Methods of fixing and uses. Description, types and application of bushes, bearing and couplings. Procedure to fit bushes, bearings and coupling safely	10
8	Pumps-its importance for agricultural & industrial applications. Classification of pumps, its prime movers, parts and operation safety. Classification of reciprocating pump, construction and operation. Installation technique of reciprocating pump. Tools and equipment required & procedure	10
9	Submersible pump, Procedure to recondition, install and test of submersible pumps, Principle of centrifugal pump. Construction and operation of centrifugal pump in series and parallel. Finding out defects and method to recondition centrifugal pump. Different types of valves-their description, advantages & use. Special pumps & glands used for corrosive fluids. Different gasket cement used to prevent leakage and advantages of each over the other.	10
10	Different types of ropes, different types of knots, slings, types of lifting tackles, types of pulleys, types of key and key ways AC Motors - related terminology. Purpose, type, construction, operation, testing for correct functioning, maintenance and industrial applications. Trouble shooting & protection of induction motor, watt meter and energy meter	10

**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.**