MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI -51

<table>
<tr><td>1</td><td>Name of Syllabus</td><td>C.C. IN IRRIGATIION PUMP MECHANIC. (305109)</td></tr>
<tr><td>2</td><td>Max.Nos of Student</td><td>25 students.</td></tr>
<tr><td>3</td><td>Duration</td><td>6 Month</td></tr>
<tr><td>4</td><td>Type</td><td>Part Time</td></tr>
<tr><td>5</td><td>Nos Of Days / Week</td><td>6 Days</td></tr>
<tr><td>6</td><td>Nos Of Hours /Days</td><td>4 Hr</td></tr>
<tr><td>7</td><td>Space Required</td><td>PRACTICAL = 300 Sq feet
Class Room = 200 Sq feet
TOTAL = 500 Sq feet</td></tr>
<tr><td>8</td><td>Entry Qualification</td><td>7th passed</td></tr>
<tr><td>9</td><td>Objective Of Syllabus/ introduction</td><td>INTRODUCTION:-
IRRIGATION PLAYS AN IMPORTANT ROLE IN Agriculture , Hence a person having Knowledge of pumps, drips, prime movers etc. has wide scope in this area.
OBJECTIVES :-
1. To know all the basic principles behind the working of various pumps.
2. To defect various defects.
3. To remove the faults so as to resume the normal working of pumps.
4. To replace the worn out parts in the pumps.
5. To overhaul various types of pump.
6. Can do the maintenance of irrigation pumps in Agricultural sector.</td></tr>
<tr><td>10</td><td>Employment Opportunity</td><td>A) Self- Employment :-
After completion of course the candidate can do the work of pump installation repairing individually, He can establish his own servicing and repairing centre.
B) Wage-Employment :-
After completion of course the candidate can obtain job in company or in pump dealer’s shop who gives the services to his costumer, the irrigation Deptt. Of Z.P. ‘s G. S. D. A. (Geological Deptt.)</td></tr>
<tr><td>11</td><td>Teacher’s Qualification</td><td>Diploma in Mechanical Engg. “ / N. G. T. VT. Certificate of Diesel or pump mechanic.</td></tr>
<tr><td>12</td><td>Training System</td><td>Training System Per Week
<table><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>6 Hours</td><td>18 Hours</td><td>24 Hours</td></tr></table></td></tr>
<tr><td>13</td><td>Exam. System</td><td><table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Min. Marks</th></tr><tr><td>1</td><td>30510911</td><td>IRRIGATIION PUMP MECHANIC</td><td>TH-1</td><td>3 hrs</td><td>100</td><td>35</td></tr><tr><td>2</td><td>30510921</td><td>BASIC WORK</td><td>PR-1</td><td>3 hrs</td><td>100</td><td>50</td></tr><tr><td>3</td><td>30510922</td><td>IRRIGATIION PUMP MECHANIC</td><td>PR-2</td><td>6 hrs</td><td>200</td><td>100</td></tr><tr><td></td><td></td><td>Total Marks</td><td></td><td></td><td>400</td><td>185</td></tr></table></td></tr>
</table>

CURRICULUM :-

Week no.	THEROY - I & PRACTICAL - II - IRRIGATIION PUMP MECHANIC
1	Importance of safety and general precaution observed in the section Importance of the trade in the Industries as well as in Irrigation. Causes of accident and its remedies Guidance to be provided to the new comers.
2	Vice its Types & Uses files different types and uses cut-Grade, shape Measurements, by steel rule. Difference types of steel rule Try Square different Types parts Material and uses marking Media, punches Center Dot & Pricks punch scriber and its uses. Scribing Block or marking Block.
3	Calipers, Types and uses, surface, gauge, surface plate, V. Block Venire Caliper, Graduation least count & uses.
4	Calipers, Types and uses, surface, gauge, surface plate, V. Block Venire Caliper, Graduation least count & uses.
5	Drills and drilling Types Drill angles-and their Importance coolant used for drilling-Taps Different types care while Tapping Die different types care while Tapping Die different types and uses calculation involved to find out drill size (metric and Inch.) key., Keyways.
6	Pipe cutters, pipe dies- threading methods.
7	Safety precautions & first aid, common term used in the Trade, conductors & insulators, selected symbols.
8	Soldering, types Ohms law simple problems, series parallel & combined circuit. Types of fuse-purpose, earthing purpose types-necessity. Terms used such as A. C. D. C. inductance capacitance frequency power energy.
9	Types of wires & cables, Types of single phase & three phase motors.
10	Different types of starters such as star delta starter, D. C. L. starter Auto Trans former starter. & its internal details. Attention, No volt, overload, single Phasing, under voltage & over voltage.
11	General description of Diesel angles, Classification of Diesel Engine Hand tools & Equipments & used in Diesel Engine shop.
12	Description about two stroke & stroke (four) diesel Engine. Care & maintenance of Diesel Engine soldering brazing flux.
13	Description of F. I. pump Auto miser, Lubricant & Lubrication system soldering brazing flux.
14	Valve & velvet timing defect in Diesel fuel system remedies. Difference between Diesel & Petrol Engine. Difference between Diesel & Kerosene engine. Difference between diesel & kerosene Engine. Difference between kerosene & petrol engine.
15	Necessity of the trade in agricultural field and in Industrial application. Classification of pumps reciprocating centrifugal & rotary sueried introduction to various pumps. Components and installation of pump.
16	Classification of reciprocating pump. its
17	Construction and recondition procedure.
18	Types of centrifugal pumps. Its construction & function.
19	Repair procedure Meaning of Priming, its effect in pump operation. Brief description of Jet pump. Stage pumps their advantages.
20	Different types of valves, their description, advantages & use. Special pumps and Glands used in corrosive fluid with specification.
21	Different gasket / packing gland material methods of replacement techniques of gasket . different gasket cement used foe repair of leaks and advantages of each over the sealing compound.
22	Various seals their use & places of application with advantage of each.
23	Different types of pipes, and pipe fitting rolls required for pipe fitting decryption and function of carious accessories used in pipe fitting with their details. Use of protecting caps on threads.
24	Necessity of filter its servicing for efficient performance types of prime movers and its uses.
25	R E V I S O N

26	Trade Practical Familiarization with the Institute Training, Type of work done by trainees in the trade. Introduction to safety rules in shop floor and to the fire fighting equipment.
27	Filing practice on plain surface, Right angle by filing use of Try Square, and scale measurement.
28	Ex, on simple marking out. Punching use of calipers and scale measurements.
29	Filing at right angle marking and sawing – chipping –chisel grinding chambering ring 45˚- 30˚ Angular filing
30	Drilling Operation Tapping operations. Marking out key wayon shaft outing key way using crosscut chisel and Finish filing preparing a key to fit into groove universally.
31	Pipe cutting pipe threading.
32	Common Hand tools use & maintenance safety precautions types of joints/ soldering practice on wire joints, crimping of lungs.
33	Verification of Ohms law Pre-preparation of simple electric circuits-series & parallel measuring of current voltage and resistance. Measurement of power & energy using voltmeter & Ammeter wattmeter, and energy meter.
34	Connection of main switch, starter and single phase & three phase motor & starting. Identification of terminals of single phase & there phase motors measuring speed of the motor by using tachometer.
35	D. C. L. starter, star delta starter, connections maintenance of main switch starter and motor.

PRACTICAL 1 - BASIC WORK

11	Introduction General Safety Precautions shop Layout-Hand tools and its maintenance diesel Engine Parts & their Description i. e. piston, piston ring crank , shaft, cam shaft puppet value.
12	Cleaning of fuel tank and other parts checking soldering brazing of fuel tank and other parts. Value seat grinding, Servicing, of Exhaust value.
13	Overhauling of oil pump servicing of pump fitter air cleaner carburetors Auto miser , spark value.
14	Fuel feed system f. T. Pump., Injector Nozzle testing, Practice of starting of stoping of Diesel Engine Cooling system of Engine.
15	Introduction to the shop lay out familiarization with shop tools and equipments, Their maintenance & care General introduction to different pump, it a various parts, its prime movers electrical motors Diesel, petrol, kerosene, engine and their Operational safety.
16	Dismantling of reciprocating & pump with valves, pistons,
17	Cranks , seal etc. for inspections & repair and replacement.
18	Dismasting of Centrifugal & pumps dismantling impeller, shaft bearing etc.
19	Inspection for repair/reconditioning checking for clearance etc. and reassembling. Priming technique and its application.
20	Servicing of pumps, Valves & for General purpose and corrosive fluid. Foot valves. As an on riture valve prevention of leakage & obtaining proper suitable seat by emmer paste etc.
21	Selection of gasket/packing materials, marking of gasket as per shape cutting gasket as per shape profile use of gasket cement & other adhesives to stop leakage.
22	Installation of seal leather polythene asbestos rope rubber-spring loaded their removal & replacement methods of lubrication & type of lubricant
23	Selection of pipes and pipe joints preparation of pipes for assembly fitting of flanges and assembling of pipe work testing and rectification use of T. elbow, bent, socket reducers etc. cutting threads on pipe.
24	Installation of stationary and portable pumps checking and correcting of alignment of pumps with its prime movers and its service ability test. Testing of pump for its delivery and pressure.
25	Trouble shooting of pump set its rectification preventive maintenance program as applied in pump installation

- **LIST OF TOOLS AND EQUIPMENT :-**

SR.NO.	TOOLSV & EQUIPMENT
1	Steel Rule 15 cm with Metric Graduation.
2	Square try 10 cm blade.
3	Caliper 0/S 15 cm spring.
4	Caliper I/S 15 cm spring
5	Divider 15 cm spring.
6	Scriber 15 cm
7	Punch centre 10 cm.
8	Chisel cold 20 cm. flat
9	Chisel cross cut 9 mm
10	Hammer ball pen 0.50 kg with handle
11	Hammer Ball pen 0.258 kg with handle
12	File flat 20 cm .Bastard
13	File flat 25 cm secant cut.
14	File flat 25 cm smooth.
15	Hack saw frame adjustable 20-30 cm.
16	File H/R 250 mm II cut.
17	File Triangular smo0oth 200 mm.
18	File square smooth 20 mm.
19	File round smooth 200 mm.
20	Machine Vice 10 cm.
21	Bunch Vice 12 cm jow.
22	Drilling Machine Bench 0-12 mm Cap-motorized with chuck and key.
23	Surface plate 45 X 45 cm.
24	Universal Marking B' ock 12" n / 30 cm.
25	Angle plate 150 X 150 X 200 .
26	Bench Working wooden 120X 180 X 90 cm
27	Drill Twist 1.5 to 13 mm.
28	Pipe winch (Adjustable) 18"
29	Pipe Die 15 mm, 20 mm , 25 mm, 40 mm, (set of 4)
30	V. Block pair 7 cm & 15 cm with clamp.
31	Punch round 3 mm X 4 mm set of 2.
32	Pliers side cutting insulated 150 mm.
33	Die stock capacity 10 mm.
34	Tap Handle capacity 10 mm.
35	Allen kwys Hexagonal 2.5 -12 mm.
36	Tap & dies complete set in Box metric.
37	Spanner adjustable 10 cm.
38	Spanner Adjustable 15 cm.
39	Machine Vice 10 cm.
40	Grinding Machine (General purpose) pedestal type with 18 cm doa wheels tough & smooth.
41	Chain range 75 mm capacity.
42	Circle pliers (Internal & External)
43	Steel Rule 30 cm
44	Saw tennon 250 mm.
45	Firmer chisel wood (6 mm, 12 mm , & 25mm).
46	Blow lamp 0.5 liter capacity.
47	Malthing pot.
48	'C' Clamp 100mm, 150mm, 200mm,
49	Rawl plug tools & kit.
50	Socket set of 12 pieces handle, T bar, Rachet 6 mm to 32 mm.
51	D. E. spanner 6 mm to m 32 mm set of 12 pieces.

52	Ring spanners 6 mm to 32 mm.
53	Techo meter for checking RPM
54	Centrifugal pump for training.
55	Gear pump ------"------
56	Piston type pump -----"-------
57	Diesel Engine 2 stroke cold start vertical about 15 Hp.
58	Diesel Engine fuel injection type 4 stroke up to 15 H. P.
59	Diesel cut away to show working.
60	Diesel Engine up II nd hand up to 15 GP.
61	Diesel Engine up to 4.5 H. P. fitted with pump & pipe fitting.
62	Diesel Engine portable for water lifting pump & pipe fitting.
63	Kerosene engine up to 4.5 H. P. fitted with pump & pipe fitting.
64	Almiraha 180 cm X 120 cm X 45 cm.
65	Lockers with 18 drawers standerd size.
66	Pipe vice 2 and 3 inches.
67	Fire extinguisher.
68	Four fire buckets with stand.
69	Duel desk for trainees – 8 Nos.
70	Black board with easel
71	Table & chair for Instructor .
72	Multimeter sanwa type P-3.
73	Ammeter 0 to 1 Amp. M. I. type protable
74	Ammeter 0 to 5 Amp. M. I. type protable.
75	Ammeter 0 to 25 Amp. M. I. tyupe protable
76	Voltmeter 0 to 500 V M. I. type protable.
77	Wattmeter single ph. 1 kwa. C. 5 Amps
78	Energy meter single ph. 5 Amps. 230 V
79	-------"------- 3 ph. 20 Amps. 415 V.
80	I. C. D. P. Switch, 16 Amps. 250 V
81	I. C. T. P. Switch 16 A . 415 V
82	Single phase motor capacitor type ½ Hp, 230 V. and Universal motor.
83	3 PH Squirrel cage motor 1H.P. 415 V.
84	D. O. L. Starter 2.5 to 4.5 A. range.
85	Starter star delta for 5 H. P. motor 3 ph
86	Squirrel cage motor 5 H. P. 415 V3 PH
87	Megger 500 V
88	Earth Tester completer kit.
89	Soldering iron 65W, 125W. 230V. 01 ph.
90	Crimping tools up to 4 mm & up to 10 mm
91	Hand rubber glows.
92	Universal motor AC/ DC 230V. 50 HZ. 1/16 to ½ HP.
93	Tong Tester (Digital) 15-30-60 Amp. 500V.
94	Spanner set Metric standare set
95	Adjustable spanners 150 mm.
96	Screw Driver 100 mm Insulated (Taparia)
97	Screw Driver 150 mm Insulated (Taparia)
98	Screw Driver 200 mm Insulated (Taparia)
99	Screw Driver 250 mm Insulated (Taparia)
100	Combination plier 150 mm.
101	Wire stripper 1.4 mm^2 to 4 mm^2 (Taparia)
102	Knife single or double blade.
103	Neon Tester (Taparia)
104	Flat nose plier 150 mm.
105	Hammer ball pain 1. ½ Ibs.
106	Pulley puller 3 legs type 150 mm dia cap
107	Standard wire gauge 0-36 Nos.
108	Dearing puller up to 3"n cap

- **REFERENCE BOOKS :-**

1. Hand pump insulation & Maintenance by %. Unicef.
2. Pump servicing & maintancance by kashik & Gupta. New heights 1367/21 Lalal baught Delhi -110005.
3. Elements of Heat engines –By –Charotar Book stall. Tulsi Sadan, Station Road Anand (WR) Gujrath.
4. Solved question papers in DSL Mech. Ft. Et, Trade.
5. Wireman By – udyam Prakashan, Nagpur.

****