

SYLLABUS FOR THE TRADE

OF


Motor Driving and Heavy Earth Moving Machinery operator

(SEMESTER PATTERN)
ONE YEAR CERTIFICATE COURSE

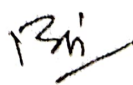
UNDER

STATE COUNCIL FOR VOCATIONAL TRAINING


Directorate of Technical Education,
Vocational & Industrial Training,
Himachal Pradesh, Sundernagar.


Gulab Singh
HOD Auto Engg




R.S. Banyal
Principal
Govt ITI Sundernagar




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GENERAL INFORMATION

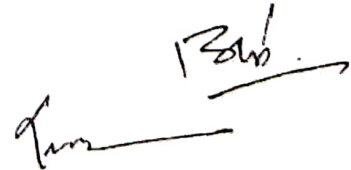
1. Name of the Trade : Motor Driving and Heavy Earth Moving Machinery Operator
2. N.C.O Code No. :
3. Duration of Training : One Year (Two Semesters)
4. Power Norms : 3KW
5. Space Norms : @5.5 * 16 = 88 Sq. meter and 1 acre open land for driving practice and heavy earth moving practice.
6. Entry Qualification : Passed in 10th Class Examination & Minimum 20 years of age
7. Unit Strength : 16
8. Qualification of the Instructor :
 - i) NTC in MMV trade
 - ii) One year CTI training (including modular pattern.)
 - iii) HTV(Heavy Passenger Service Vehicle/Heavy Goods Vehicle)
Driving License with minimum Two year Heavy vehicle
Driving Experience
 - OR
 - i) Apprenticeship in MMV trade
 - ii) One year CTI trade training (including modular pattern)
 - iii) HTV(Heavy Passenger Service Vehicle/Heavy Goods Vehicle)
Driving License with minimum Two year Heavy vehicle
Driving Experience
 - OR
 - i) Diploma/Degree in Automobile Engineering
 - ii) HTV(Heavy Passenger Service Vehicle/Heavy Goods Vehicle)
Driving License with minimum Two year Heavy vehicle
Driving Experience


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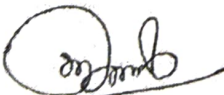




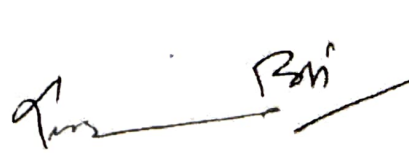


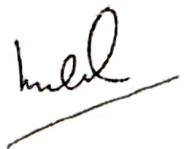
9. Examination and Evaluation Scheme :

Sr.No.	Subject of the trade:	Maximum marks for the Ist Semester		Total	Maximum marks for the IInd Semester		Total	Duration	Question Paper pattern	Remarks
		I Sem.	sessional		I Sem.	sessional				
1.	Trade Practical	50	10	60	50	10	60	4-6 hours	Practical	To be Evaluated by the State Directorate/Board
2.	Trade theory	30	--	30	30	--	30	2 Hours	Descriptive Q.1 is compulsory objective type & other 4 questions of 5 mark each	To be Evaluated by the State Directorate/Board
3	Autoshop Practical	50	10	60	50	10	60	4-6 hours	Practical	-Do-
4.	Employ ability skill	50	--	50	50	--	50	1 hour	Maximum 25 Questions	-Do-
Total		180	20	200	180	20	200			


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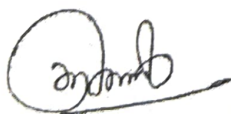


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First Semester


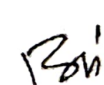

Study Hours

Sr.No.	Subjects	Study Scheme			Remarks	
		Theory	Practical	Total		
1.	Trade Practical	---	364 hours	364 hours		
2.	Trade Theory	260 hours	---	260 hours		
3.	Autoshop Practical	----	336 hours +28 hours (Project work)	364 hours		
4.	Employability skill					
		IT Literacy	4 hours	16 hours	20 hours	
		English Literacy	3 hours	12 hours	15 hours	
		Communication Skills	3 hours	12 hours	15 hours	



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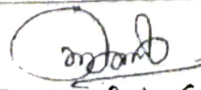
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SYLLABUS FOR TRAINING COURSE OF DRIVING AND HAVING
EARTH MOVING MACHINE OPERATORS FOR THE FIRST SEMESTER
DURATION DIVIDED IN 26 WEEKS


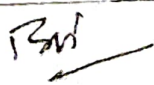
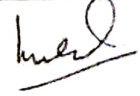
**MOTORS DRIVING AND HEAVY EARTH MOVING MACHINERY
OPERATOR TRAINING INSTITUTE AMB AT UNA(H.P.)**

WEEK NO.	DRIVING THEORY	PRACTICAL
1.	Complete knowledge of an automobile engine and their working history	Identification of different types of engines that is diesel and petrol engines and their parts.
2.	Control of vehicle – foot brake, hand brake, clutch, accelerator, dipper, steering, wheels, lighting switches, wiper, starter, ignition switch, indicators, center lock, air conditioner switch, use of light and switches.	Explanation and working of related parts of controls.
3.	Other controls:- Rear view mirror (side view mirror both sides) instruments on dash board that is fuel gauge, oil pressure gauge, temperature gauge, warning lights (battery charging ,oil level) air pressure gauge and use of other controls. Daily maintenance and essential checks before sitting on driver seat and after sitting on driver seat.	Detailed practical work on running vehicle and use of working gauges and controls. knowledge of general purpose tools , checking level of water and coolant of radiator, check oil level in engine with dip stick, fan belt tension, wind screen washer reservoir, battery water , electrolyte level, tyre pressure , brake oil, brake paddle free play , hand brake operation, switching on lights and checking of indicators for their performance, cleaning and washing of the vehicle if required, cleaning of wind screen with a soft brush that there may be no scratch on wind screen, starting of engine to attain normal temperature of engine, adjustment of driving seat, rear view mirror, side view mirror before taking the vehicle on the road.
4.	Driving Methods:- know about steering and its operations with related parts ,clutch pedal and its operation ,single plate clutch and automatic clutch, hand brake and its use, foot brake and its related parts, brake pedal play, accelerator and its related parts.	How to start engine:- (1). starting methods, use of ignitor key and its purposes. (2). Depressing clutch pedal and taking up practice with left foot. (3). Making use of accelerator with right foot to know the relationship between and accelerator and clutch pedal. (4). Shifting the gear lever with left hand palm after depressing clutch pedal. (5). Drive the vehicle after releasing clutch pedal slowly and depressing accelerator pedal slowly so that vehicle starts moving without making any jerk.

		<p>(6). Practicing of driving & stopping of vehicle by applying brake and check engine within short interval.</p> <p>(7). Driving slowly on ground in first gear after short intervals driving in slow speed on ground then put on high speed on ground with gear changing practice. Driving practice continued.</p> <p>(8). Drive slowly on ground in first gear and try to change gears after short intervals. Driving practice continued.</p> <p>(9). Steering control practice, braking control practice, cornering practice taking off and parking. Use of accelerator, brake and clutch suddenly & gradually. Driving practice continued.</p> <p>(10). Traffic sense and road sense judgement. Driving practice continued.</p> <p>(11). Reverse driving practice on ground. Driving practice continued.</p> <p>(12). Turning to the left hand, turning to right and straight. Driving practice continued.</p> <p>(13). Driving on road:- Anticipation and judgement for road positioning according to other road user. Driving practice continued.</p> <p>(14). Driving on inter section speed control, use of indicators and indicator lever left or right covering three point turn, five point turn, 'U' turn, overtaking stationary and moving vehicle left and right side, round about, driving guarded crossing. Working light junction, knowledge about red, yellow and green light. Driving practice continued.</p>
5.	Difficult driving condition- Use of tyres and tread, braking effectiveness tyre pressure loading capacity.	Overtaking of vehicles and how to allow overtaking of vehicle driving on hills and use of gear, driving on down hill and use of gears, wet roads driving uneven road driving, deep driving, snow bound area, driving sandy road, driving. skidding of tyres clear tyres and skidding of front tyres and skidding of all tyres, driving in heavy rain, driving in frost in bound area and driving on slippery road, driving practice continued.
6.	Parking of vehicles.	Practice in parallel, angular, perpendicular, and facing up hills, parking downhill and common across. Driving practice continued.
7.	Traffic signal and Marking:- Red light, Yellow light, Green light, Flashing light.	Taking left turn when red light is on.
8.	Painted line on road lane and its definition.	Practice on such crossing—driving practice between painted lines, lane driving practice, stop line, cross walk and regarding yellow and white line on the road. Driving practice continued.


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9.	<p>Hand signals:- Left arm stop traffic Approaching from Behind right arm stop traffic approaching from front, right arm stop traffic, approaching from the left of policeman and wanting to turn right that is stop signal on cross traffic detail of different types of hand signals.</p>	<p>To remember on the road sign while driving the vehicles. Driving practice continued.</p>
10.	<p>Traffic sign:- Mandatory, warning and informatory different schedules to Motor Vehicle Act 1988.</p>	
11.	<p>Introduction to Automatic light signal, parking at objectionable places , speed, regulation on highway and city roads. Traffic laws in accordance with Motor Vehicle act 1988 section 122 to 207.</p>	<p>Driving practice continued on light vehicles.</p>
12.	<p>Fitness to driver and Age factor of driver. Legal and insurance Obligations. 1. To produce learning license 2. To produce regular driving license 3. Filling of log book 4. Registration of motor vehicle 5. Passing of motor vehicle 6. First Aid Knowledge. 7. To recover the vehicle After an accident. 8. Fuel saving methods.</p>	<p>Driving practice continued on light vehicles. Clutch Slip, Brake binding , dusty air cleaner uneven tyres pressure, wrong engine oil , vehicle with full accelerator , speed controls driving vehicles with foot on clutch pedal, choke in off position to plan long journey, top gear driving applying brakes frequently , changing gear frequently.</p>
13.	<p>Functions of diesel and petrol <u>engines</u> Fuel system. Cooling system. Lubrication system.</p>	<p>Driving continued knowledge of fuel.</p>
14.	<p>Transmission System</p>	<p>Clutch -Function, slip, rising linkages. (Gear box -Function, purpose and parts. Propeller shaft -Function , purpose, Slip Joint and its lubrication. Universal Joint -Yoke and Universal Joint bearing . Differential:- purpose , function and noise in differential.</p>

15.	Suspension system and Steering system.	Purpose of springs, Shackle pin, bushes, shackles, shock absorber & its types. Purpose of steering geometry, steering linkages, steering Box. Driving practice continued.
16.	Brake system	Purpose, hydraulic brake and its knowledge, assisted hydraulic brake and its knowledge, brake adjustment.
17.	Electrical system	Battery and its conditions, dynamo, alternator, starting motor, regulators, lights, battery charging, read in ampere meter, use of indicators, use of parking light switch, use of wiper switch. Driving practice continued.
18.	Tyre and tubes	Study of tyres, tyre maintenance, effect of defective tyre wheel alignment. Driving practice continued.

HEAVY VEHICLE DRIVING

Quality of good driver:-

Patience, responsibilities, self confidence, anticipation, concentration, courage, courtesy, defensive driving knowledge of road rules, regulations, knowledge of vehicle controls. Major controls and minor controls during driving on Heavy vehicle.

20.	Response of Controls. Pre driving checks	Accelerator, brake (gradually and suddenly) clutch, Operation on heavy vehicle. Steering operation- Checking - 1. before sitting on driver seat. 2. after sitting on driver seat.
21.	Use of steering wheel while driving Gear changing, development of judgement. (driving continued)	1. Control on steering while gear changing, while turning, sounding horn, while operating dash board switches, while signaling and on emergencies. Double "D" clutching importance and procedure - Clutching 1st gear, 2 nd gear. 3rd, 4th, 5 th and reversing. Passing, merging, over taking. Crossing and parking, normal stopping, emergency stopping. Use of engine exhaust brake, driving a heavy vehicle.
22.	Development of anticipation height and hill driving under special condition.	Turning, entering and emerging a junction, lane selection, lane discipline intersection observation, location of head light switch, procedure obligation to light lamps. Restriction on flashing lamps. Starting in the hill using the parking brake method, slipping clutch method, driving up hill in low gear and driving down hill in low gear driving a heavy vehicle.
23.	Emergencies maneuvers	Prevention is better than cure in the case of fire, wheels coming out, brake failure, broken stub axle, burst front tyre. Steering wobbling, chances of collision with a Vehicle, brake failure in down hill. sudden obstruction in front of vehicle. driving a heavy vehicle.

4. Accident	Types of accidents, causes of accidents, preventing methods, driver duties and responsibilities on the occurrence of accident.
5. First aid	Introduction of first aid, outline of first aid, structure and function of bodies, dressing of bodies, dressing and bandages, circulation of blood, hemorrhage from special regions, shock, respiration, energy to bones, unconsciousness, insensibility position, driving a heavy vehicle.
6. HTV Driving Practice	Heavy Motor Vehicle Intensive driving practice on different track

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Second Semester

Study Hours

Sr.No.	Subjects	Study Scheme			Remark
		Theory	Practical	Total	
1.	Trade Practical	---	364 hours	364 hours	
2.	Trade theory	260 hours	---	260 hours	
3.	Autoshop Practical	----	336 hours +28 hours (Project work)	364 hours	
4.	Employability skill				
	I Entrepreneurships Skill	10 hours		10 hours	
	II Environment Education	10 hours		10 hours	
	III Occupational Safety and Health	8 hours	2 hours	10 hours	
	IV Labour Welfare Legislation	10 hours		10 hours	
	V Quality Tools	10 hours		10 hours	

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EARTH MOVING MACHINE OPERATORS FOR THE SECOND SEMESTER
DURATION DIVIDED IN 26 WEEKS
MOTORS DRIVING AND HEAVY EARTH MOVING MACHINERY
OPERATOR TRAINING INSTITUTE AMB AT UNA(H.P.)

WEEK NO.	DRIVING THEORY	PRACTICAL
1.	Safety programs : Hazards, losses resulting accident safety analysis	Handling of different types of general purpose tools & special purpose tools used in workshop .
27	Foundation of tractor its operation and lubricants, fuel used in tractors.	
28	Functions and working of domestic type tractor used for ploughing fields.	Servicing of tractor i.e. greasing. Changing engine oil hydraulic oil, brake oil, Engine oil filters. dry air filter elements, wet air filter, washing and cleaning practice
29	Function of transmission system of tractor, use of hydraulic lifts , tillers discs, jacks and other attachment during ploughing and harvesting.	Dismantling rear tyres of tractor . Repair of puncture and rear assembly of tractor.
30	Difference between different types of soils, sands and detailed discussion on sandy prone area, rocks, falling rocks.	Difference between different types of soils, sands and observing the loose and falling rocks. Use of gravel sand and concrete.
31	Function and definition of dozer and its application.	Servicing of dozer & identification of the main parts.
32	Detailed working and function of dozer and its types i.e. bull dozer, straight dozer, angle dozer, push dozer, U shaped dozer, tilt dozer , hydraulic control of dozer.	Field practice on different types of Dozers, available in dozers places. Dimensions of hydraulic operated dozer blade.
33	Function and working of crawler dozer with direct transmission.	Field practice on crawler dozer.
34	Complete knowledge of lubricant oils, hydraulic oils used in dozer, crawler dozer.	Identify different types of lubricants, oils, hydraulic oil compressor oil used in heavy earth moving machine. Trainee should be able to carry minor and major repair at site.
35	Detail theoretical instructions on major and minor parts related to bulldozer and crawler dozer.	Preventive maintenance of heavy machine , changing oil greasing, changing of hydraulic oils , rubber oil seals, types of nuts and bolts.
36	Function and working of motor grader blade, bowl, blade stabilizer.	Use of motor grader blade bowl stabilizer in open space.
37	Definitions, function, working of stopper elevating grader. Scrapper.	Field practice of slapper elevating. Grader and scrapper.
38	Definitions function use of disc horn ripper .	Practice on ripper, disc horn for proper use.

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Function and working of wheel loader its use with its application.	Practice on wheel loader on site, preventive maintenance, servicing, greasing and proper use of fasteners on load with right and accurate tools.
Function and working of power shovel and its use.	Field practice on power shovels.
Working and functions of attachment of full revolving shovel, crane, clamshell, dragline	Field practice on site on (I) Power shovel (II) Crane (III) Clamshell. (IV) Drag lines Preventing maintenance, servicing, greasing, cleaning and washing at site after the work is over.
Definitions, function and economical use of scrapper.	Field practice on site on scrapers, preventive maintenance, greasing, servicing, tightening of bolts and nuts.
Definition, tractor driven scrapper, motorized scrapper, Rubber tyred scrapper, tandem scrapper, efficiency of scrapper.	Field practice on different types of scrapers and their preventive maintenance to be carried out under the supervision of Instructor.
Difference between scrapper and bottom dumper, its operation, function and uses.	Practice on site on bottom dumper with preventive maintenance.
Difference between water bond macadam and bituminous macadam road.	Practice in construction of micro types of road at site selected for Practice.
Definition and uses of gradients, various types of canals, dams, water supply trenches and sewer lines.	Practice on site for making of gradients on roads, making of small canal, trenches of water for supply and sewer lines should do work on filling of earth. Filling of the dam with the help of heavy machinery.
Definition, working and use of light and high speed road rollers.	Practice on site both high speed and low speed road roller preventive maintenance during the operation of road roller.
Function and working of J.C.B. and its use in modern times, its efficiency. Fuel, lubricants and hydraulic oil used.	Practice on J.C.B. at site or making trenches.
49. -do-	Practice for digging of soil.
50. -do-	Scrapping practice on J.C.B.
51. Heavy Earth Moving practice continued.	Heavy Motor Vehicle, J.C.B. Tractor Intensive driving practice on different tracks

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THE LIST NEED TO BE AMMENDED & MODIFIED FOR HAND TOOLS AND MACHINERY EQUIPMENT. THIS IS ONLY THE LIST OF AVAILABLE M/E

LIST OF TOOL AND EQUIPMENT MOTOR DRIVING AND HEAVY EARTH MOVING MACHINERY OPERATOR TRAINING INSTITUTE AMB AT UNA (H.P.)

S.NO.	NAME OF ITEMS	QUANTITY
1	Hacksaw Frame	6 No.
2	Center Punch	6 No.
3	Cutter 12"	2 No.
4	Ball Peen Hammer	6 No.
5	Sledge Hammer	2 No.
6	Gas Pipe	22 mtr.
7	Steel Tool Box With Lock Key	4 No.
8	Auto Stand	6 No.
9	Ring Spanner Set Matrix 6-32 mm	3 sets
10	Socket Spanner Set Matrix 6-32 mm	3 sets
11	Grease gun P-Type 10Kg	2 No.
12	Hand Drill Machine 12 mm Electric	1 No.
13	Trolley Type Jack 14 Ton Hydraulic	1 No.
14	Battery Charger with Micro and Boost Charging 6 Batteries X 15 amperes	1 No.
15	Hydraulic Jack 10 Ton	2 No.
16	Screw Jack Mechanical 10 Ton with handle	2 No.
17	Star Screw Driver	4 No.
18	Torque Wrench 150 Lbs	1 No.
19	Water Pump Plier	2 No.
20	Magnetic Screw Driver Set	2 No.
21	Filler Gauge	4 No.
22	Scissors Type Jack with Handle	2 No.
23	D.E. Spanner set 6-32 mm	2 sets
24	Gun Praffine Pressure Type	2 No.
25	Oil Gun	2 No.
26	Oil Can	2 No.
27	Valve Spring Lifter	1 No.
28	Piston ring Compressor	1 No.
29	Piston Ring Expander	1 No.
30	Screw Driver 8" Plastic handle	4 No.
31	Screw Driver 10" Plastic handle	4 No.
32	Valve Die	1 No.
33	File and Handle	1 No.
34	Tyre Pressure Gauge	1 No.
35	Tyre Lever Rod 4 feet	2 No.
36	Heavy Duty Box spanner set	2 sets

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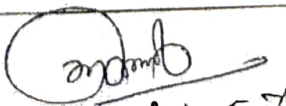
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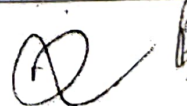
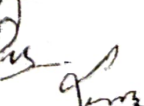
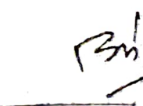
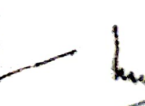

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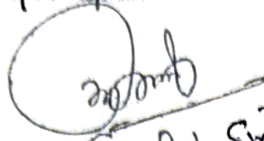
37	Special Tool Kit For Tractor, Grader, Scrapper, Ripper, Loader, Shovel, Crane, Clamshell, Drag Line, Bottom Dumper, Low Speed Road roller, High Speed road roller And for J.C.B.	2 sets Each
38	Chain Pulley Block 10 Ton Cap	1 No.
39	Petrol Engine Four Cylinder of Car (old but in good condition)	2 No.
40	Dynamo Old (U.S.)	2 No.
41	Self Starter Old (U.S.)	2 No.
42	Tata Bus 32 Seater	1 No.
43	Engine stand Static Old (U.S.)	1 No.
44	Tata Bus 42 Seater	1 No.
45	Ambasder Car	1 No.
46	Fiat car	1 No.
47	U/S Dozers (A) D-50 8002 (B) D-50 7892	2 No.
48	Tractor Four Cylinder-With All Attatchments	1 No.
49	Grader With All Attatchments	1 No.
50	Scrapper All Types	1 No. Each
51	Disc Horn Ripper	1 No.
52	Wheel Loader	1 No.
53	Power Shovel	1 No.
54	Crane	1 No.
55	Clam Shell	1 No.
56	Drag Line	1 No.
57	Bottom dumpers	1 No.
58	Low Speed Road Roller	1 No.
59	High Speed Road Roller	1 No.
60	J.C.B.	1 No.
61	Executive Table 1800*900*760 mm (sunmica top)	1 No.
62	Revolving Chair Push Back spring	1 No.
63	Office Chair delux Type Cusion Seat And Back	6 no.
64	Waste paper Bucket	1 No.
65	Office Table with One Drawer	1 No.
66	Adjustable Record rack With Four Shelves	5 No.
67	Steel Almirah 127*765*440 mm with three Shelves	3 No.
68	Revolving Chair with Medium Back	1 No.
69	Office Table 90*660*760 mm	5 No.
70	Steel Almirah 1980*865*485 mm	1 No.
71	Stool Made of Square pipe with ply Sheet	3 No.
72	Working Bench 1500*450*900 mm	1 No.
73	Locker Cabnet Steel With '8' Lockers	3 No.
74	Desk Double Seater	20 No.
75	Office Metal Chair with Cane Sheet And back Square Pipe	5 No.
76	Executive Side Rack 5"*5"*13" moving Three Drawer with sunmica Top	1 No.
77	Cooling Fan 1200 mm P.S.P. orient	4 No.
78	Sofa Set	1 Set
79	Center Table	1 No.


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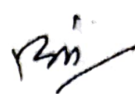
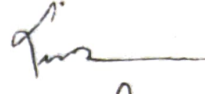






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80	Office Table with 3 Drawer	1 No.
81	Room Heater	2 No.
82	Cooler 3 speed make Khaitan	1 No.

The Heavy Machinery like J.C.B, Earth Mover etc can be shared with nearby institute / organisation for Training purpose.


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LIST OF REGISTERS/RECORD OF MOTOR TRAINING AND HEAVY EARTH MOVING MACHINERY
OPERATOR TRADE

S.NO.	NAME OF ITEMS	QUANTITY
1	Tools and Equipments Register	1 No.
2	Work Order register	1 No.
3	Diary Register	1 No.
4	Tools And Equipments Indent Book	1 No.
5	Raw Material Register SSR	1 No.
6	Raw Material Indent Book	1 No.
7	Log Book	1 No. For Each vehicle
8	Lubricant Register	1 No.
9	Maintenance Log Book	1 No. For Each vehicle
10	Attendance Register	1 No.
11	Staff Attendance register	1 No.
12	R.C. Book	1 No. For Each vehicle
13	Foreman Stamp With Pad	1 No.
14	Register for 14 No. forms (Renewal of License) up to 80pages,214 pages 313 pages 380 pages	5 No.


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