

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAM, MUMBAI -51

1	Name of Syllabus	C.C. IN SERVICING AND REPAIRING OF DIESEL ENGINE (306101)																																								
2	Max. Nos of Student	25 students.																																								
3	Duration	6 Month																																								
4	Type	Part Time																																								
5	Nos Of Days / Week	6 Days																																								
6	Nos Of Hours /Days	4 Hrs																																								
7	Space Required	Class Room = 200 Sq feet <u>Workshop = 800 Sq feet</u> TOTAL = 1000 Sq feet																																								
8	Entry Qualification	7 th passed																																								
9	Objective Of Syllabus/ introduction	1) Trainee should be well conversant with the tool generally used for repair and maintenance of diesel engines Trainee should know the working of diesel engine. 2) Trainee should be able to detect the faults. 3) He should be able to rectify the fault by way of repairing defective part of carry out minor repair and put the engine in working condition. 4) He should know the maintenance of the engine.																																								
10	Employment Opportunity	Self Employment:- To undertake faulty and minor repair work, especially in rural areas where garage facilities are not available. Wage-Employment: - Will is able to work in vehicle related establishment.																																								
11	Teacher's Qualification	H.S.C.VOCATIONAL OR D.M.E. (Mechanical)/ D.A.E.(AUTO)																																								
12	Training System	Training System Per Week <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Theory</td> <td>Practical</td> <td>Total</td> </tr> <tr> <td>6 Hours</td> <td>18 Hour</td> <td>24 Hours</td> </tr> </table>						Theory	Practical	Total	6 Hours	18 Hour	24 Hours																													
Theory	Practical	Total																																								
6 Hours	18 Hour	24 Hours																																								
13	Exam System	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <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>Mini. Marks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>30610111</td> <td>SERVICING AND REPAIRING OF DIESEL ENGINE</td> <td>TH-I</td> <td>3 HRS</td> <td>100</td> <td>35</td> </tr> <tr> <td>2</td> <td>30610121</td> <td>ENGINE AND USE OF SPECIAL TOOLS</td> <td>PR-I</td> <td>3 HRS</td> <td>100</td> <td>50</td> </tr> <tr> <td>3</td> <td>30610122</td> <td>DIFFERENT ENGINE SYSTEM</td> <td>PR-II</td> <td>6 HRS</td> <td>200</td> <td>100</td> </tr> <tr> <td align="right" colspan="5">TOTAL</td> <td>400</td> <td>185</td> </tr> </tbody> </table>						Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks	1	30610111	SERVICING AND REPAIRING OF DIESEL ENGINE	TH-I	3 HRS	100	35	2	30610121	ENGINE AND USE OF SPECIAL TOOLS	PR-I	3 HRS	100	50	3	30610122	DIFFERENT ENGINE SYSTEM	PR-II	6 HRS	200	100	TOTAL					400	185
Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks																																				
1	30610111	SERVICING AND REPAIRING OF DIESEL ENGINE	TH-I	3 HRS	100	35																																				
2	30610121	ENGINE AND USE OF SPECIAL TOOLS	PR-I	3 HRS	100	50																																				
3	30610122	DIFFERENT ENGINE SYSTEM	PR-II	6 HRS	200	100																																				
TOTAL					400	185																																				

SYLLABUS

THEORY PAPER – I, SERVICING & REPAIRING OF DIESEL ENGINE

1. Description, construction, material uses of the special tools used in the trade such as
 1. Piston Ring Expander.
 2. Piston Ring compressor.
 3. Ridge remover.
 4. Piston Ring fitting Gig.
 5. Ridge remover
 6. Pullers, Jack, Value lapping tools etc.
2. History of the I C Engines in brief classification of I C Engines. General description and construction of diesel & petrol engines.
3. Description of 4 stroke cycle principles and two stroke cycle principles on Auto & diesel cycle engines and four stroke engines.
4. Types of four stroke cycle diesel & petrol engines types of scavenging uni flow scavenge opposed piston engine.
5. Details of engine parts description materials Location of parts function
6. Piston connecting Rod engine head cylinder block operating mechanism.
7. Description types of cooling system water cooling thermo siphon and pressure cooling Air cooling Blowers and fins of the engine Advantage and disadvantages.
8. Description material types of bearing used in diesel engine clearance Lubrication types Lubricants Lubrication system function of Lubrication oil filter pressure relief valve etc.
9. Description type material principle of simple carburetor A. C. fuel used in petrol engine etc.
10. Description types function of the component in fuel injection system fuel tank fuel pipe lines feed pump briefly maintenance scheduled.
11. Description types function in briefly of the components fuel filters fuel injection pump injectors overflow connection, relief valves etc.
12. Description types function in briefly of mechanical Governor dynamic Governor Construction and components of Governor.
13. General performance of the engine particular of engine clearance timing diagrams, setting of timing etc.
14. Battery – Construction of battery , checking of battery
15. Starter - types of starter ,Construction of starter , checking of starter
16. Dynamo- Construction of dynamo ,
17. Alternator - Construction of alternator,

PRACTICAL – I, ENGINE AND USE OF SPECIAL TOOLS

1. Demonstrate the special tool a how & where to use such as
 - 1) Piston Ring expander
 - 2) Piston Ring compressor.
2. Demonstrate the special tools how & where to use such as Piston Ring groove cleaner ,
Piston Ring filling gig.
3. Demonstrate the special tools how & where to use such as Ridge remover & pullers
4. Give suitable practicals on Jacks, valve lapping tools.
5. Exercises involving such of ratchet, pliers, screw-drivers pullers.
6. Cleaning and Lubrication of engine parts.
7. Location & identification of engine components.
8. To study and observation of principles use on Auto & diesels four stroke engine.
Identification of engine compounds.
9. Practice on unserviceable diesel engines removing diesel engines removing jammed nuts &
broken studs whole fitting oversize studs.
10. Selection of materials for gaskets and packing's use of locking devices locking, nuts, cotters,
split pins and circlips lock ring. Location where they are used.
11. Inspection and checking leakage of air fuel oil exhaust in the engine

PRACTICAL – II, DIFFERENT ENGINE SYSTEM

A. DIFFERENT ENGINE SYSTEM

1. Maintenance of cooling system overhauling water pumps dis scaling water jackets
2. Cleaning & refitting of radiator.
3. Maintenance of air blower fan bolt tension cleaning of air fins of the engine Radiator
4. Overhauling oil pump oil filters air cleaner's air filters check.
5. Adjust oil pressure relief valves changing oil in the sump repair to oil flow pipe lines and unions.
6. Overhauling and maintenance of fuel pipe lines pump etc.
7. Studding electrical circuits in the engine assembly checking loose open and short circuit in ignition circuits cleaning and testing.
8. Changing of rule pipelines stopping leaks of diesel oils over hauling of fuel tank feed pump and taking maintenance of injection system.
9. Overhauling fuel filters fuel injection pump.
10. Injector cleaning and refitting changing gasket of injectors.
11. Starting running & stopping engine checking speed of engine and adjust it as per recommendation of manufactured
12. Checking smokes of the engine leakage of air fuel lubrication oils setting

B. DIFFERENT ENGINE SYSTEM

1. Clearance of tappets setting of engine timing etc.
2. Checking refitting of engine foundation
3. Inspection of fan , Fan belt & replacement of fan belt
4. To study the battery & inspection test
5. To study the dynamo
6. To study the starter (Bendix drive)
7. To study the alternator
8. To check the compression of engine cylinder
9. To check the nozzle pressure of engine
10. Precaution for the overheating of engine
11. Diesel tank & fuel line cleaning
12. To study the feed pump for diesel engine
13. To study the different type of switches like – oil pressure, temperature switch.

LIST OF TOOLS & EQUIPMENTS

Sr. no.	Name of Tools & Equipment	Required quantity
1	Hammer ball pane 0.75 kg.	10
2	Chisel cold flat 19 mm.	10
3	Centre punch 10 cm	10
4	Steel rule 15 cm & metric	10
5	Screw driver 30 cm X 9 mm blade	10
6	Screw driver 20cm X 9 mm.	10
7	Spanner DE set of 12 metric 8-32 mm.	10
8	Pliers combination 15 cm.	10
9	Flat file 20 cm second cut	10
10	Feeler gauge 20 blades	10
11	Ring spanner set of 12 metric 8-32 mm.	10
12	Steel tool box with lock	10
13	steel rule 30 cm	10
14	Chisel cross cut 9X3 mm	10
15	Hammer ball pane 0.5 kg.	10
16	Hack-saw frame adjustable for 20-30 cm blades.	2
17	Punch hollow 6,7,8,9,10,5, & 12, mm.	2 set
18	Hand vice 3.7 mm.	2 nos
19	File flat 35 cm. bastard	10
20	File flat 25 cm. second cut	10
21	File flat 20 cm. smooth.	10
22	Mallet hammer	4
23	Spanner adjustable 20 cm.	4
24	Spanner Ring of set 6 SAE	10
25	Double open ended spanner set of 12 pieces 8 to 32 mm.	10
26	Valve lapping suction type tools	10
27	Piston ring Groove cleaner	4 nos
28	Piston Ring expander & remover	4 nos
29	Circlip pliers expandable	4 nos
30	Circlip pier compressible	4 nos
31	Socket spanner set of 28 pieces 8 mm. to 32 mm.	4 nos
32	Torque 7 kg, to 35 kg, / meter	1
33	Piston ring compressor	4 nos
34	Puller set universal for bearing & bushes	1 no
35	Lifter valve spring 'C' type & side valve type.	2 each
36	Extractor stud " Ezy out " type	1 no
37	Mallet (Wooden)	1 no
38	Work bench 250 X 120 X 75 cm with 4 vices of 12.5 jaw.	4 nos
39	Fuel feed pump	2 nos
40	Fuel injection pump ((PE) Type)	2 nos
41	Water pump & oil pump 2 nos	2 nos
42	Filling ig for adjusting the piston ring gap.	2 nos
43	Tachometer (Counting Type)	1 no
44	Injectors assorted type	1 each
45	Tap & doe set B. S. W.	1 set
<u>GENERAL MACHINERY</u>		

1	Diesel engine cut-out model to	1 no
2	Diesel engine 4 stroke Multi cylinder , 4 cylinder vehicle type	2 nos
3	Diesel engine stationery type	2 nos
4	Air cooled vertical diesel engine.	1 no
5	Trolley type portable air compressor, single cylinder with 45 liters capacity air tank all accessories and with working pressure 6.5 kg. 159 cm2	1 no
6	Unserviceable Horizontal diesel engine	1 no
7	Unserviceable vertical water cool engine	1 no
8	Unserviceable vertical Air cool engine	1 no

REFERENCE BOOKS :

- | | | |
|----|--------------------------------------------|---------------|
| 1. | Oil Engine Mechanic | Vaze |
| 2. | Yantric Motor Gadi Part – I & II (Marathi) | Shekhar Dalvi |
| 3. | Diesel engine operation and Maintenance | Malveer V.L. |
| 4. | Diesel engine Mechanic | N.K. Mangal |
