



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

MECHANIC AGRICULTURAL MACHINERY

(Duration: Two Years)

CRAFTSMEN TRAINING SCHEME (CTS)



NSQF LEVEL- 4

SECTOR - AUTOMOTIVE



Directorate General of Training

MECHANIC AGRICULTURAL MACHINERY

(Engineering Trade)

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CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the two-year duration of Mechanic Agricultural Machinery trade, a candidate is trained on subjects- Professional Skill, and Employability Skills related to job role. In addition to this, a candidate is entrusted to make/do project work and Extra Curricular Activities to build up confidence. The practical skills are imparted in simple to complex manner & simultaneously theory subject is taught in the same fashion to apply cognitive knowledge while executing task.

The content broadly covers fitting of different components by operating different hand tools conventional machines and maintenance of machineries used in agriculture field. The broad components covered under Professional Skill subject are as below:

First Year: – In this year, the contents covered are from safety aspect related to the trade, the learner learns to apply safe working practices complying environment regulations and housekeeping in an automotive workshop; plan and perform precision measurements on the components and compare parameters with specifications used in automotive workshop practices, carryout marking and perform basic fitting operations used in the work shop practices along with inspection of dimensions; produce sheet metal components using bending process & other various sheet metal operations; construct electrical circuits and perform testing of basic electrical parameters by using electrical measuring instruments, construct basic electronic circuits and testing, manufacture components with different types of welding processes in the given job, identify and select the hydraulic and pneumatic components in a vehicle and inspect the auto component using Non-destructive testing methods. The learner learns to overhaul diesel engine of Tractor; service, cooling and lubrication system of Tractor in a workshop; service Exhaust System and Fuel Feed System of Tractor in a workshop; overhaul Clutch, Gearbox, Steering system, differential and PTO unit of Tractor in a workshop; carryout Repair of Wheels and Tyres of Tractor in the Workshop; overhaul Brake system of Tractor in the workshop; overhaul Major Assemblies of Power Tiller and carryout Field Operation; overhaul and troubleshoot for correct functioning of Implements of Tractor; perform battery testing, charging operations and overhaul charging and Starting System of Tractor.

Second Year: – In this year, test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements; check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator; troubleshoot & test the functionality of major components and assemblies of disc harrows (Off set Type/Double action. And single action) and Power harrows; check and service proper functionality of major components and assemblies of cultivators and soil forming equipments; identify and check functionality of major components and assemblies

of Lazar leveler, trencher & post hole digger; dismantle, assemble and troubleshoot seed drills; test and verify functions of major components and assemblies of planters and fertilizer applicators; identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump; service irrigation valves and hydrants; service and trouble shoot power tillers/power weeder; identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors; identify and trouble shoot faults in major components and assemblies of sprayers & dusters; detect and troubleshoot major components and assemblies of reaper, reaper winder, straw- reapers; troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator; identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit; test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter; detect and rectify functionality of major components and assemblies of rotary harvester, hay bailer; find and troubleshoot major components and assemblies of groundnut digger, potato / onion digger; service and troubleshoot winnower, cleaner & grader; maintain and service rice huller, polisher, feed grinder-cum-mixer, hammer mill; detect and rectify functionality of grain handling seed treating and drying equipment.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with **variants** and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

Mechanic Agricultural Machinery trade under CTS is delivered nationwide through a network of ITIs. The course is of two years duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill, knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read & interpret technical parameters/documentation, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional knowledge, core skills & employability skills while performing the job and machining work.
- Check the job/components as per drawing for functioning identify and rectify errors in job/components.
- Document the technical parameters related to the task undertaken.

2.2 PROGRESSION PATHWAYS:

- Can join industry as Technician and will progress further as Senior Technician, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can take admission in diploma course in notified branches of Engineering by lateral entry.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).

- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming an instructor in ITIs.
- Can join Advanced Diploma (Vocational) courses as applicable conducted by DGT.

2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of two years:

| S No. | Course Element | Notional Training Hours | |
|-------|---------------------------------------|-------------------------|----------------------|
| | | 1 st Year | 2 nd Year |
| 1 | Professional Skill (Trade Practical) | 840 | 840 |
| 2 | Professional Knowledge (Trade Theory) | 240 | 300 |
| 3 | Employability Skills | 120 | 60 |
| | Total | 1200 | 1200 |

Every year 150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

| | | | |
|---|--|-----|-----|
| 4 | On the Job Training (OJT)/ Group Project | 150 | 150 |
| 5 | Optional Courses (10 th / 12 th class certificate along with ITI certification or add on short term courses) | 240 | 240 |

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th class /12th class certificate along with ITI certificate or add on short term courses.

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by the DGT from time to time.

a) The Continuous Assessment (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute have to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the Formative assessment template provided on www.bharatskills.gov.in

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NTC will be conducted by controller of examinations, DGT as per the guideline. The pattern and marking structure is being notified by DGT from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.**

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency. Assessment will be evidence based, comprising some of the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work
- Computer based multiple choice question examination
- Practical Examination

Evidences of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examination body. The following marking pattern to be adopted for formativeassessment:

| Performance Level | Evidence |
|---|---|
| (a) Marks in the range of 60 -75% to be allotted during assessment | |
| <p>For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices.</p> | <ul style="list-style-type: none"> • Demonstration of good skill in the use of hand tools, machine tools and workshop equipment. • 60-70% accuracy achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job. |
| (b) Marks in the range of 75%-90% to be allotted during assessment | |
| <p>For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices.</p> | <ul style="list-style-type: none"> • Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% accuracy achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job. |
| ©Marks in the range of above 90% to be allotted during assessment | |
| <p>For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.</p> | <ul style="list-style-type: none"> • High skill levels in the use of hand tools, machine tools and workshop equipment. • Above 80% accuracy achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project. |

Brief description of job roles:

Tractor Mechanic; repairs and overhauls tractors by various mechanical processes for agriculture, constructional and other heavy duties. Examines and drives vehicle on road or runs engine in stationary position to diagnose troubles and defects. Dismantles part or complete engine or unit according to nature of defects. Repairs or replaces defective parts, reassembles them with prescribed settings, clearances, timings and adjustments by further tooling as necessary and ensures accuracy of fit. Installs assembled or repaired engine securely in position on vehicle chassis and connects oil and fuel lines, controls and other accessories. Starts engine and observes performance for any unusual noise and knocks. Adjusts carburetor, fuel pump (Carburetor for petrol engine and fuel pump for diesel engine), sets clearance between tappets and valves, tunes engine, adjusts brakes, makes electrical connections and performs other tasks to ensure stipulated performance. May repair and overhaul electric motors, fuel pump etc. of engine. May weld, braze or solder parts. May repair other agricultural machinery for ploughing, harvesting etc. and be designated as mechanic, agricultural machines.

Tractor Operator, Farm; Tractor Driver, Farm operates and services farm tractor having different attachments for ploughing, harrowing, harvesting and other agricultural operations. Checks different parts of tractor to ensure that it is in proper working order. Collects, attaches and adjusts special equipment, required for different operations of tractor. Feeds tractor with fuel and demarcates land for ploughing. Starts tractor and drives it through fields at regulated speed depending on nature of soil and work. Controls operation of different attachments including turning of wheels by operating levers and pedals as required. Tows trailers laden with crops and other materials when required. Cleans and oils machine. Maintains tractor and other implements in good working order and keeps record of fuel consumption. May supervise work of Helpers. May detect mechanical defects and undertake minor repairs.

Tractor Driver, Construction; operates petrol or diesel powered tractor to haul vehicles or implements such as trailers, graders, etc. for pushing, pulling or moving goods and material or dumping earth. Checks engine oil, radiator water, diesel or petrol supply and other important greasing points of vehicles. Checks that brakes and pedals of vehicle are in good condition. Fastens attachments, such as graders, trailers, ploughs, and rollers to tractor with hitch pins; releases brakes, shifts gears, and depresses, accelerator or moves throttle to control forward and backward movement of machine; steers tractor by turning steering wheel and depressing brake pedals. May couple and uncouple loads to and from tractor. May lubricate and repair tractor and attachments. May be designated according to type of power utilized as diesel tractor operator or gasoline-tractor operator.

Reference NCO-2015:

- a) 7233.1500–Tractor Mechanic
- b) 8341.0101 – Tractor Operator, Farm
- c) 8341.0300 –Tractor Driver, Construction

Reference NOS: -

- | | | | |
|-------|-----------|---------|-----------|
| i. | ASC/N1404 | xviii. | AGR/N9438 |
| ii. | ASC/N1406 | xix. | AGR/N9439 |
| iii. | ASC/N1405 | xx. | AGR/N9440 |
| iv. | PSC/N0136 | xxi. | AGR/N9441 |
| v. | ASC/N1438 | xxii. | AGR/N9442 |
| vi. | AGR/N9426 | xxiii. | AGR/N9443 |
| vii. | ASC/N1420 | xxiv. | CSC/N9401 |
| viii. | ASC/N1435 | xxv. | CSC/N9402 |
| ix. | AGR/N9429 | xxvi. | AGR/N1129 |
| x. | AGR/N9430 | xxvii. | AGR/N1126 |
| xi. | AGR/N9431 | xxviii. | AGR/N1130 |
| xii. | AGR/N9432 | xxix. | AGR/N1128 |
| xiii. | AGR/N9433 | xxx. | AGR/N1108 |
| xiv. | AGR/N9434 | xxxi. | AGR/N1119 |
| xv. | AGR/N9435 | xxxii. | AGR/N1114 |
| xvi. | AGR/N9436 | xxxiii. | AGR/N1111 |
| xvii. | AGR/N9437 | xxxiv. | AGR/N1006 |

4. GENERAL INFORMATION

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|---|---|
| Name of the Trade | Mechanic Agricultural Machinery |
| Trade Code | DGT/1064 |
| NCO – 2015 | 7233.1500, 8341.0101,8341.0300 |
| NOS Covered | ASC/N1404, ASC/N1406, ASC/N1405, PSC/N0136, ASC/N1438, AGR/N9426, ASC/N1420, ASC/N1435, AGR/N9429, AGR/N9430, AGR/N9431, AGR/N9432, AGR/N9433, AGR/N9434, AGR/N9435, AGR/N9436, AGR/N9437, AGR/N9438, AGR/N9439, AGR/N9440, AGR/N9441, AGR/N9442, AGR/N9443, CSC/N9401, CSC/N9402, AGR/N1129, AGR/N1126, AGR/N1130, AGR/N1128, AGR/N1108, AGR/N1119, AGR/N1114, AGR/N1111, AGR/N1006 |
| NSQF Level | Level – 4 |
| Duration of Craftsmen Training | Two Years (2400 hours + 300 hours OJT/Group Project) |
| Entry Qualification | Passed 10th class examination with Science and Mathematics or with vocational subject in same sector or its equivalent. |
| Minimum Age | 14 years as on first day of academic session. |
| Eligibility for PwD | LD, LC, DW, AA, LV, DEAF |
| Unit Strength (No. Of Students) | 24 (There is no separate provision of supernumerary seats) |
| Space Norms | 225 Sq. m |
| Power Norms | 10 KW |
| Instructors Qualification for | |
| 1. Mechanic Agricultural Machinery Trade | B.Voc/Degree in Agriculture Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. OR 03 years Diploma in Agriculture Engineering from AICTE recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. OR NTC/NAC passed in the trade of "Mechanic Agricultural |

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| | <p>Machinery” with three years’ experience in the relevant field.</p> <p>Essential Qualification: Relevant National Craft Instructor Certificate (NCIC) in any of the variants under DGT.</p> <p><i>NOTE: - Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.</i></p> |
| <p>2. Workshop Calculation & Science</p> | <p>B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field.</p> <p style="text-align: center;">OR</p> <p>03 years Diploma in Engineering from AICTE recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years’ experience in the relevant field.</p> <p style="text-align: center;">OR</p> <p>NTC/ NAC in any one of the engineering trades with three years’ experience.</p> <p><u>Essential Qualification:</u> National Craft Instructor Certificate (NCIC) in relevant trade</p> <p style="text-align: center;">OR</p> <p>NCIC in RoDA or any of its variants under DGT</p> |
| <p>3. Engineering Drawing</p> | <p>B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field.</p> <p style="text-align: center;">OR</p> <p>03 years Diploma in Engineering from AICTE recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years’ experience in the relevant field.</p> <p style="text-align: center;">OR</p> <p>NTC/ NAC in any one of the engineering/ Draughtsman group of trades with three years’ experience.</p> <p><u>Essential Qualification:</u> Regular / RPL variants of National Craft Instructor</p> |

| | |
|--------------------------------------|---|
| | <p>Certificate (NCIC) in relevant trade</p> <p style="text-align: center;">OR</p> <p>Regular/RPL variants NCIC in RoDA or any of its variants under DGT</p> |
| 4. Employability Skill | <p>MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills.</p> <p>(Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above)</p> <p style="text-align: center;">OR</p> <p>Existing Social Studies Instructors in ITIs with short term ToT Course in Employability Skills.</p> |
| 5. Minimum Age for Instructor | 21 Years |
| List of Tools and Equipment | As per Annexure – I |

5. LEARNING OUTCOMES

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES

First Year

1. Make choices to carry out marking of the components for basic fitting operations in the workshop following safety precautions. (NOS:ASC/N1404)
2. Perform precision measurements on the components in automotive workshop practices. (NOS:ASC/N1406)
3. Use different types of fastening and locking devices in a vehicle. (NOS:ASC/N1405)
4. Use cutting tools in the workshop, following safety precautions while grinding. (NOS:PSC/N0136)
5. Use different types of tools and workshop equipment in the workshop. (NOS:AGR/N1126)
6. Perform basic fitting operations used in the workshop practices and inspection of dimensions. (NOS:ASC/N1438)
7. Produce sheet metal components using various sheet metal operations. (NOS:AGR/N9426)
8. Construct electrical circuits and test its parameters by using electrical measuring instruments. (NOS:ASC/N1420)
9. Perform basic electrical testing in a vehicle. (NOS:AGR/N1129)
10. Perform battery testing and charging operations. (NOS:AGR/N1129)
11. Construct basic electronic circuits and testing. (NOS:ASC/N1435)
12. Manufacture components with different types of welding processes in the given job. (NOS:AGR/N9429)
13. Inspect the auto component using Non-destructive testing methods. (NOS:AGR/N1126)
14. Identify the hydraulic and pneumatic components in a vehicle. (NOS:AGR/N1129)
15. Demonstrate Major Assemblies of Tractor. (NOS:AGR/N1130)
16. Overhaul Diesel Engine of Tractor. (NOS:AGR/N1128)
17. Perform servicing of Cooling and Lubrication system of Tractor in a workshop. (NOS:AGR/N1128)
18. Service Intake and Exhaust System of Tractor in a workshop. (NOS: AGR/N1128)
19. Service Fuel Feed System of Tractor in a workshop. (NOS: AGR/N1128)
20. Overhaul Clutch and Gearbox of Tractor in a workshop. (NOS: AGR/N1129)
21. Overhaul Differential and PTO Unit of Tractor in the workshop. (NOS: AGR/N1129)
22. Overhaul Steering System of Tractor in the workshop. (NOS: AGR/N1129)
23. Carryout Repair of Wheels and Tyres of Tractor in the Workshop. (NOS: AGR/N1129)
24. Overhaul Brake system of Tractor in the workshop. (NOS: AGR/N1129)
25. Overhaul MajorAssemblies of Power Tiller and carryout Field Operation. (NOS:AGR/N1108)
26. Overhaul Implements of Tractor. (NOS: AGR/N1119)
27. Overhaul Charging and Starting System of Tractor. (NOS:AGR/N1129)

28. Read and apply engineering drawing for different application in the field of work. (NOS:CSC/N9401)
29. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:CSC/N9402)

Second Year

30. Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. (NOS:AGR/N1119)
31. Check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator. (NOS:AGR/N9430)
32. Troubleshoot & Test the functionality of major components and assemblies of disc harrows (Off set Type/Double action and single action) and Power harrows. (NOS:AGR/N1119)
33. Check and service proper functionality of major components and assemblies of cultivators and soil forming equipments. (NOS:AGR/N1119)
34. Identify and check functionality of major components and assemblies of Lazar leveller, trencher & post hole digger. (NOS:AGR/N9431)
35. Dismantle, assemble and troubleshoot seed drills. (NOS:AGR/N9432)
36. Test and verify functions of major components and assemblies of planters and fertilizer applicators. (NOS:AGR/N9433)
37. Identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump. (NOS:AGR/N1114)
38. Service irrigation valves and hydrants. (NOS:AGR/N1006)
39. Service and Trouble shoot power tillers/power weeder. (NOS:AGR/N1111)
40. Identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors. (NOS:AGR/N9434)
41. Identify and trouble shoot faults in major components and assemblies of sprayers & dusters. (NOS:AGR/N9435)
42. Detect and troubleshoot major components and assemblies of reaper, reaper winder, straw- reapers. (NOS:AGR/N9436)
43. Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator. (NOS:AGR/N9437)
44. Identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit. (NOS:AGR/N1105)
45. Test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter. (NOS:AGR/N9438)

46. Detect and rectify functionality of major components and assemblies of rotary harvester, hay bailer. (NOS:AGR/N9439)
47. Find and troubleshoot major components and assemblies of groundnut digger, potato / onion digger. (NOS:AGR/N9440)
48. Service and troubleshoot winnower, cleaner & grader. (NOS:AGR/N9441)
49. Maintain and service rice huller, polisher, feed grinder-cum-mixer, hammer mill. (NOS:AGR/N9442)
50. Detect and rectify functionality of grain handling seed treating and drying equipment. (NOS:AGR/N9443)
51. Read and apply engineering drawing for different application in the field of work. (NOS:CSC/N9401)
52. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.(NOS:CSC/N9402)

6. ASSESSMENT CRITERIA

| LEARNING OUTCOMES | ASSESSMENT CRITERIA |
|--|--|
| First Year | |
| 1. Make choices to carry out marking of the components for basic fitting operations in the workshop following safety precautions. (NOS:ASC/N1404) | Mark according to drawings by using marking tools on the work pieces. |
| | Chip the job in accordance with standard specifications and tolerances. |
| | Measure all dimensions in accordance with standard specifications and tolerances. |
| 2. Perform precision measurements on the components and compare parameters with specifications used in automotive workshop practices. (NOS:ASC/N1406) | Measure all dimensions in accordance with standard specifications and tolerances by using precision measuring instruments. |
| | Measure the parameters related with the vehicle components for its effective operation by matching with manufacturer's specification using different gauges. |
| 3. Use of different types of fastening and locking devices in a vehicle. (NOS:ASC/N1405) | Identify the different type of fasteners and locking devices used in the vehicle. |
| | Use different types of locking devices correctly. |
| | Specify the bolt and nut threads. |
| | Practice on removing the damaged studs and bolts. |
| 4. Use cutting tools in the workshop, following safety precautions while grinding. (NOS:PSC/N0136) | Identify cutting tool materials and their application. |
| | Plan and grind cutting and marking tools. |
| | Measure the tool angles with gauges. |
| 5. Use different types of tools and workshop equipment in the workshop. (NOS:AGR/N1126) | Identify the different types of hand and power tools used in the automotive workshop. |
| | Operate various tools and workshop equipment. |
| 6. Perform basic fitting | Mark according to drawing by using marking tools on flat |

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| <p>operations used in the workshop practices and inspection of dimensions. (NOS:ASC/N1438)</p> | surfaces. |
| | Hack saw and file the job using different methods and perform in accordance with the standard specifications and tolerances. |
| | Drilling and reaming on flat surfaces. |
| | Identify and use hand tools for internal and external threading with taps and dies. |
| | Measure all dimensions in accordance with standard specification and tolerances. |
| | |
| <p>7. Produce sheet metal components using various sheet metal operations. (NOS:AGR/N9426)</p> | Ascertain and select tools and materials for the job and make this available for use in a timely manner. |
| | Plan and organize the work for different types of sheet metal operations. |
| | Mark according to drawing by using marking tools on flat surfaces. |
| | Produce components as per the drawing. |
| | |
| <p>8. Construct electrical circuits and test its parameters by using electrical measuring instruments. (NOS:ASC/N1420)</p> | Plan and organize the work for basic electrical operations. |
| | Select the tools, instruments and materials required to do the job. |
| | Comply with safety rules when performing the basic electrical operations. |
| | Perform electrical wire joints, form electrical circuits and test basic electrical parameters as per the circuit drawings and operating procedures. |
| | |
| <p>9. Perform basic electrical testing in a vehicle. (NOS:AGR/N1129)</p> | Plan and organize the work for auto electrical component testing. |
| | Tracing the auto electrical components in a vehicle. |
| | Test continuity and voltage drop in the electrical circuits. |
| | Operate the electrical components in a vehicle and test lamps. |
| | |
| <p>10. Perform battery testing and charging operations. (NOS:AGR/N1129)</p> | Ascertain and select tools and materials for the job. |
| | Comply with safety rules when performing the following operations. |
| | Plan and select different methods for charging the battery. |
| | Perform battery testing as per the operating procedure. |

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| 11. Construct basic electronic circuits and testing. (NOS:ASC/N1435) | Plan and select different types of basic electronic components and measuring instruments. |
| | Construct and test the basic electronic gate circuits and its components as per the standard procedure. |
| 12. Manufacture components with different types of welding processes in the given job. (NOS:AGR/N9429) | Plan and select appropriate method to produce components with welding process. |
| | Comply with safety rules when performing the above operations. |
| | Mark according to the drawing using marking tools on the job. |
| | Select appropriate tools and equipment to perform the above operations. |
| | Set up and produce component as per standard operating procedure. |
| 13. Inspect the auto component using Non-destructive testing methods. (NOS:AGR/N1126) | Classify different vehicle components by its manufacturing processes |
| | Ascertain and select tools and equipment to do NDT test the given job. |
| | Plan and organize the work for nondestructive testing. |
| | Perform different types of nondestructive tests using appropriate testing equipment. |
| | Observe safety/precaution during testing the job. |
| 14. Identify the hydraulic and pneumatic components in a vehicle. (NOS:AGR/N1129) | Comply with safety rules when performing the following operations. |
| | Locate and identify the hydraulic components in a vehicle. |
| | Locate and identify the pneumatic components in a vehicle. |
| 15. Demonstrate major assemblies of Tractor. (NOS:AGR/N1130) | Ascertain and select tools and materials for the job and make this available for use in a timely manner. |
| | Identify different gauges fitted on the dashboard and check for proper functioning |
| | Perform daily checks before starting the engine. |
| | Start the engine and allow it to warm up. |
| | Identify the problem in functionality of particular Gauge fitted on dashboard and record the reading and compare it with |

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| | standard reading. |
| | Repair / Replace the defective gauges as per standard operating practice. |
| | Check for proper functionality. |
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| 16. Overhaul Diesel Engine of Tractor. (NOS:AGR/N1128) | Ascertain and select tools and materials for the job and make this available for use in a timely manner. |
| | Plan work in compliance with standard safety norms. |
| | Demonstrate possible solutions and agree tasks within the team. |
| | Drain coolant and lubricants from the engine and remove accessories of engine. |
| | Service cylinder head assembly. |
| | Service Oil Sump and Oil Pump. |
| | Service Piston and connecting Rod Assembly. |
| | Service Flywheel, Crank shaft, camshaft and its Bearings and gear. |
| | Service cylinder block. |
| | Check and adjust valve clearances as per procedure and recommended specification. |
| | Refit all the accessories. |
| | Refill all the required coolant and lubricants as per standard specification. |
| | Start the engine and observe reading of dashboard gauges and record Engine Performance. |
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| 17. Perform servicing of Cooling and Lubrication system of Tractor in a workshop. (NOS:AGR/N1128) | Check Engine Coolant and Reverse flush the cooling system using flushing solution. |
| | Service Radiator and radiator cap |
| | Check Radiator hoses for crack and replace if necessary. |
| | Test Thermostat valve for proper functioning as per manufacturer specification and replace if necessary. |
| | Check water pump for serviceability and replace if faulty. |
| | Check Fan/Alternator Belt for proper tension. |
| | Check & Replace Engine Oil |
| | Replace Oil Filter & oil pump |
| Service Oil Cooler and pressure relief valve | |
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| 18. Service Intake and Exhaust System of Tractor in a workshop. (NOS: AGR/N1128) | Service/Replace Air Cleaner |
| | Overhaul Air Compressor |
| | Overhaul Exhauster Assembly |
| | Service Turbo charger/Super charger as per manufacturer specification. |
| | Service Intercooler. |
| | Check Exhaust Leakages and Rubber Mounting of Exhaust System. |
| | Service Exhaust manifold. |
| | Check and Replace Catalytic Converter. |
| Check and Replace Resonator/Muffler. | |
| 19. Service Fuel Feed System of Tractor in a workshop. (NOS:AGR/N1128) | Tune up Petrol Engine Tractor as per manufacturer specification |
| | Check leakages in Diesel/Petrol fuel line. |
| | Service Fuel Tank and fuel filter |
| | Service Fuel Feed Pump/Petrol Fuel Pump |
| | Set Diesel Fuel Injection Pump Timing as per manufacturer specification |
| | Bleed the Fuel System to vent out any air trapped. |
| | Start the Engine and check for proper functioning as per standard guidelines specified by manufacturer. |
| 20. Overhaul Clutch and Gearbox of Tractor in a workshop. (NOS:AGR/N1129) | Ascertain and select tools and equipment for the job and make this available for use in a timely manner. |
| | Plan work in compliance with standard safety norms. |
| | Adjust clutch pedal free play and check its performance. |
| | Monitor performance of Clutch and Gearbox by operating vehicle. |
| | Service Clutch, Gearbox and Driveline of tractor. |
| | Refit Clutch, Gearbox and Auxiliary Gearbox to the Tractor and check performance as per standard guidelines. |
| 21. Overhaul Differential and PTO Unit of Tractor in the workshop. (NOS:AGR/N1129) | Ascertain and select tools and equipment for the job and make this available for use in a timely manner. |
| | Plan work in compliance with standard safety norms. |
| | Service Differential unit of the tractor |
| | Service PTO unit of the tractor. |

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| 22. Overhauling Steering system of Tractor in the workshop. (NOS:AGR/N1129) | Inspect steering linkages for excessive play. |
| | Service Steering Gear Box of the Tractor. |
| | Remove front Axle assembly from the Tractor. |
| | Repair Front Axle Assembly as per guidelines laid down by manufacturer |
| | Refit Front Axle Assembly and check for proper functioning as per manufacturer's guidelines. |
| | Check front and rear suspension for proper functioning and abnormal noise. |
| | Service front and rear suspension system. |
| | Refit the front and rear suspension to the tractor and check for proper functioning as per manufacturer's specification. |
| 23. Carryout Repair of Wheels and Tyres of Tractor in the Workshop. (NOS:AGR/N1129) | Check and service Rim, tires and tube and perform repair/replace if necessary. |
| | Inflate tires as per manufacturer recommended inflation pressure. |
| 24. Overhaul Brake system of Tractor in the workshop. (NOS:AGR/N1129) | Test the brake of tractor for effectiveness. |
| | Service Brake. |
| | Remove Hydraulic Brake cylinder. |
| | Service Hydraulic brake cylinder. |
| | Bleed the brake system. |
| 25. Overhaul Major Assemblies of Power Tiller and carryout Field Operation. (NOS:AGR/N1108) | Remove major assemblies of Power tiller. |
| | Dismantle Transmission, clutch and brake |
| | Clean and Replace/Repair components of Transmission, clutch and brake. |
| | Assemble Transmission, clutch and brake components. |
| | Refit the Transmission, clutch and brake to the Power Tiller. |
| | Carryout field operation of Power tiller without implements. |
| 26. Overhaul Implements of Tractor. (NOS:AGR/N1119) | Check Plough, Harrows, cultivator, seed drill and tractor trailer for proper functioning. |
| | Carryout Service of Plough, Harrows, cultivator, seed drill and tractor trailer. |
| | Perform hitching practice (Single & Three Point). |

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| | Adjust agricultural implements for correct functioning during field operations. |
| 27. Overhaul Charging and Starting System of Tractor. (NOS:AGR/N1129) | Check Charging system for proper functioning as per manufacturer guidelines. |
| | Service alternator. |
| | Refit Alternator to the tractor and check for functioning. |
| | Check starting system for proper functioning as per manufacturer guidelines. |
| | Service starter. |
| | Refit starter to the tractor and check for functioning. |
| 28. Read and apply engineering drawing for different application in the field of work. (NOS:CSC/N9401) | Read & interpret the information on drawings and apply in executing practical work. |
| | Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters. |
| | Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work. |
| 29. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:CSC/N9402) | Solve different mathematical problems |
| | Explain concept of basic science related to the field of study |
| SECONDYEAR | |
| 30. Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. (NOS:AGR/N1119) | Select, care and use of PPE while dismantling and assembling of Mould Board plough. |
| | Use the tools and equipment in the way specified by manufacturers to dismantle and assemble Mould Board plough. |
| | Dismantle and assemble Mould Board/disc plough by reviewing technical data of removal and replacement procedures as per. |
| | Measure and adjust Horizontal & Vertical suction. |
| | Select and use safety measures while dismantling and assembling of disc plough. |

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| | <p>Measure and adjust disc and tilt angle.</p> <p>Identify the common fault and take corrective action for tillage system as per technical manual.</p> <p>Use testing methods that comply with the manufacturer's requirements.</p> <p>Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements.</p> <p>Ensure replaced components and assemblies conform to the specified operating specification.</p> |
| 31. Check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator. (NOS:AGR/N9430) | <p>Select and use PPE while dismantling and assembling chisel plough.</p> <p>Select tools and materials for the job and make this available for use in a timely manner.</p> <p>Use the tools and equipment in the way specified by manufacturers to dismantle and assemble chisel plough.</p> <p>Dismantle and assemble chisel plough. by reviewing: Technical data removal and replacement procedures.</p> <p>Carryout hitching of sub soiler/ chisel plough.</p> <p>Use the tools and equipment in the way specified by manufacturers to dismantle and assemble rotavator.</p> <p>Dismantle and assemble rotavator by reviewing: Technical data for removal and replacement procedures complying.</p> <p>Carry out workshop adjustments of rotavator</p> <p>Identify the common fault and take corrective action for rotavator system as per technical manual</p> <p>Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements.</p> |
| 32. Troubleshoot & Test the functionality of major components and assemblies of disc harrows (Off set Type/ Double action and single action) and Power harrows. | <p>Use PPE, tools and equipment as per manufacturer's specified way while dismantling and assembling of disc harrows.</p> <p>Dismantle and assemble disc harrows.</p> <p>Measure and adjust gang angle.</p> <p>Perform Depth adjustment and side deflector.</p> <p>Identify the common fault and take corrective action for harrows system as per technical manual.</p> |

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| (NOS:AGR/N1119) | Adjust the units components correctly where necessary to ensure that they operate to meet the specified operating requirements. |
| | Ensure replaced components and assemblies conform to the specified operating specification. |
| 33. Check and service proper functionality of major components and assemblies of cultivators and soil forming equipments. (NOS:AGR/N1119) | Select and use PPE while dismantling and assembling of cultivators. |
| | Select tools and materials for the job and make this available for use in a timely manner. |
| | Use the tools and equipment in the way specified by manufacturers to dismantle and assemble cultivators. |
| | Dismantle and assemble cultivator by reviewing: Technical data for removal and replacement procedures. |
| | Carryout setting of cultivator as per flow diagram. |
| | Identify the common fault and take corrective action for cultivator system as per technical manual |
| | Ensure replaced components and assemblies conform to the specified operating specification. |
| | Dismantle and assemble levelers, scrapers/ blade terracer, ditchers and bund formers/dozer/dumper by reviewing technical data removal and replacement procedures. |
| Carryout servicing of post hole digger as per technical manual. | |
| 34. Identify and check functionality of major components and assemblies of Lazar leveller, trencher & post hole digger. (NOS:AGR/N9431) | Use PPE while dismantling and assembling of Lazar leveler, trencher & post hole digger. |
| | Select tools and materials for the job and make this available for use in a timely manner |
| | Use the tools and equipment in the way specified by manufacturers to Dismantle and assemble of Lazar leveler, trencher & post hole digger. |
| | Dismantle and assemble Lazar leveler, trencher & post hole digger by reviewing technical data removal and replacement procedures. |
| 35. Dismantle, assemble and troubleshoot seed drills. (NOS:AGR/N9432) | Use the tools and equipment in the way specified by manufacturers to Dismantle and assemble of seed drills |
| | Carryout their Dismantling and assembling of seed drills by |

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| | <p>reviewing technical data removal and replacement procedures.</p> <p>Carryout Calibration of seed & fertilizer rates.</p> <p>Carryout Workshop adjustments of special drills such as zero till strip drill/rotto drill & Happy seeder.</p> <p>Identify the common fault and take corrective action for seed drills as per technical manual.</p> |
| 36. Test and verify functions of major components and assemblies of planters and fertilizer applicators. (NOS:AGR/N9433) | <p>Select and use PPE while dismantling and assembling of planters.</p> <p>Select tools and materials for the job and make this available for use in a timely manner</p> <p>Use the tools and equipment in the way specified by manufacturers to dismantle and assembles of planters</p> <p>Carryout dismantling and assembling of planters by reviewing technical data for removal and replacement procedures.</p> <p>Set planter with different seed plates & adjust for planting.</p> <p>Carryout vegetable trans planter adjustments.</p> <p>Carryout raising bed and adjustments of paddy trans planter.</p> <p>Dismantle and assemble fertilizer applicators by reviewing given technical data parameters.</p> <p>Carryout calibration of fertilizer applicators.</p> |
| 37. Identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump. (NOS:AGR/N1114) | <p>Use PPE while dismantling and assembling of volute type centrifugal pump.</p> <p>Select tools and materials for the job and make this available for use in a timely manner</p> <p>Use the tools and equipment in the way specified by manufacturers to dismantle and assembles volute type centrifugal pump.</p> <p>Dismantle and assemble volute type centrifugal pump by reviewing technical data for removal and replacement procedures.</p> <p>Carryout adjustments process of centrifugal pump.</p> <p>Measure discharge of water.</p> |
| 38. Service irrigation valves and hydrants. (NOS: AGR/N1006) | <p>Use PPE while servicing of irrigation valves and hydrants.</p> <p>Select tools and materials for the job and make this available for use in a timely manner</p> |

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| | Use the tools and equipment in the way specified by manufacturers' servicing of irrigation valves and hydrants. |
| | Carryout installation of sprinkler, fogger, pop-up and dippers by reviewing technical data removal and replacement procedures. |
| | Carryout Field operation & adjustment (angular/ full circle). |
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| 39. Service and Trouble shoot power tillers/power weeder. (NOS: AGR/N1111) | Use PPE while servicing of Power tiller/power weeder. |
| | Use the tools and equipment in the way specified by manufacturers to Servicing of Power tiller/power weeder. |
| | Carryout Field operation with different attachments and adjustments by reviewing technical data for removal and replacement procedures. |
| | Identify the common fault and take corrective action for power tillers/power weeder as per technical manual. |
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| 40. Identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors. (NOS:AGR/N9434) | Use PPE while dismantling and assembling of cultivator. |
| | Select tools and materials for the job and make this available for use in a timely manner. |
| | Use the tools and equipment in the way specified by manufacturers to dismantle and assembles of cultivator. |
| | Carryout their Dismantling and assembling of cultivator by reviewing technical data for removal and replacement procedures. |
| | Carryout Adjustment of the cultivator with the help of flow diagrams. |
| | To carryout Setting of shovels and sweeps. |
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| 41. Identify and trouble shoot faults in major components and assemblies of sprayers & dusters. (NOS:AGR/N9435) | Select and use PPE while dismantling and assembling of Sprayers & dusters. |
| | Select tools and materials for the job and make this available for use in a timely manner |
| | Use the tools and equipment in the way specified by manufacturers to dismantle and assemble sprayers & dusters. |
| | Carryout their Dismantling and assembling sprayers & dusters by reviewing technical data removal and replacement procedures. |
| | Carryout Calibration of sprayers and dusters |

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| | Carryout Field adjustment and operation of sprayers and dusters |
| | Identify the common fault and take corrective action for sprayers & dusters as per technical manual. |
| | Follow the safety procedure while handling insecticides and pesticides |
| | Conduct appropriate and target oriented discussions with higher authority and within the team, where a replacement is uneconomic or unsatisfactory to perform |
| | Use testing methods that comply with the manufacturers requirements. |
| | Adjust the units components correctly where necessary to ensure that they operate to meet the specified operating requirements. |
| 42. Detect and troubleshoot major components and assemblies of reaper, reaper winder, straw-reapers. (NOS:AGR/N9436) | Use PPE while dismantling and assembling of reaper, reaper winder, straw-reapers |
| | Use the tools and equipment in the way specified by manufacturers to dismantle and assembles of reaper, reaper winder, straw-reapers as per given technical data. |
| | Carryout Field adjustment and operation of reaper, reaper winder, straw-reapers |
| | Identify the common fault and take corrective action for reaper, reaper winder, straw-reapers as per technical manual. |
| | Conduct appropriate and target oriented discussions with higher authority and within the team, where replacement is uneconomic or unsatisfactory to perform. |
| | Use testing methods that comply with the manufacturer's requirements. |
| | Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements. |
| 43. Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut | Demonstrate care and use of PPE while dismantling and assembling of Thresher, Maize seller, Ground nut decorticator |
| | Select tools and materials for the job and make this available for use in a timely manner |
| | Dismantle and assemble Thresher, Maize seller, Ground nut |

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| decorticator. (NOS:AGR/N9437) | decorticator by reviewing the technical data as per removal and replacement procedures complying. |
| | Carryout Field adjustment and operation of Thresher, Maize seller, Ground nut decorticator |
| | Identify the common fault and take corrective action for Thresher, Maize seller, Ground nut decorticator as per technical manual. |
| 44. Identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit. (NOS:AGR/N1105) | Demonstrate care and use of PPE while dismantling and assembling of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit. |
| | Select tools and materials for the job and make this available for use in a timely manner |
| | Use the tools and equipment in the way specified by manufacturers to dismantle and assemble of combine harvester- cutter bar assembly, feeder unit, threshing unit. |
| | Carryout dismantling and assembling of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit as per given technical data. |
| | Carryout workshop adjustment for combine harvester. |
| | Compute grain loses. |
| 45. Test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter. (NOS:AGR/N9438) | Use PPE while dismantling and assembling of mower, folder harvester, power chaff/silage cutter. |
| | Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles of power, folder harvester, power chaff/silage cutter. |
| | Carryout dismantling and assembling of mower, folder harvester, power chaff/silage cutter by reviewing the technical data. |
| | Carryout Field operation and workshop adjustment for mower, folder harvester, power chaff/silage cutter |
| | Identify the common fault and take corrective action for mower, folder harvester, power chaff/silage cutter. |
| | Adjust the units components correctly where necessary to ensure that they operate to meet the specified operating requirements. |
| | Identify the common fault and take corrective action for rotary |

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| | harvester, hay bailer as per technical manual. |
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| 46. Detect and rectify functionality of major components and assemblies of rotary harvester, hay bailer. (NOS:AGR/N9439) | Select and use PPE dismantling and assembling of rotary harvester, hay bailer. |
| | Select tools and materials for the job and make this available for use in a timely manner. |
| | Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles rotary harvester, haybailer. |
| | Dismantle and assemble rotary harvester, haybailer as per the technical data for removal and replacement procedures. |
| | Carryout Field operation and workshop adjustment for rotary harvester, hay bailer. |
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| 47. Find and troubleshoot major components and assemblies of groundnut digger, potato / onion digger. (NOS:AGR/N9440) | Demonstrate care and use of PPE while dismantling and assembling of groundnut digger, hay bailer, potato /onion digger. |
| | Select tools and materials for the job and make this available for use in a timely manner |
| | Use the tools and equipment in the way specified by manufacturers to dismantle and assembles groundnut digger, haybailer, potato / onion digger |
| | Carryout dismantling and assembling of groundnut digger, hay bailer, potato /onion diggerby reviewing technical data of removal and replacement procedures. |
| | Carryout Field operation and workshop adjustment for groundnut digger, hay bailer, potato / onion digger. |
| | Identify the common fault and take corrective action for groundnut digger, hay bailer, potato / onion digger as per technical manual. |
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| 48. Service and troubleshoot winnower, cleaner & grader. (NOS:AGR/N9441) | Demonstrate care and use of PPE while servicing of winnower, cleaner & grader. |
| | Use the tools and equipment in the way specified by manufacturers to service winnower, cleaner & grader. |
| | Carryout their adjustments of winnower, cleaner & grader by reviewing technical data for removal and replacement procedures. |

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| | Carryout Field operation and workshop adjustment for winnower, cleaner & grader. |
| | Identity the common fault and take corrective action for winnower, cleaner & grader as per technical manual. |
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| 49. Maintain and service rice huller, polisher, feed grinder-cum-mixer, hammer mill. (NOS: AGR/N9442) | Select and use PPE while servicing of rice huller, polisher, feed grinder-cum-mixer, hammer mill. |
| | Select tools and materials for the job and make this available for use in a timely manner |
| | Carryout their adjustments of rice huller, polisher, feed grinder- cum-mixer, hammer mill by reviewing technical data removal and replacement procedures. |
| | Carryout operation of rice huller, polisher, feed grinder-cum-mixer, hammer mill. |
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| 50. Detect and rectify functionality of grain handling seed treating and drying equipment. (NOS:AGR/N9443) | Identify the common fault and take corrective action for rice huller, polisher, feed grinder-cum-mixer, hammer mill as per technical manual. |
| | Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements. |
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| 51. Read and apply engineering drawing for different application in the field of work. (NOS:CSC/N9401) | Read & interpret the information on drawings and apply in executing practical work. |
| | Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters. |
| | Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work. |
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| 52. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:CSC/N9402) | Solve different mathematical problems |
| | Explain concept of basic science related to the field of study |
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7. TRADE SYLLABUS

| SYLLABUS – MECHANIC AGRICULTURAL MACHINERY | | | |
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| FIRST YEAR | | | |
| Duration | Reference Learning Outcome | Professional Skills (Trade Practical) | Professional Knowledge (Trade Theory) |
| Professional Skill 76 Hrs.; Professional Knowledge 14 Hrs. | Make choices to carry out marking of the components for basic fitting operations in the workshop following safety precautions. | <ol style="list-style-type: none"> 1. Familiarization with institute, Job opportunities in the auto mobile sector, Machinery used in Trade. 2. Types of work done by the students in the shop floor. 3. Practical related to Safety and Health, Importance of maintenance and cleanliness of Workshop. 4. Interaction with health centre and fire service station to provide demo on First aid and Fire safety, Use of fire extinguishers. 5. Demonstration on safe handling and Periodic testing of lifting equipment, and Safety disposal of used engine oil. | <p>Admission & introduction to the trade: Introduction to the Course duration, course content, study of the syllabus. General rule pertaining to the Institute, facilities available- Hostel, Recreation, Medical and Library working hours and timetable .</p> <p>Occupational Safety & Health Importance of Safety and general Precautions to be observed in the shop. Basic first aid, safety signs- for Danger, Warning, caution & personal safety message. Safe handling of Fuel Spillage, Fire extinguishers used for different types of fire. Safe disposal of toxic dust, safe handling and Periodic testing of lifting equipment, Authorization of Moving & road-testing vehicles. Safety disposal of Used engine oil, Electrical safety tips.</p> |
| | | 6. Practice using all marking aids, like | Hand & Power Tools: -Marking scheme, Marking material-chalk, |

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| | | <p>steel rule with spring calipers, dividers, scribe, punches, Chisel etc.</p> <p>7. Layout a work piece - for line, circle, arcs and circles.</p> <p>8. Practice to measure wheel base of a vehicle with measuring tape.</p> <p>9. Practice to measure valve spring tension using spring tension tester Practice to remove wheel nuts with use of an air impact wrench Practice on General workshop tools & power tools.</p> | <p>Prussian blue. Cleaning tools- Scraper, wire brush, Emery paper, Description, care and use of Surface plates, steel rule, measuring tape, try square. Calipers- inside and outside. Dividers, surface gauges, scribe, punches- prick punch, center punch, pin punch, hollow punch, number and letter punch. Chisel- flat, crosscut. Hammer- ball peen, lump, mallet. Screw drivers- blade screwdriver, Phillips screw driver Ratchet screwdriver. Allen key, bench vice & C-clamps, Spanners- ring spanner, open end spanner & the combination spanner, universal adjustable open end spanner. Sockets & accessories, Pliers- Combination pliers, multi grip, long nose, flat-nose, Nippers or pincher pliers, Side cutters, Tin snips, Circlip pliers, external circlip pliers. Air impact wrench, air ratchet, wrenches- Torque wrenches, pipe wrenches, car jet washers Pipe flaring & cutting tool, pullers- Gear and bearing.</p> |
| <p>Professional Skill 56 Hrs.;</p> <p>Professional Knowledge 15 Hrs.</p> | <p>Perform precision measurements on the components in automotive workshop practices.</p> | <p>10. Practice on measuring the various components using precision instruments Vernier Caliper, Micrometer, Dial Bore Gauge, Telescopic Gauge, Feeler Gauge,</p> | <p>Systems of measurement, Description, care & use of- Micrometers- Outside and depth micrometer, Micrometer adjustments, Vernier calipers, Telescope gauges, Dial bore gauges, Dial indicators, straight edge, feeler gauge, thread</p> |

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| | | Pressure Gauge, Dial Test Indicator by given Job. | pitchgauge,vacuumgauge,tirepressuregauge. |
| Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs. | Use different types of fastening and locking devices in a vehicle. | 11. Practice on General cleaning, checking and use of nut, bolts, & studs etc. 12. Removal of stud/bolt from blind hole. | Fasteners -Study of different types of screws, nuts, studs & bolts, locking devices, such as lock nuts, cotter, split pins, keys, circlips, lock rings, lock washers and locating where they are used. Washers & chemical compounds can be used to help secure these fasteners. Function of Gaskets, Selection of materials for gaskets and packing, oil seals. |
| Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs. | Use cutting tools in the workshop, following safety precautions while grinding. | 13. Practice on cutting tools like Hacksaw, file, chisel, Sharpening of Chisels, center punch, safety precautions while grinding. 14. Practice on Hacksawing and filing to give dimensions. | Cutting tools :- Study of different type of cutting tools like Hacksaw, File- Definition, parts of a file, specification, Grade, shape, different type of cut and uses., OFF-hand grinding with sander, bench and pedestal grinders, safety precautions while grinding. |
| Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs. | Use different types of tools and workshop equipment in the workshop. | 15. Practice on Marking and Drilling clear and Blind Holes, Sharpening of Twist Drills Safety precautions to be observed while using a drilling machine. | Limits, Fits & Tolerances : - Definition of limits, fits & tolerance with examples used in auto components. Drilling machine - Description and study of Bench type Drilling machine, Portable electrical Drilling machine, drill holding devices, Work Holding devices, Drill bits. |
| Professional Skill 14 Hrs.; Professional Knowledge | Perform basic fitting operations used in the workshop practices | 16. Practice on Tapping a Clear and Blind Hole, Selection of tap drill Size, use of Lubrication, | Taps and Dies : Hand Taps and wrenches, Calculation of Tap drill sizes for metric and inch taps. Different type of Die |

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| knowledge05Hrs. | and inspection of dimensions. | Use of stud extractor. 17. Cutting Threads on a Bolt/ Stud. 18. Adjustment of two - piece Die, reaming a hole/ Bush to suit the given pin/ shaft, scraping a given machined surface. | andDiestock.Screwextractors. HandReamers- DifferentTypeofhandreamers,Dri llsizeforreaming,Lapping,Lappin gabrasives,typeofLaps. |
| ProfessionalSkill7 Hrs.; ProfessionalKnowledge01Hrs. | Produce sheet metal components using various sheet metal operations. | 19. Brazing of Pipes. | Brazing.fluxesusedoncommonjoints. |
| ProfessionalSkill 14 Hrs.; ProfessionalKnowledge07Hrs. | Construct electrical circuits and test its parameters by using electrical measuring instruments. | 19.Practicein joining wiresusing soldering Iron,Constructionofsimpleelectrical circuits,measuringofcurrent,voltageandresistanceusingdigitalmultimeter ,practice continuity test forfuses,jumperwires,fusiblelinks,circuitbreakers. | Basicelectricity, Groundconnections,Multimeter,Conductors &insulators,Wires,Shielding,Length vs. resistance, Resistorratings. |
| ProfessionalSkill14 Hrs.; ProfessionalKnowledge03Hrs. | Perform basic electrical testing in a vehicle. | 20.Diagnoseseries,parallel,series-parallel circuitsusingOhm'slaw,checkelectrical circuit with a testlamp,performvoltage drop test in circuits usingmultimeter, measurecurrentflowusing multimeter/ammeter,useofservicemanualwiringdiagram for | Fuses&circuitbreakers,Ballast resistor, Stripping wireinsulation, cable colour codesandsizes,Resistorsin Seriescircuits,Parallelcircuitsand Series-parallel circuits, Capacitors and itsapplications, Capacitorsinseriesandparallel. |

| | | Troubles hooting. | |
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| Professional Skill 28 Hrs.; Professional Knowledge 03 Hrs. | Perform battery testing and charging operations. | 21. Cleaning and topping up of a lead acid battery, Testing battery with hydrometer, connecting battery to charger for battery charging, Inspecting & testing a battery after charging, Measure and Diagnose the cause(s) of excessive Key-off battery drain (parasitic draw) and do corrective action. 22. Testing of relay and solenoids and its circuit. (12 hrs.) | Description of Batteries & cells, Lead acid batteries & Stay Maintenance Free (SMF) batteries, Thermistors, Thermocouples, Relays, Solenoids, Charging system circuit |
| Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs. | Construct basic electronic circuits and testing. | 23. Identify and test power and signal connectors for continuity, Identify and test different types of Diodes, NPN & PNP Transistors for its functionality, Construct and test simple logic circuits OR, AND & NOT and Logic gates using switches. | Basic electronics: Description of Semiconductors, Solid state devices - Diodes, Transistors, Thyristors, Unijunction Transistors (UJT), Metal Oxide Field Effect Transistors (MOSFETs), Logic gates - OR, AND & NOT and Logic gates using switches. |
| Professional Skill 14 Hrs.; Professional Knowledge 3 Hrs. | Manufacture components with different types of welding processes in the given job. | 24. Setting of Gas welding flames, practice to make a straight beads and joints Oxy-Acetylene welding | Introduction to welding and Heat Treatment Welding processes - Oxy-Acetylene welding - principles, equipment, welding parameters, edge preparation & fit up and welding techniques. |
| Professional Skill 56 Hrs.; Professional Knowledge 6 Hrs. | Identify the hydraulic and pneumatic components in a vehicle. | 25. Identification of Hydraulic components used in vehicle. 26. Tracing of hydraulic circuit on hydraulic jack, hydraulic power steering, and | Introduction to Hydraulics & Pneumatics: - Definition of Pascal law, pressure, Force, viscosity. Description, symbols and application in automobile of Gear Pump - Internal & External, single acting, |

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| | | <p>Brake circuit.</p> <p>27. Identification of different type of Vehicle.</p> <p>28. Demonstration of vehicles specification data; Identification of vehicle information Number (VIN).</p> <p>29. Demonstration of Garage, Service station equipments. - Vehicle hoists - Two post and four post hoist, Engine hoists, Jacks, Stands.</p> | <p>double acting & Double ended cylinder; Directional control valves - 2/2, 3/2, 4/2, 4/3 way valve, Pressure relief valve, Non return valve, Flow control valve used in automobile. (03 Hrs.)</p> <p>Auto Industry - History, leading manufacturers, development in automobile industry, trends, new product. Brief about Ministry of Road transport & Highways, Definition:-</p> <p>Classification of vehicles on the basis of load as per central motor vehicle rule, wheels, final drive, and fuel used, axles, position of engine and steering transmission, body and load. Brief description and uses of Vehicle hoists - Two post and four post hoist, Engine hoists, Jacks, Stands.</p> |
| <p>Professional Skill 56 Hrs.;</p> <p>Professional Knowledge 6 Hrs.</p> | <p>Demonstrate Major Assemblies of different types of Tractor.</p> | <p>30. Demonstration of tractors specification data.</p> <p>31. Identification of different major assemblies of tractor and cleaning of tractors, oil greasing and lubricating all moving parts of tractor.</p> <p>32. Practice on starting and stopping of tractor engine.</p> <p>33. Dismantling of tractor engine as per procedure & Inspection of components for dimension and wear.</p> | <p>Tractor Industry in India - leading manufacturers, development in Tractor industry, trends, new product. Study of tractors, Different type of Tractor starting method and stopping.</p> <p>Engine Basics: Classification of engines, Principle & working of 2 & 4 stroke diesel engine (Compression Ignition Engine (C.I)), Principle of Spark Ignition</p> |

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| | | | Engine(SI), differentiate between 2-stroke and 4 stroke, C.I engine and S.I Engine, Direct injection and Indirect injection. Brief on common rail diesel injection engine. Engine output, compression pressure, Compression ratio. |
| <p>Professional Skill 77 Hrs.;</p> <p>Professional Knowledge 16 Hrs.</p> | <p>Overhaul Diesel Engine of Tractor.</p> | <p>34. Remove cylinder head from engine.</p> <p>35. Overhauling of cylinder head assembly with use of service manual for clearance and other parameters.</p> <p>36. Practice on removing rocker arm assembly manifolds, fitting of valve guide.</p> | <p>Engine Components- Working principle & construction of cylinder heads, types of combustion chambers. Function of Engine Valves, different types, materials, Type of valve operating mechanism. Importance of Valve seats & inserts, importance of Valve movement, Valve stem, oil seals, Valve-timing diagram and concept of Variable valve timing.</p> |
| | | <p>37. Cylinder block overhaul.</p> <p>38. Measurement of cylinder liner & crankshaft for ovality and taperness.</p> <p>39. Overhauling piston and connecting rod assembly with use of service manual for clearance and other parameters.</p> <p>40. Practice on removing oil sump and oil pump - clean the sump.</p> | <p>Description of Cylinder block, Cylinder block construction, types of cylinder blocks & cylinder liners. Description & functions of different types of pistons, piston rings and piston pins and materials. Used recommended clearances for the rings and its necessity precautions while fitting rings, common troubles and remedy.</p> |
| | | <p>41. Practice on removing the big end bearing, connecting rod with the piston.</p> <p>42. Practice on removing the piston rings, Dismantle the piston and</p> | <p>Description & function of connecting rod, importance of big end split obliquely, Materials used for connecting rods big end & main bearings. Shells piston pins and locking methods of piston pins. Recommended clearances</p> |
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| | | <p>connecting rod.</p> <p>43. Check the side clearance of piston rings in the piston groove & lands for wear.</p> <p>44. Check piston skirt and crown for damage and scuffing, clean oil holes. Measure the piston ring close gap in the cylinder, clearance between the piston and the liner, clearance between crank pin and the connecting rod big end bearing.</p> <p>45. Check connecting rod for bend and twist.</p> <p>46. Setting of Connecting rod big end & main bearing.</p> <p>47. Assembling crankshaft, main bearings, connecting rods and piston assembly in the engine, fitting cylinder head.</p> <p>48. Setting valve timing.</p> | <p>for the cylinder liners & rings. Bearing failure & its causes - care & maintenance.</p> <p>Description of crankshaft & Cam shafts. Types of their drives. Description of Overhead camshaft, importance of Cam lobes. Crankcase ventilation (PCV). Crankshaft, Crankshaft balancing, Firing order of the engine.</p> <p>Description and function of the flywheel and vibration damper. Timing mark.</p> |
| <p>Professional Skill 56 Hrs.;</p> <p>Professional Knowledge 6 Hrs.</p> | <p>Perform servicing of Cooling and Lubrication system of Tractor in a workshop.</p> | <p>49. Checking cooling system for overheating / under-cooling.</p> <p>50. Dismantling, cleaning, assembling & testing of water pumps, reverse flush in the system.</p> <p>51. Checking of thermostat valve, pressure cap. Adjusting the fan belt tension.</p> | <p>Cooling systems: - Purpose, types, Heat transfer method, effect of boiling point & pressure, coolant properties, preparation and recommended change of interval, use of anti-freezer.</p> <p>Cooling system components, water pump, function of thermostat, pressure cap, Recovery system & Thermostat switch. Function & types of Radiator</p> |

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| | | <p>52. Identification of lubrication oil flow circuit in an engine.</p> <p>53. Overhauling oil pump, servicing of oil cooler & centrifugal oil filter.</p> <p>54. Testing oil pressure.</p> | <p>Lubrication system:- purposes & characteristics of oil, type of lubricants, grade as per SAE, & their application, oil additives, type of lubrication system.</p> <p>Lubrication system components- different type of Oil pump, Oil filters & oil cooler. Probable reasons for low/high oil pressure, high oil consumption and their remedies.</p> |
| <p>Professional Skill 28 Hrs.;</p> <p>Professional Knowledge 04 Hrs.</p> | <p>Service Intake and Exhaust System of Tractor in a workshop.</p> | <p>55. Servicing of air cleaner (Oil bath) Checking & changing an air filter.</p> <p>56. Dismantling & assembling of turbocharger, check for axial clearance as per service manual.</p> <p>57. Checking of Exhaust Gas Recirculation.</p> <p>58. Check Exhaust system for rubber mounting for damage, deterioration and out of position; for leakage, loose connection, dent and damage; Practice on Exhaust manifold removal and installation.</p> <p>59. Practice on Catalytic converter removal and installation.</p> | <p>Intake & exhaust systems- Description of Diesel induction & Exhaust systems. Description & function of air compressor, Supercharger, Intercoolers, turbocharger, variable turbocharger mechanism.</p> <p>Intake system components- Description and function of Air cleaners, Different type air cleaner, Description of Intake manifold and material.</p> <p>Exhaust system components- Description and function of Exhaust manifold, Exhaust pipe, Mufflers- Reactive, absorptive, Combination, Electronic mufflers, Catalytic converters, Back pressure, Diesel particulate filter, Exhaust Gas Recirculation (EGR).</p> |
| <p>Professional Skill 56 Hrs.;</p> | <p>Service Fuel Feed System of</p> | <p>60. Practice in engine tune up in a vehicle-</p> | <p>Diesel fuel characteristics, concept of Quiet diesel technology & Clean</p> |

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| <p>Professional Knowledge 7 Hours.</p> | <p>Tractor in a workshop.</p> | <p>testing vacuum and compression of engine,</p> <p>61. Tracing of different parts of fuel system.</p> <p>62. Repairing fuel leaks in pipeline and unions, Servicing and testing of fuel feed pump. Servicing of fuel filters. Servicing of fuel Injection Pump. (8hrs.)</p> <p>63. Servicing of pressure pump of (C.R.D.I.).</p> <p>64. Regulator's and Elect/Electronic injectors, checking operation of C.R.D.I. system. Overhauling & testing of injectors.</p> <p>65. Setting injection timing. Bleeding fuel lines for Airlocks.</p> <p>66. Testing cylinder compression, checking idles speed, Obtaining & interpreting scan tool data.</p> <p>67. Fault finding & remedy, care & maintenance.</p> | <p>diesel technology, Fuel feed system used in Tractor's description and layout. Diesel fuel system components, Description and function of Diesel fuel injection system, types of fuel injection pumps, type of drive, injectors - types and function. Governor and their types. Distributor - type injection pump, Glow plugs, Cummins & Detroit Diesel injection. Diesel electronic control - Dieselelectronic control systems (DEC), Common rail diesel injection System. Method of bleeding fuel supply system.</p> |
| <p>Professional Skill 28 Hrs.; Professional Knowledge 05 Hours.</p> | <p>Overhaul Clutch and Gearbox of Tractor in a workshop.</p> | <p>68. Dismantle clutch assembly.</p> <p>69. Inspect the parts of clutch.</p> <p>70. Relining of clutch plate & assemble.</p> <p>71. Coupling the clutch with fly wheel & join the engine with gearbox.</p> <p>72. Adjust clutch pedal free play. Dismantle gearbox of</p> | <p>Clutch: - types, construction and function. Components of clutch - driver & driven plates, torsion spring, cushion springs, operating fingers, clutch shaft, Slave cylinder & oil seal. Clutch release bearing & linkages.</p> <p>Manual transmissions- Function, description, types and their application.</p> |

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| | | <p>a tractor & inspect the parts.</p> <p>73. Assemble the gear box.</p> <p>74. Overhauling Transfer case and auxiliary gear box.</p> | <p>Gearbox layout.</p> <p>Components of tractor gearbox. Principle of epicyclic gear box.</p> <p>Necessity of torque converter, need of 4 x 4 wheel drive/ Front wheel drive, Low & high gear ratio, universal joint and propeller shaft.</p> |
| <p>Professional Skill 28 Hrs.;</p> <p>Professional Knowledge 07 Hrs.</p> | <p>Overhaul Differential and PTO Unit of Tractor in the workshop.</p> | <p>75. Overhauling of differential.</p> <p>76. Servicing of reduction gear, rear axle wheel hub.</p> <p>77. Servicing of PTO (Power Take Off). Measure rpm of PTO shaft & speed of belt pulley.</p> | <p>Final Drive & Drive Shafts</p> <p>Differential carriers double reduction gearing, differential lock, crown wheel and pinion adjustments, function and types of power take off (PTO) mechanism. Types of front & rear axles. Common trouble and their remedies, care and maintenance.</p> |
| <p>Professional Skill 56 Hrs.;</p> <p>Professional Knowledge 09 Hrs.</p> | <p>Overhaul Steering System of Tractor in the workshop.</p> | <p>78. Checking, Layout of Mechanical steering system. Checking/Inspection of steering linkage and necessary repair.</p> <p>79. Remove steering wheel. Overhauling of steering gearbox of tractor.</p> <p>80. Remove front axle and spindle hub and steering linkage.</p> <p>81. Reassembling steering assembly and Test for correct function.</p> <p>82. Checking, inspect layout of different parts of Hydraulic steering system.</p> <p>83. Practice on visual inspection</p> | <p>Steering Systems-</p> <p>Function and types of steering system.</p> <p>Description, construction and function of mechanical steering system steering wheel, steering gearbox, tie-rod, arms link, ball and socket joints etc. their movement and adjustment. Description and mechanism of foot steering pedal as incorporated in tractors. Description, working and principle of hydraulic steering system. Different parts such as pump, distributor valves, pipe line and hoses etc. Development of mechanical framing. Use of Power tiller, Tractor & Bulldozer, Chassis frame of tractor.</p> |

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| | | <p>onofchassisframeforcra ck,bentand twists.</p> <p>84. Overhauling andInspectionofshackle, front&rearsuspension.</p> <p>85. Lubricatinga suspension system.</p> | |
| <p>ProfessionalSkill28 Hrs.;</p> <p>ProfessionalKnowledge05Hrs.</p> | <p>CarryoutRepairofWhe elsandTyresofTract orintheWorkshop.</p> | <p>86. Removewheelsfromtrac tor.</p> <p>87. Dismantle wheelforcheckingrims,t yresforwear and tubes for leaks.</p> <p>88. Repairing, de- rusting,painting.</p> <p>89. Fitting of tyres and tubeson rim & inflate to correctpressure.</p> <p>90. BalancingofTractorwhe els.Practiceoftyrerotatio n. Fitting wheels ontractors.Tighteningof wheel in correct sequence.</p> <p>91. Checking&adjustingtire pressurebyuseofairorby Nitrogen.</p> | <p>Wheels &Tyres- Description,constructionandfunc tionofWheel.Rimsizes.Types&siz esoftyres.Solid,pneumatic&Radi al.Plyrating.Tyrematerials,Hyster esis&designations,Tyreinformati on,Tyretreaddesigns,Tyreratings fortemperature&traction.Import anceofin- Flattingtyrestocorrectpressure.R epairandmaintenanceoftyresand tubes.Storageoftyres.Descriptio nsTirewearPatterns and causes Nitrogenvsatmosphericairintyres .</p> |
| <p>ProfessionalSkill28 Hrs.;</p> <p>ProfessionalKnowledge09Hrs.</p> | <p>Overhaul Brakesystem of Tractorintheworksh op.</p> | <p>92. Overhauling brakesincludingcleaning andinspection of allcomponents, reliningshoes,settingan dactuatingshoeclearanc e.</p> <p>93. Inspectionspringofboth hoeandlever.</p> <p>94. Inspecting and setting parkingbrakes.</p> <p>95. Inspectingandsettinghy</p> | <p>BrakingSystems- BrakingfundamentalsPrincipleso fbraking, Drum & disc brakes,Lever/mechanicaladvant age,Hydraulicpressure&force,Br ake fade.</p> <p>Braking systems - Brake typeusedontractor- principles,Airbrakes, Brakingsystemcomponents- Park brake system, Brake pedal, Brake lines, Brake</p> |

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| | | <p>draulic main brake including replacement of washers and oil seals.</p> <p>96. Overhauling servomechanism (as applicable) inspecting pistons and valves.</p> <p>97. Bleeding and adjustment of brakes .</p> <p>98. Fault tracing and remedy.</p> <p>99. Skimming of brake drum and disc plate.</p> | <p>fluid, Bleeding, Master cylinder, Divided systems, Tandem master cylinder, Power booster or brake unit, Hydraulic brake booster, Applying brakes, Brake force, Brake light switch</p> <p>Drum brakes & components - Drum brake system, Drum brake operation, Brake linings & shoes, Backing plate, Wheel cylinders Disc brakes & components - Disc brake system, Disc brake operation, Disc brake rotors, Disc brake pads, Disc brake calipers, Proportioning valves, Proportioning valve operation, Brake friction materials.</p> |
| <p>Professional Skill 21 Hrs.;</p> <p>Professional Knowledge 04 Hrs.</p> | <p>Overhaul Major Assemblies of Power Tiller and carry out Field Operation.</p> | <p>100. Overhauling power tiller transmission system includes main clutches, steering clutch/brake mechanism-gear box and wheel hub testing for field operation without implements and with implements.</p> <p>101. Driving practice with trolley/trailer.</p> | <p>Description, working principle & use of power tiller (two wheel tractor) power unit. Method of power transmission to wheel from engine. Main clutch assembling working procedure steering Clutch/brake mechanism method of power transmission to implement (Rotation), irrigation pump, thresher. Hitching of M.B. Plough, trailer disc harrow.</p> |
| <p>Professional Skill 15 Hrs.;</p> <p>Professional Knowledge 06 Hrs.</p> | <p>Overhaul Implement of Tractor.</p> | <p>103. Checking implement such as plough harrows, cultivators, seed drills, tractor trailer, & P.T.O. units etc. for serviceability before use.</p> <p>104. Lubricate them as required. Hitching</p> | <p>Tractor equipment: - Description, function of harrows, cultivators, seed drills & tractor trailer. Hitching of equipment. Danger in overloading & incorrect field operation. Average life of Agriculture implements. Description and function of tractor accessories such as Draw bar, top</p> |

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| | | <p>practice(single&threepoint).</p> <p>105. Exercise in driving a tractor with different implements.</p> | <p>link & Belly Pulley. Setting of drawbar to correct height. Use of Hydraulic lift. Maintenance of tractor accessories.</p> |
| <p>Professional Skill 28 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>Overhaul Charging and Starting System of Tractor.</p> | <p>106. Practice on removing alternator from vehicle dismantling, cleaning checking for defects, assembling and testing formotoring action of alternator & fitting to vehicles .</p> <p>107. Practice on removing starter motor vehicle and overhauling the starter motor, testing of starter motor.</p> <p>108. Servicing storage batteries, tracing lighting circuit fault rectification.</p> | <p>Tractor Electrical Maintenance: Lighting arrangement in tractors (As applicable). Description of charging circuit. Operation of alternator, regulator unit ignition warning lamp troubles and remedy in charging system. Fault finding in electrical system. Description of starter motor circuit , common troubles and remedy in starter circuit. Description of lighting circuit. Charging & discharging of lead acid battery.</p> |
| ENGINEERING DRAWING: 40 HRS. | | | |
| <p>Professional Knowledge</p> <p>ED- 40 Hrs.</p> | <p>Read and apply engineering drawing for different application in the field of work.</p> | <p><u>ENGINEERING DRAWING:</u></p> <p>Introduction to Engineering Drawing and Drawing Instruments – Conventions</p> <p>Sizes and layout of drawing sheets</p> <p>Title Block, its position and content</p> <p>Drawing Instrument</p> <p>Lines- Types and applications in drawing</p> <p>Free hand drawing of –</p> <p>Geometrical figures and blocks with dimension</p> <p>Transferring measurement from the given object to the free hand sketches.</p> <p>Free hand drawing of hand tools and measuring tools.</p> <p>Drawing of Geometrical figures:</p> <p>Angle, Triangle, Circle, Rectangle, Square, Parallelogram.</p> <p>Lettering & Numbering – Single Stroke.</p> <p>Dimensioning</p> <p>Types of arrowhead Leader line with text</p> | |

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| | | <p>Position of dimensioning (Unidirectional, Aligned) Symbolic representation – Different symbols used in the related trades. Concept and reading of Drawing in Concept of axes plane and quadrant Concept of Orthographic and Isometric projections Method of first angle and third angle projections (definition and difference) Reading of Job drawing of related trades.</p> |
| WORKSHOP CALCULATION & SCIENCE: 34 HRS. | | |
| <p>Professional Knowledge WCS- 34 Hrs.</p> | <p>Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.</p> | <p><u>WORKSHOP CALCULATION & SCIENCE:</u> Unit, Fractions Classification of unit system Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units Measurement units and conversion Factors, HCF, LCM and problems Fractions - Addition, subtraction, multiplication & division Decimal fractions - Addition, subtraction, multiplication & division Solving problems by using calculator Square root, Ratio and Proportions, Percentage Square and square root Simple problems using calculator Applications of pythagoras theorem and related problems Ratio and proportion Ratio and proportion - Direct and indirect proportions Percentage Percentage - Changing percentage to decimal and fraction Material Science Types metals, types of ferrous and non ferrous metals Physical and mechanical properties of metals Mass, Weight, Volume and Density Mass, volume, density, weight and specific gravity, numerical related to L,C,O section only Related problems for mass, volume, density, weight and specific gravity Speed and Velocity, Work, Power and Energy Speed and velocity - Rest, motion, speed, velocity, difference between speed and velocity, acceleration and retardation Speed and velocity - Related problems on speed & velocity Work, power, energy, HP, IHP, BHP and efficiency Heat & Temperature and Pressure Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of</p> |

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| | | <p>different metals and non-metals Concept of pressure - Units of pressure, atmospheric pressure, absolute pressure, gauge pressure and gauges used for measuring pressure</p> <p>Basic Electricity Introduction and uses of electricity, electric current AC,DC their comparison, voltage, resistance and their units</p> <p>Mensuration Area and perimeter of square, rectangle and parallelogram Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder Finding the lateral surface area, total surface area and capacity in litres of hexagonal, conical and cylindrical shaped vessels</p> <p>Levers and Simple machines Simple machines - Effort and load, mechanical advantage, velocity ratio, efficiency of machine, relationship between efficiency, velocity ratio and mechanical advantage Lever & Simple machines - Lever and its types</p> <p>Trigonometry Measurement of angles Trigonometrical ratios Trigonometrical tables</p> |
| InPlantTraining/ProjectWork | | |

| SYLLABUS – MECHANIC AGRICULTURAL MACHINERY | | | |
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| Second Year | | | |
| Duration | Reference Learning Outcome | Professional Skills (Trade Practical) | Professional Knowledge (Trade Theory) |
| Professional Skill 43 Hrs; Professional Knowledge 08 Hrs | Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. | 109. Use of PPE while dismantling and assembling of Mould Board plough. 110. Explain range of machinery used in the trade & their features. 111. Demonstrate precautions to be observed in handling farm machinery. 112. Dismantle Mould Board plough. Check, repair & replace their Component. 113. Assemble MB plough, measure Horizontal & Vertical suction. 114. Dismantle disc plough, check, repair & replace their components. 115. Assemble disc plough, measure disc & tilt angle of disc plough. Workshop adjustments. 116. Perform Hitching of ploughs. Field operation & adjustments. 117. Identify Faults and apply remedies. 118. Perform care and maintenance. | Introduction to the trade curriculum. Importance of the trade in the advancement of Agriculture technology in the country. Types of tillage & their uses. Working principles of ploughs. Constructional details. Workshop adjustments. Method of hitching. Importance of weight transfer. Considerations while using mounted and semi mounted implements. Method of ploughing. Methods of field operation. Recommended speeds for operation under different field conditions. Daily and periodical maintenance |
| Professional Skill 25 Hrs; Professional Knowledge 8Hrs | Check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator. | 119. Service sub soiler and dismantle chisel plough. 120. Check, repair & replace the component. 121. Assemble chisel plough. | Function & working of sub soiler/ chisel plough. Constructional details. Function & working of Rotavator. Workshop adjustments. |

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| | | <p>122. Hitch sub soiler/ chisel plough.</p> <p>123. Dismantle Rotavator, check repair and replace its components.</p> <p>124. Assemble Rotavator and conduct workshop adjustments.</p> <p>125. Perform field operations & adjustments.</p> <p>126. Find Faults and apply remedies.</p> <p>127. Perform Care and maintenance.</p> | <p>Method of hitching. Importance of weight transfer. Method of ploughing. Method of Field operation. Recommended speeds for operation of rotavators. Daily and periodical maintenance</p> |
| <p>Professional Skill 25 Hrs;</p> <p>Professional Knowledge 10Hrs</p> | <p>Troubleshoot & Test the functionality of major components and assemblies of disc harrows (Off set Type/Double action and single action) and Power harrows.</p> | <p>128. Dismantle & assemble disc harrows (Off set Type/Double action).</p> <p>129. Dismantle & assemble disc harrows (Single action).</p> <p>130. Measure gang angle.</p> <p>131. Dismantle & assemble bar/power harrows.</p> <p>132. Service spring/blade harrow.</p> <p>133. Plan and prepare Hitching arrangements.</p> <p>134. Perform field operation & adjustments.</p> <p>135. Detect Faults and apply Remedies.</p> <p>136. Perform Care and maintenance.</p> | <p>Types of harrows & their uses. working principles & Constructional details. Setting and adjustments. Hitching and mode of operation. Difference between disc harrows & drag harrow. Difference between disc harrows & disc plough. Trouble shooting. Safety precautions.</p> |
| <p>Professional Skill 25 Hrs;</p> <p>Professional Knowledge 06Hrs</p> | <p>Check and Service proper functionality of major components and assemblies of cultivators and soil forming equipments.</p> | <p>137. Dismantle the cultivator (Spring /Rigid) and check, repair & replace the components.</p> <p>138. Assemble the cultivator.</p> <p>139. Illustrate setting of cultivators with the help of</p> | <p>Types of cultivator. Working Principles & their constructional details, adjustments. Common types of shovels & seeps. Adjustments, mode of operation. Trouble shooting. Care &</p> |

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| | | <p>floor diagram.</p> <p>140. Demonstrate Workshop adjustments, and perform field operation & adjustments.</p> <p>141. Trace Faults and implement Remedies.</p> <p>142. Perform Care and maintenance.</p> | Maintenance. |
| <p>Professional Skill 20Hrs;</p> <p>Professional Knowledge 08 Hrs</p> | <p>Identify and check functionality of major components and assemblies of Lazar leveler, trencher & post hole digger.</p> | <p>143. Dismantle and assemble levelers, scrapers/ blade terracer, ditchers and bund formers/dozer/dumper.</p> <p>144. Service Lazar leveler, post hole digger.</p> <p>145. Dismantle, check, repair & replace the components of Lazar leveler, trencher & post hole digger.</p> <p>146. Assemble Lazar leveler, trencher & post hole digger.</p> <p>147. Arrange and perform Workshop adjustments.</p> <p>148. Set, adjust and troubleshoot field operation.</p> | <p>Soil forming equipment & their types. Constructional details of levelers, scrapers/ blade terracer, ditchers and bund formers. Constructional details of Lazar leveler, trencher & dozer/dumper and post hole digger. Prime mover & driving practice. Adjustments, mode of operation. Method of Field operation. Recommended speeds for operation. Daily and periodical maintenance, Care & Maintenance.</p> |
| <p>Professional Skill 44 Hrs;</p> <p>Professional Knowledge 09Hrs</p> | <p>Dismantle, assemble and troubleshoot seed drills.</p> | <p>149. Dismantle & assemble seed drills.</p> <p>150. Calibrate seed & fertilizer rates.</p> <p>151. Perform Workshop adjustments of special drills such as zero till, strip drill/rotto drill & Happy seeder.</p> <p>152. Conduct Field operation & adjustments of special drills such as zero till, strip</p> | <p>Types of seed drills & their uses. Constructional details of seed cum fertilizer drill. Seed & fertilizer metering devices. Constructional details of special drills such as zero till, strip drill/rotto drill & Happy seeder. Types of furrow openers, methods of transmission of power. Calibration & workshop adjustments. Field</p> |

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| | | <p>drill/rotto drill & Happy seeder.</p> <p>153. Trace Faults and apply remedies.</p> | <p>calibration and mode of operation. Guide chart for mixing fertilizers. Recommended speeds for operation. Care & maintenance.</p> |
| <p>Professional Skill 85Hrs;</p> <p>Professional Knowledge 22 Hrs</p> | <p>Test and verify functions of major components and assemblies of planters and fertilizer applicators.</p> | <p>154. Dismantle & assemble of planters, calibrate seed & fertilizer rates.</p> <p>155. Conduct Workshop adjustments and set planter with different seed plates & adjust for planting.</p> <p>156. Repair furrow openers.</p> <p>157. Servicing of veg. transplanter.</p> <p>158. Use veg. transplanter and adjustments.</p> <p>159. Service paddy transplanter and raise type of MAT type nursery for paddy.</p> <p>160. Use paddy transplanter. Raise bed and adjustments.</p> <p>161. Use cage-wheels and paddy</p> <p>162. Puddles.</p> | <p>Types of planters. Constructional details of Maize, Cotton, G/ nut & potato planters. Constructional details of paddy transplanter, Sugarcane & paddy transplanter. Common metering devices. Types of furrow openers. Power transmission. Function of row marker. Field operation of paddy transplanter. Field operation of veg. transplanter. Use of cage wheels and puddles.</p> |
| | | <p>163. Dismantle and assemble fertilizer applicators.</p> <p>164. Perform minor repairs of fertilizer applicator; calibrate fertilizer applicator.</p> <p>165. Perform field operation & adjustments of fertilizer applicators and troubleshoot the problems.</p> <p>166. Follow precautions to be observed in handling fertilizer.</p> | <p>Types of fertilizer applicators. Constructional details of fertilizer applicators Types of furrow openers, Methods of transmission of power. Calibration & workshop adjustments. Field operation & adjustments of fertilizer applicators. Recommended speeds for operation Care & maintenance.</p> |

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| <p>Professional Skill 50Hrs; Professional Knowledge 16Hrs</p> | <p>Identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump.</p> | <p>167. Visit to a tube well boring sites for study of boring and its operation. 168. Dismantle and assemble a volute type centrifugal pump. 169. Prepare foundations and install a pumping set. 170. Check Adjustments and operation of a pumping set.</p> | <p>Source of water. Study common irrigation and drainage systems. Types of irrigation systems. Types of pumps. Working principles & constructional details of centrifugal pumps.</p> |
| | | <p>171. Service a submersible pump. 172. Measure discharge of water and install HDPE, QRC, PVC & dipper pipe line.</p> | <p>Types of centrifugal pumps constructional details & principle of operation of a submersible pump. Description of tools and equipment required for boring a tube well. Use a compressor for revitalizing the tube well to improve its discharge.</p> |
| <p>Professional Skill 25 Hrs; Professional Knowledge 09 Hrs</p> | <p>Service irrigation valves and hydrants.</p> | <p>173. Repair and adjust irrigation valves and hydrants. 174. Install sprinkler and fogger. 175. Install pop-up and drippers. 176. Install drippers on level/hilly ground. 177. Field operation & adjustment (angular/ full circle). Faults and remedies. Troubles and remedies.</p> | <p>Pump selection, common prime movers, and coupling devices. Different types of irrigation pipes. Working principles of valves and hydrants. Working principles of Popup/sprinkler & mister /fogger. Working principles of drippers. Methods of field operation & adjustment. Daily and periodical maintenance. Precautions to be observed. Care & Maintenance.</p> |
| <p>Professional Skill 25 Hrs; Professional Knowledge</p> | <p>Service and Trouble shoot power tillers/power weeder.</p> | <p>178. Service Power tiller/power weeder. 179. Perform field operation with different attachments</p> | <p>Types of power tillers, their uses, constructional details. Method of power transmission for different field operation with</p> |

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| 10Hrs | | <p>with Common adjustments.</p> <p>180. Dismantle and assemble a cultivator and perform pairing and maintenance.</p> <p>181. Adjust the cultivator with the help of floor diagram.</p> <p>182. Set shovels and sweeps.</p> <p>183. Perform field operation of cultivator with shovels and sweeps.</p> <p>184. Troubleshoot faults and apply remedies.</p> <p>185. Plan and prepare care and maintenance work.</p> | <p>different attachments.</p> <p>Common types of weeds and their control.</p> <p>Methods of weed control.</p> <p>Constructional detail of power weeder.</p> <p>Premergence and post emergence applications.</p> <p>Recommended weedicides for different crops. Equipments used for their applications.</p> <p>Trouble shooting and remedies. Daily and periodical maintenance.</p> <p>Precautions in handling weedicides.</p> |
| <p>Professional Skill 11Hrs;</p> <p>Professional Knowledge 07Hrs</p> | <p>Identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors.</p> | <p>186. Familiarize to the trade curriculum.</p> <p>187. Explain importance of the trade in the advancement of Electrical technology in the country.</p> | <p>Introduction to the trade curriculum. Importance of safety precaution to be observed in the section.</p> <p>Range of machinery used in the trade & their features.</p> <p>Precautions to be observed in handling farm machinery.</p> |
| <p>Professional Skill 40Hrs;</p> <p>Professional Knowledge 12Hrs</p> | <p>Identify and troubleshoot faults in major components and assemblies of sprayers & dusters.</p> | <p>188. Dismantle and assemble AC motors and identify their parts.</p> <p>189. Demonstrate motor starting devices and its periodical maintenance.</p> <p>190. Detect faults and apply remedies.</p> <p>191. Dismantle and assemble common sprayers.</p> <p>192. Calibrate sprayers and carryout field adjustments & operation of sprayers.</p> <p>193. Dismantle and assemble common dusters.</p> <p>194. Service fogging machine</p> | <p>Types of electrical motors used on the farm, their constructional details, selection, operation, care and maintenance. Different types of starters. Fuses and their capacities. Installation of motors. Safety precautions</p> <p>Types of sprayers & dusters. Working principles. Calibrations of sprayers & dusters. Method of operation. Common prime movers. Workshop adjustments.</p> <p>Constructional details, working principles & calibration of high</p> |

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| | | <p>and Calibrate common dusters.</p> <p>195. Carryout field adjustments & operation of duster.</p> <p>196. Service high clearance/cotton sprayers.</p> <p>197. Service Aero blast sprayers.</p> <p>198. Calibrate & adjust high clearance/ cotton sprayers & Aero blast sprayers.</p> <p>199. Carryout repairs and maintenance work.</p> <p>200. Perform field operation & adjustments.</p> <p>201. Troubleshoot faults and apply remedies.</p> <p>202. Apply precaution measure while handling insecticides and pesticides.</p> | <p>clearance sprayers/ cotton & Aero blast sprayers. Methods of operation. Field operation. Common accidents and their prevention. Care and maintenance.</p> |
| <p>Professional Skill 30Hrs;</p> <p>Professional Knowledge 07Hrs</p> | <p>Detect and troubleshoot major components and assemblies of reaper, reaper winder, straw-reapers.</p> | <p>203. Dismantle and assemble a reaper.</p> <p>204. Carryout Workshop adjustments.</p> <p>205. Dismantle and assemble reaper winder and demonstrate workshop adjustments.</p> <p>206. Dismantle and assemble straw-reapers and carry out their workshop adjustments.</p> <p>207. Carryout hitching and fitting with prime mover.</p> <p>208. Perform field operation & adjustment of reapers/ reaper winder/ straw - reapers.</p> <p>209. Trace faults and ensure correct functioning.</p> | <p>Reapers & their types Functions, working principles, constructional details. Field adjustments & operation Care and maintenance. Trouble shooting. Precautions in working & transporting.</p> |

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| <p>Professional Skill 25 Hrs; Professional Knowledge 08Hrs</p> | <p>Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator.</p> | <p>210. Dismantle and assemble thresher. 211. Carryout workshop adjustments. Fit with prime mover. 212. Select tools and use for adjusting and operating in field. 213. Dismantle and assemble Maize seller. 214. Dismantle and assemble groundnut decorticator; fit with prime mover. 215. Measure important speeds affecting the performance. 216. Detect fault and apply remedies. 217. Demonstrate precautionary measures for safe operation.</p> | <p>Types of threshers, maize Sheller and ground nut decorticators. Working principles, constructional details. Adjustments and operations. Primemover and driving systems. Troubleshooting and remedies. Transmission of power belts and pulleys. Safety precautions. (08Hrs)</p> |
| <p>Professional Skill 65 Hrs; Professional Knowledge 25Hrs</p> | <p>Identify and check functionality of major components and assemblies of combine harvester-cutter bar assembly, feeder unit, threshing unit, separating unit.</p> | <p>218. Perform on different components systems of combine harvester. 219. Describe drive mechanism and controls of combine harvester. 220. Drive combine harvester. 221. Dismantle cutter bar assembly. Dismantle feeder unit. 222. Dismantle threshing unit /separating unit. 223. Check, repair and replace the defective components. 224. Assemble the components of different systems of combine harvester. 225. Carryout workshop</p> | <p>Purpose of a combine harvester. Advantages and limitations. Types of combine harvester. Special purpose combine harvesters . Working principles & constructional of different systems of combine harvester. Components of different systems of combine harvester. Flow path material of combine harvesters. Power transmission & drive systems. Workshop adjustments. Methods of field operation. Field adjustments according to crop & soil</p> |

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| | | <p>adjustments.</p> <p>226. Transport practice of the combine.</p> <p>227. Operate the combine in the field and adjust according to the field and crop conditions.</p> <p>228. Carryout its servicing and maintenance work.</p> <p>229. Compute grain losses. Storage during off season and perform care and maintenance work.</p> | <p>condition. Types of grain losses, their causes and remedies.</p> <p>Factors affecting the performance of a combine. Recommended speeds. Considerations while selecting a combine. Custom hiring of combine. Calculating of combine operation of combine harvesting. Safety precautions.</p> |
| <p>Professional Skill 75Hrs;</p> <p>Professional Knowledge 15 Hrs</p> | <p>Test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter.</p> | <p>230. Dismantle and assemble mower / fodder harvester.</p> <p>231. Demonstrate dismantling and assembling of power chaff/ silage-cutter.</p> <p>232. Perform Workshop adjustments.</p> <p>233. Perform hitching and fitting with prime-mover.</p> <p>234. Carryout field operation and adjustments.</p> <p>235. Perform servicing and maintenance.</p> | <p>Need of green harvesting equipment. Working principles, constructional details of mover. Functions, working principles, constructional details of folder harvester. Functions, working principles, constructional details power chaff/ silage-cutter. workshop and field adjustments. Methods of field operation. care and maintenance. Trouble shooting. Precautions in working & transporting.</p> |
| <p>Professional Skill 25 Hrs;</p> <p>Professional Knowledge 07Hrs</p> | <p>Detect and rectify functionality of major components and assemblies of rotary harvester, haybailer.</p> | <p>236. Dismantle and assemble rotary harvester/ hay bailer.</p> <p>237. Carryout Workshop adjustments.</p> <p>238. Perform Hitching and fitting with prime- mover.</p> <p>239. Perform field operation and adjustments.</p> <p>240. Use Safety precautions while servicing and</p> | <p>Function and working of rotary harvester. Function and working of hay-bailer. Workshop adjustments. Method of field operation. Method of transportation. Common accidents and their prevention. Trouble shooting. Care and maintenance.</p> |

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| | | <p>maintenance.</p> <p>241. Troubleshoot Faults and apply remedies for proper functioning.</p> | |
| <p>Professional Skill 50Hrs;</p> <p>Professional Knowledge 14Hrs</p> | <p>Find and troubleshoot faults in major components and assemblies of groundnut digger, potato / oniondigger</p> | <p>242. Dismantle groundnut digger / potato / onion digger.</p> <p>243. Check, repair and replace the defective components.</p> <p>244. Assemble groundnut digger potato / onion digger.</p> <p>245. Carryout Workshop adjustments. Attachment of diggers with prime-movers.</p> <p>246. Perform field operation and adjustments, servicing and maintenance work.</p> <p>247. Identify and troubleshoot faults following safety precautions and apply remedies for proper functioning.</p> | <p>Need & importance of root harvesting machine. Types & working of diggers. Components of diggers. Prime mover attachments and driving system. Transporting the root harvesting machinery. Settings & Adjustments. Troubles & Maintenance. Safety precautions.</p> |
| <p>Professional Skill 50Hrs;</p> <p>Professional Knowledge 14Hrs</p> | <p>Service and troubleshoot winnower, cleaner & grader.</p> | <p>248. Service and adjust the winnower, cleaner & graders.</p> <p>249. Fit with prime mover attachment.</p> <p>250. Operate winnower, cleaner and grader.</p> <p>251. Trace Common troubles and its causes.</p> | <p>Important of winnowing. Types of winnower and its parts. Importance of cleaning & grading. Types of cleaner/ grader. Methods of cleaning/grading. Prime mover attachments and driving system. Settings and Adjustments. Troubles & maintenance. Safety precautions.</p> |
| <p>Professional Skill 50Hrs;</p> <p>Professional Knowledge 14Hrs</p> | <p>Maintain and service rice huller, polisher, feed grinder-cum-mixer, hammermill.</p> | <p>252. Service and adjust the rice huller, polisher, the feed grinder-cum- mixer.</p> <p>253. Service and adjust the hammer mill and fit with prime mover.</p> | <p>Importance of rice huller and polisher, feed grinder-cum-mixer, hammer mill, oil extractor and sugarcane crusher. Constructional details, materials used. Principles</p> |

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| | | <p>254. Operate rice huller, polisher, hammer mill.</p> <p>255. Trace Common troubles and its causes.</p> | <p>of operation. Common faults and remedies. Care & maintenance.</p> <p>Safety precautions.</p> |
| <p>Professional Skill 52Hrs;</p> <p>Professional Knowledge 15Hrs</p> | <p>Detect and rectify functionality of grain handling seed treating and drying equipment.</p> | <p>256. Visit to a grain drying and storing plant and study different aspects of the construction, adjustments, controls.</p> <p>257. Operate grain handling seed treating and drying equipment.</p> <p>258. Explain silo structure.</p> | <p>Working of fans and blowers. Purpose of grain auger, bucket elevator etc.,</p> <p>Constructional details and working of a grain drier.</p> <p>Grain storage structure i.e. concrete and sheet metal bins (silo structure).</p> <p>Methods and instruments used for measuring moisture contents of grains. Equipment and methods used for treating and fumigating seeds and grains.</p> |
| | | <p>259. Prepare Log books.</p> <p>260. Maintain necessary records i.e. Log books of tractors, combines etc.</p> <p>261. Plan and prepare service schedules, off season storage of farm equipment.</p> | <p>Operation of transporting and handling equipment i.e. Tractor, tractor trailer, power tiller & combine harvester.</p> |
| | | <p>262. Visit to a Government Farms, Haryaltee and Co-operative Societies.</p> <p>263. Describe farm records, accounts and log books.</p> <p>264. Plan and prepare service schedule of farm machinery, off season storing of farm equipment.</p> <p>265. Plan and prepare layout and list of equipment of a typical farm workshop.</p> | <p>Procedure and principle for efficient management and organization of a farm.</p> <p>Discussion on different farm shop layout.</p> |
| Engineering Drawing: 40 Hrs. | | | |
| Professional Knowledge | Read and apply engineering drawing | <p><u>ENGINEERING DRAWING:</u></p> <p>Reading of Electrical, Electronic & Mechanical Sign and Symbols</p> | |

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| ED- 40 Hrs. | for different application in the field of work. | <p>used in Automobile.</p> <p>Sketches of Electrical, Electronic & Mechanical components used in Automobile.</p> <p>Reading of Electrical wiring diagram and Layout diagram used in Automobile.</p> <p>Drawing of Electrical circuit diagram used in Automobile.</p> <p>Drawing of Block diagram of Instruments & equipment of trades</p> |
| Workshop Calculation & Science: 16 Hrs. | | |
| Professional Knowledge WCS- 16 Hrs. | Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. | <p><u>WORKSHOP CALCULATION & SCIENCE:</u></p> <p>Friction</p> <p>Friction - Advantages and disadvantages, simple problems related to friction</p> <p>Friction - Lubrication</p> <p>Estimation and Costing</p> <p>Estimation and costing - Simple estimation of the requirement of material etc., as applicable to the trade</p> <p>Estimation and costing - Problems on estimation and costing</p> |
| InPlantTraining/ProjectWork | | |

SYLLABUS FOR CORE SKILLS

1. Employability Skills (Common for all CTS trades) (120 Hrs. + 60 Hrs.)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in/ dgt.gov.in

| List of Tools & Equipment | | | |
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| MECHANIC AGRICULTURAL MACHINERY (For batch of 24Candidates) | | | |
| S No. | Name of the Tools& Equipment | Specification | Quantity |
| A. TRAINEES TOOL KIT | | | |
| 1. | Allen Key | set of 12 pieces (2mm to 14mm) | 6+1 Nos. |
| 2. | Caliper inside | 15 cm Spring | 6+1 Nos. |
| 3. | Calipers outside | 15 cm spring | 6+1 Nos. |
| 4. | Center Punch | 10 mm. Dia. x 100 mm. | 6+1 Nos. |
| 5. | Dividers | 15 cm Spring | 6+1 Nos. |
| 6. | Electrician Screw Driver | 250mm | 6+1 Nos. |
| 7. | Hammer ball peen | 0.5 kg with handle | 6+1 Nos. |
| 8. | Hands file | 20 cm. Second cut flat | 6+1 Nos. |
| 9. | Philips Screw Driver | set of 5 pieces (100 mm to 300 mm) | 6+1 Nos. |
| 10. | Pliers combination | 20 cm. | 6+1 Nos. |
| 11. | Screw driver | 20cm.X 9mm. Blade | 6+1 Nos. |
| 12. | Screw driver | 30 cm. X 9 mm. Blade | 6+1 Nos. |
| 13. | Scriber | 15 cm | 6+1 Nos. |
| 14. | Spanner D.E. | set of 12 pieces (6mm to 32mm) | 6+1 Nos. |
| 15. | Spanner, ring | set of 12 metric sizes 6 to 32 mm. | 6+1 Nos. |
| 16. | Spanners socket with speed handle, T-bar, ratchet and universal | upto 32 mm set of 28 pieces with box | 6+1 Nos. |
| 17. | Steel rule | 30 cm inch and metric | 6+1 Nos. |
| 18. | Steel tool box with lock and key (folding type) | 400x200x150 mm | 6+1 Nos. |
| 19. | Wire cutter and stripper | | 6+1 Nos. |
| B. Tools Instruments and General Shop Outfits | | | |
| 20. | AC alternator slip ring puller | | 1No. |
| 21. | Adjustable spanner | Pipe wrench 350 mm | 2 Nos. |
| 22. | Air blow gun with standard accessories | | 1No. |
| 23. | Air impact wrench with standard accessories | | 4 Nos. |
| 24. | Air ratchet with standard accessories | | 4 Nos. |
| 25. | Allen Key | set of 12 pieces (2mm to 14mm) | 2 Nos. |
| 26. | Alternator for tractor – different type | | 2 Nos. |
| 27. | Ammeter | 300A/ 60A DC with external shunt | 4 Nos. |
| 28. | Angle plate adjustable | 250x150x175 | 1No. |
| 29. | Angle plate size | 200x100x200mm | 2 Nos. |

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| 30. | Anvil 50 Kgs with Stand | | 1No. |
| 31. | Arbor press hand operated | 2 ton capacity | 1No. |
| 32. | Auto Electrical test bench | | 1No. |
| 33. | Battery –charger | | 2 Nos. |
| 34. | Belt Tensioner gauge | | 1No. |
| 35. | Blow Lamp | 1 litre | 2 Nos. |
| 36. | Caliper inside | 15 cm Spring | 4 Nos. |
| 37. | Calipers outside | 15 cm spring | 4 Nos. |
| 38. | Car Jet washer with standard accessories | | 1No. |
| 39. | Carburetor repair tool kit | | 1No. |
| 40. | Chain Pulley Block- | 3 ton capacity with tripod stand | 1No. |
| 41. | Chaser hard W/V | 9 to 40 T.P.I. set of 11 external. | 1 set |
| 42. | Chaser, hand W/W | 9 to 40 T.P.I. set of 11 internal. | 1 set |
| 43. | Chisel | 10 cm flat | 4 Nos. |
| 44. | Chisels cross cut | 200 mm X 6mm | 4 Nos. |
| 45. | Circlip pliers Expanding and contracting type | 15cm and 20cm each | 4 Nos. |
| 46. | Clamps C | 100mm | 2 Nos. |
| 47. | Clamps C | 150mm | 2 Nos. |
| 48. | Clamps C | 200mm | 2 Nos. |
| 49. | Cleaning tray | 45x30 cm. | 4 Nos. |
| 50. | Clutches, different types such as cone type, disc type | | 1 each |
| 51. | Compression testing gauge suitable for diesel Engine | | 2 Nos. |
| 52. | Connecting rod alignment fixture | | 1No. |
| 53. | Copper bit soldering iron | 0.25 Kg | 4 Nos. |
| 54. | Cut section model of fuel filter | | 1No. |
| 55. | Cylinder bore gauge capacity | 20 to 160 mm | 4 Nos. |
| 56. | Cylinder liner- Dry & wet liner, press fit & slide fit liner | | 1 each |
| 57. | DC Ohmmeter | 0 to 300 Ohms, mid scales at 20 Ohms | 2 Nos. |
| 58. | Depth micrometer | 0-25mm | 4 Nos. |
| 59. | Dial gauge type | 1 Gr. A (complete with clamping devices and stand) | 4 Nos. |
| 60. | Different type of Engine Bearing model | | 1 set |
| 61. | Different type of piston model | | 1each |
| 62. | Dividers | 15 cm Spring | 4 Nos. |
| 63. | Drift Punch Copper | 15 cm | 4 Nos. |

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| 64. | Drift, copper | 10 x 15 1/2 mm | 2 Nos. |
| 65. | Drill point angle gauge | | 1No. |
| 66. | Drill twist | 1.5 mm to 15 mm (various sizes) by 0.5 mm | 4 Nos. |
| 67. | Electric Soldering Iron | 230 V 60 watts 230 V 25 watts | 2 each |
| 68. | Electric testing screw driver | | 2 Nos. |
| 69. | Engineer's square | 15 cm. Blade | 2 Nos. |
| 70. | Engineers stethoscope | | 1 No. |
| 71. | Equipment puncture, in box, | | 1No. |
| 72. | Feeler gauge | 20 blades (metric) | 2 Nos. |
| 73. | File flat | 20 cm bastard | 4 Nos. |
| 74. | File, half round | 20 cm second cut | 4 Nos. |
| 75. | File, Square | 20 cm second cut | 4 Nos. |
| 76. | File, Square | 30 cm round | 4 Nos. |
| 77. | File, triangular | 15 cm second cut | 4 Nos. |
| 78. | Files assorted sizes and types including safe edge file | (20 Nos) | 2 set |
| 79. | Flat File | 25 cm second cut | 4 Nos. |
| 80. | Flat File | 35 cm bastard | 4 Nos. |
| 81. | Fuel feed pump for diesel | | 2 Nos. |
| 82. | Fuel injection pump (Diesel) inline | | 1 No. |
| 83. | Glow plug tester | | 2 Nos. |
| 84. | Granite surface plate | 1600 x 1000 with stand and cover | 1 No. |
| 85. | Grease Gun | | 2 Nos. |
| 86. | Grover | 3, 4, 6mm. | 1 Each |
| 87. | Growler | | 2 Nos. |
| 88. | Hacksaw frame adjustable | 20-30 cm | 10 Nos. |
| 89. | Hammer Ball Peen | 0.75 Kg | 4 Nos. |
| 90. | Hammer Chipping | 0.25 Kg | 4 Nos. |
| 91. | Hammer copper | 1 Kg with handle | 4 Nos. |
| 92. | Hammer Mallet | | 4 Nos. |
| 93. | Hammer Plastic | (i) for crimping up to 4mm and (ii) for crimping up to 10mm | 4 Nos. |
| 94. | Hand operated crimping tool | | 2 Nos. |
| 95. | Hand reamers adjustable | 10.5 to 11.25 mm, 11.25 to 12.75 mm, 12.75 to 14.25 mm and 14.25 to 15.75 mm | 2sets |
| 96. | Hand Shear Universal | 250mm | 2 Nos. |
| 97. | Hand vice | 37 mm | 2 Nos. |
| 98. | High rate discharge tester (cell tester) | | 1 No. |
| 99. | Hollow Punch set of seven pieces | 6mm to 15mm | 2 sets each |

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| 100. | Hydraulic jack HI-LIFT type - | 3 ton capacity, | 1 No. |
| 101. | Injector – Multi hole type, Pintle type | | 4 each |
| 102. | Injector cleaning unit | | 1 No. |
| 103. | Injector testing set (Hand tester) | | 1 No. |
| 104. | Insulated Screw driver | 20 cm x 9mm blade | 4 Nos. |
| 105. | Insulated Screw driver | 30 cm x 9mm blade | 4 Nos. |
| 106. | Left cut snips | 250mm | 4 Nos. |
| 107. | Lifting jack screw type | 3 ton, 5ton | 1 each |
| 108. | Magneto spanner | set with 8 spanners | 1 set |
| 109. | Magnifying glass | 75mm | 2 Nos. |
| 110. | Marking out table | 90X60X90 cm. | 1 No. |
| 111. | Multi Scan Tool | | 1 No. |
| 112. | Multimeter digital | | 5 Nos. |
| 113. | Oil can | 0.5/0.25 liter capacity | 2 Nos. |
| 114. | Oil pump for dismantling and assembling. | | 2 Nos. |
| 115. | Oil Stone | 15 cm x 5 cm x 2.5 cm | 1 No. |
| 116. | Oscilloscope | 20MHz | 1 No. |
| 117. | Outside micrometer | 0 to 25 mm | 4 Nos. |
| 118. | Outside micrometer | 25 to 50 mm | 4 Nos. |
| 119. | Outside micrometer | 50 to 75 mm | 1 No. |
| 120. | Outside micrometer | 75 to 100 mm | 1 No. |
| 121. | Pat melting | | 2 Nos. |
| 122. | Philips Screw Driver | set of 5 pieces (100 mm to 300 mm) | 2 sets |
| 123. | Pipe cutting tool | | 2 Nos. |
| 124. | Pipe flaring tool | | 2 Nos. |
| 125. | Piston ring compressor | | 2 Nos. |
| 126. | Piston Ring expander and remover. | | 2 Nos. |
| 127. | Piston Ring groove cleaner. | | 1 No. |
| 128. | Pliers combination | 20 cm. | 2 Nos. |
| 129. | Pliers flat nose | 15 cm | 2 Nos. |
| 130. | Pliers round nose | 15 cm | 2 Nos. |
| 131. | Pliers side cutting | 15 cm | 2 Nos. |
| 132. | Poker | | 2 Nos. |
| 133. | Portable electric drill Machine | | 1 No. |
| 134. | Portable oil monitoring Indicator | | 1 No. |
| 135. | Power Supply | 0-12 v, lamp | 1 No. |
| 136. | Prick Punch | 15 cm | 4 Nos. |
| 137. | Punch Letter | 4mm | 2 set |
| 138. | Radiator cut section-cross flow | | 1 No. |

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| 139. | Radiator cut section-down flow | | 1 No. |
| 140. | Radiator pressure cap | | 2 Nos. |
| 141. | Rake | | 1 No. |
| 142. | Rear axle assembly-gear box steering box assembly of the diesel engine | | 2 set |
| 143. | Ridger | | 2 Nos. |
| 144. | Right cut snips | 250mm | 4 Nos. |
| 145. | Rivet sets snap and Dolly combined | 3mm, 4mm, 6mm | 4 Nos. |
| 146. | Scraper flat | 25 cm | 2 Nos. |
| 147. | Scraper half round | 25 cm | 2 Nos. |
| 148. | Scraper Triangular | 25 cm | 2 Nos. |
| 149. | Scriber | 15 cm | 2 Nos. |
| 150. | Scriber with scribing black universal | | 2 Nos. |
| 151. | Set of stock and dies - Metric | | 2 sets |
| 152. | Shear Tin Man's | 450 mm x 600mm | 4 Nos. |
| 153. | Sheet Metal Gauge | | 2 Nos. |
| 154. | SherTinmans | 300mm | 4 Nos. |
| 155. | Shovel | | 2 Nos. |
| 156. | Soldering Copper Hatchet type | 500gms | 4 Nos. |
| 157. | Solid Parallels in pairs (Different size) in Metric | | 2 Nos. |
| 158. | Spanner Clyburn | 15 cm | 1 No. |
| 159. | Spanner D.E. | set of 12 pieces (6mm to 32mm) | 4 Nos. |
| 160. | Spanner T. flocks for screwing up and up-screwing inaccessible positions | | 2 Nos. |
| 161. | Spanner, adjustable | 15cm. | 2 Nos. |
| 162. | Spanner, ring | set of 12 metric sizes 6 to 32 mm. | 2 Nos. |
| 163. | Spanners socket with speed handle, T-bar, ratchet and universal | upto 32 mm set of 28 pieces with box | 2 Nos. |
| 164. | Spark lighter | | 2 Nos. |
| 165. | Spark plug spanner | 14mm x 18mm x Size | 2 Nos. |
| 166. | Spirit level | 2V 250, 05 metre | 2 Nos. |
| 167. | Spring tension tester | | 1 No. |
| 168. | Stake grooving. | | 2 Nos. |
| 169. | Stake, hatchet. | | 2 Nos. |
| 170. | Starter motor for tractor –different type | | 2 Nos. |
| 171. | Steel measuring tape | 10 meter in a case | 4 Nos. |
| 172. | Steel rule and metric | 15 cm inch | 4 Nos. |
| 173. | Steel rule and metric | 30 cm inch | 4 Nos. |
| 174. | Steel wire Brush | 50mmx150mm | 5 Nos. |
| 175. | Stone, carborandum | 15 x 5 x 4 cm smooth and rough. | 1each |

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| 176. | Straight edge gauge | 2 ft. | 2 Nos. |
| 177. | Straight edge gauge | 4 ft. | 2 Nos. |
| 178. | Stud extractor | set of 3 | 2 sets |
| 179. | Stud remover with socket handle | | 1 No. |
| 180. | Surface gauge with dial test indicator plunger type | 0.01 mm | 2 Nos. |
| 181. | Tachometer (Counting type) | | 1 No. |
| 182. | Taps and Dies complete sets (5 types) | | 1 set |
| 183. | Taps and wrenches -Metric | | 2 sets |
| 184. | Telescope gauge | | 4 Nos. |
| 185. | Temperature gauge | 0-100 degree | 2 Nos. |
| 186. | Thermostat | | 2 Nos. |
| 187. | Thread pitch gauge metric, BSW | | 1 No. |
| 188. | Timing lighter | | 1 No. |
| 189. | Torque wrenches | 5-35 Nm, 12-68 Nm & 50-225 Nm | 1 each |
| 190. | Trammel | 30 cm | 2 Nos. |
| 191. | Turbocharger cut sectional view | | 1 No. |
| 192. | Tyre pressure gauge with holding nipple | | 2 Nos. |
| 193. | Universal puller for removing pulleys, bearings | | 1 No. |
| 194. | VBlock with Clamps | 75 x38 mm pair | 2 Nos. |
| 195. | Vacuum gauge to read | 0 to 760 mm of Hg. | 2 Nos. |
| 196. | Valve Lifter | | 1 No. |
| 197. | Valve spring compressor universal. | | 1 No. |
| 198. | Verniercalliper | 0-300 mm with least count 0.02mm | 4 Nos. |
| 199. | Vice grip pliers | | 2 Nos. |
| 200. | Voltmeter | 50V/DC | 4 Nos. |
| 201. | Water pump for dismantling and assembling | | 2 Nos. |
| 202. | Wing compass | 25 cm | 2 Nos. |
| 203. | Wire Gauge (metric) | | 4 Nos. |
| 204. | Work bench | 250 x 120 x 60 cm with 4 vices 12cm Jaw | 4 Nos. |
| C. General Installation/Machineries | | | |
| 205. | 3 furrow disc plough with scrapersyk | | 1 No. |
| 206. | 9 tine cultivator-spring loaded mounted type | | 1 No. |
| 207. | Air conditioner | | As Required |
| 208. | Arbor press hand operated | 2 ton capacity | 1 No. |
| 209. | Automotive exhaust | 5 gas analyzer (petrol & Diesel) or Diesel Smoke meter | 1 No. |

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| 210. | Axle flow vegetable thresher | | 1 No. |
| 211. | Bench lever shears | 250mm Blade x 3mm Capacity | 1 No. |
| 212. | Bund maker (disc type) | | 1 No. |
| 213. | Centrifugal Pump with electric motor | | 1 No. |
| 214. | Chaff cutter and silage cutter | | 1each |
| 215. | Chisel Plough- | 5/7 tone | 1 No. |
| 216. | Dal Mill | | 1 No. |
| 217. | Diesel GEN SET- | 25/50 KVA with AMF facility | 1 No. |
| 218. | Disc Harrow | (14 Mounted type) off set | 1 No. |
| 219. | Disc Harrow | 8x8 trailed type | 1 No. |
| 220. | Disc Plough | 2 Bottom reversible l | 1 No. |
| 221. | Disc Plough | 3 Bottom | 1 No. |
| 222. | Discrete Component Trainer / Basic Electronics Trainer | | 1 No. |
| 223. | Drier (Solar/Heater) | | 1 No. |
| 224. | Drilling machine bench to drill | up to 12mm dia along with accessories | 1 No. |
| 225. | Dual Magnetization Yoke | AC / HWDC, 230 VAC, 50Hz | 1 set |
| 226. | Electric motor | 3 Phase 10 H.P. | 1 No. |
| 227. | Electric motor | 3 Phase 7.5 H.P. | 1 No. |
| 228. | Engine - for walking and riding type reapers | | 2 Nos. |
| 229. | Floor Mill | | 1 No. |
| 230. | Fodder Harvester/ Chopper Flale type | | 1 No. |
| 231. | Fodder kit for self Propelled reaper | | 1 No. |
| 232. | Gas Welding Table | 1220mm x760mm | 2 Nos. |
| 233. | Grinding machine (general purpose) D.E. pedestal | 300 mm dia wheels rough and smooth | 1 No. |
| 234. | Groundnut decorticator | | 1 No. |
| 235. | Header Assembly for maize and sun-flower | | 1 No. |
| 236. | High capacity multi crop thresher | | 1 No. |
| 237. | Kino/ Orange grader | | 1 each |
| 238. | Knapsack /foot sprayer | | 1 No. |
| 239. | Laser Leveler complete with transmitter, receiver, control box, survey | | 1 No. |
| 240. | Leveler/spike Leveler | 3 meter width | 1 No. |
| 241. | Liquid penetrant Inspection kit | | 1 set |
| 242. | Maize crophresher | | 1 No. |
| 243. | Mechanical Power Weeder | | 1 each |

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| 244. | Mould Board Plough-Augur type | | 1 No. |
| 245. | Mower/Grass Cutter | | 1 No. |
| 246. | Multi crop thresher | | 1 No. |
| 247. | Multi Scan Tool | | 1 No. |
| 248. | P.T.O. operated rotary lawn mower | | 1 No. |
| 249. | Paddy harrow | (14 Disc mounted type) | 1 No. |
| 250. | Paddy transplanter | | 1 No. |
| 251. | Picking platform | | 1 No. |
| 252. | Pipe Bending Machine (Hydraulic type) | 12mm to 30mm | 1 No. |
| 253. | Pneumatic rivet gun | | 2 Nos. |
| 254. | Power Operated Cleaner | | 1 No. |
| 255. | Power operated fogging machine | | 1 No. |
| 256. | Power operated Grader (wheat, maize) | | 1 No. |
| 257. | Power operated manure spreader | | 1 No. |
| 258. | Power operated potato Grader | | 1 No. |
| 259. | Power operated soybean reaper | | 2. Nos. |
| 260. | Power Tiller | | 1 No. |
| 261. | Prime movers (Engine Stationery type) | | 2 Nos. |
| 262. | Pulverizing Roller (Tractor Mounted) with spring loaded (11tyne) cultivator | | 1 No. |
| 263. | Rice Mill/Paddy dehauskar | | 1 No. |
| 264. | Rice Polisher | | 1 No. |
| 265. | Rotary duster | | 1 No. |
| 266. | Rotary Harvester | | 1 No. |
| 267. | Rotavator | 5.5" cutting Width | 1 No. |
| 268. | Self propelled Combine Harvester axial flow/Track type combine Harvester | | 1 No. |
| 269. | Self propelled high clearance sprayer | 20 hp diesel engine | 1 No. |
| 270. | Self propelled riding type Reaper/Reaper winder | | 1 No. |
| 271. | Semi-axial flow multi crop thresher | | 1 No. |
| 272. | Sewing Machine/Bag stitcher | | 1 No. |
| 273. | Solar streetlight | | 1 No. |
| 274. | Spring tension tester | | 1 No. |
| 275. | Sprinkler type and drip irrigation systems complete sets. | Pipes (Different materiel & Sizes) Such as :- PVC, HDPE, QRC & Poly Tubing Dripper(Different materiel & Sizes) Jets, Foggers & Mister Sprinkler(Mini, Micro, angular and circular type) Lawn sprinkler and garden pop-ups | As desired |

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| | | <p>Accessories and fitting for spray pop-ups</p> <p>Low volume & High volume rain gun range 15 to 30 meter die Accessories and fitting for rain gun</p> <p>Compression Fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.)</p> <p>HDPE fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.)</p> <p>PVC Fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.)</p> <p>PVC Control valve different sizes</p> <p>Air Release Valve different sizes</p> <p>Butterfly / G.M. Gate Valves different sizes</p> <p>Fertigation Tank 30 to 160 Litres</p> <p>Fertigation Equipment Pump 30 to 160 Litres</p> <p>Filters (Primary filter) Sand, Hydro cyclone, Screen, Plastic/metal & Disc and Drip line</p> <p>Poly joiner , reducer, Tee, Elbow ,End stop different sizes</p> <p>Grommet hole plug different sizes</p> <p>Pressure gauge</p> <p>Three way cock for gauge PVC valve box different sizes</p> <p>Water meter, Brase pressure regulator and irrigation drum</p> <p>Jain spanner repair tool kit & Drip line binder</p> <p>Single phase electric motor 3 HP high speed (Booster)</p> | |
| 276. | Straw reaper | | 1 No. |
| 277. | Sub solier | 24 -30 inch. | 1 No. |
| 278. | Submersible Pump complete unit | | 1 No. |
| 279. | Sugar cane transplanter | | 1 No. |
| 280. | Thresher rasp bar type | | 1 No. |
| 281. | Tin smiths bench folder | 600 x 1.6mm | 1 No. |
| 282. | Tractor PTO operated aero blast spray | | 1 No. |
| 283. | Tractor PTO operated sprayer for cotton | | 1 No. |
| 284. | Tractor | 60 HP power steering | 1 No. |
| 285. | Tractor | 75 HP 4WD | 1 No. |

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| 286. | Tractor Diesel Engine | 4 stroke for Dismantling and assembling with swiveling stand | 2 Nos. |
| 287. | Tractor operated bed farmer cum three rows planter | | 1 No. |
| 288. | Tractor Operated Combine Harvester multi- crops | | 1 No. |
| 289. | Tractor operated ground nut digger | | 1 No. |
| 290. | Tractor operated hay bailer | | 1 No. |
| 291. | Tractor operated implement loading beam | | 1 No. |
| 292. | Tractor operated onion digger | | 1 No. |
| 293. | Tractor operated potato digger | | 1 No. |
| 294. | Tractor operated two rows Semi /automatic potato planter | | 1 No. |
| 295. | Tractor operated two rows vegetable trans planter (semi automatic) | | 1 No. |
| 296. | Tractor operator Angle blade Tracer | | 1 No. |
| 297. | Tractor Operator ditcher | | 1 No. |
| 298. | Tractor operator Front mounted dozer with Hydraulic single cylinder | | 1 No. |
| 299. | Tractor Operator post hole digger | | 1 No. |
| 300. | Tractor operator scraper and bucket scraper | | 1 No. |
| 301. | Tractor Operator Seed cum fertilizer drill cum planter | | 1 No. |
| 302. | Tractor Operator trencher | 10" to 16" Width & 4 ft depth | 1 No. |
| 303. | Tractor Operator Zero/ strip till Seed cum fertilizer drill | 9/11 rows | 1 No. |
| 304. | Tractor PTO operated multi - crop direct sowing happy seeder | | 1 No. |
| 305. | Tractor trailer with hydraulic system | | 1 No. |
| 306. | Trolley type portable air compressor single cylinder | with 45 liters capacity Air tank, along with accessories & with working pressure 6.5 kg/sq cm | 1 No. |
| 307. | Vaccine Machine | | 1 No. |
| 308. | Weighing balance | | 2 Nos. |
| 309. | Welding plant Oxy-Acetylene complete (high pressure) | | 1 No. |
| 310. | Welding Transformer (150-300 Amps) | | 1 No. |
| 311. | Wheel type tractor fitted with diesel engine with standard accessories and special tools (30 to 40 draw-bar H.P). | | 2 Nos. |
| 312. | Wind mill | | 1 No. |

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| 313. | Winnower | | 1 No. |
| List of Consumable: | | | |
| 314. | Automatic Transmission oils | | As required |
| 315. | Battery- SMF | | As required |
| 316. | Brake fluids | | As required |
| 317. | Chalk, Prussian blue. | | As required |
| 318. | Chemical compound for fasteners | | As required |
| 319. | Diesel | | As required |
| 320. | Different type gasket material | | As required |
| 321. | Different type of oil seal | | As required |
| 322. | Drill Twist (assorted) | | As required |
| 323. | Emery paper | 36–60 grit , 80–120 | As required |
| 324. | Engine coolant | | As required |
| 325. | Engine oil | | As required |
| 326. | Gear oils | | As required |
| 327. | Hacksaw blade (consumable) | | As required |
| 328. | Hand rubber gloves tested | 5000 V | 5 pair |
| 329. | Holder, lamp teakwood boards, plug sockets, solders, flux wires and cables batteries round consumable blocks and other consumables as required | | As required |
| 330. | Hydrometer | | 8 Nos. |
| 331. | Lapping abrasives | | As required |
| 332. | Leather Apron | | 5 Nos. |
| 333. | Petrol | | As required |
| 334. | Power steering oil | | As required |
| 335. | Radiator Coolants | | As required |
| 336. | Safety glasses | | As required |
| 337. | Steel wire Brush | 50mmx150mm | 5 Nos. |
| 338. | Engine Spare Parts | | As per req. |
| 339. | Field crops like wheat, Soya bean, paddy etc. | | As desired |
| 340. | Gloves for Welding (Leather and Asbestos) | | 5 sets |
| Workshop Furniture | | | |
| 341. | Book shelf (glass panel) | 6½" , x 3" x 1½" | As required |
| 342. | Computer Chair | | 1+1 Nos. |
| 343. | Computer Table | | 1+1 Nos. |
| 344. | Desktop Computer | CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. | 1+1 Nos. |

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| | | RAM: -4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software. | |
| 345. | Discussion Table | 8" x 4" x 2½ " | 2 Nos. |
| 346. | Fire Extinguishers, | Arrange all proper NOCs and equipment from municipal / competent authorities. | As required |
| 347. | Instructional Material – NIMI Books/Ref.books | | Asrequired |
| 348. | Internet connection with all accessories | | Asrequired |
| 349. | Laser printer | | 1 No. |
| 350. | LCD projector/ LED /LCD TV | 42" | 1 No. |
| 351. | Multimedia DVD for Automotive application/subjects | | Asrequired |
| 352. | Online UPS | | As required |
| 353. | Stools | | 26 No. |
| 354. | StorageRack | 6½ " x3" x 1½' | As required |
| 355. | Storageshelf | 6½" x 3" x 1½' | As required. |
| 356. | Suitable class room furniture | | As required |
| 357. | Suitable Work Tables with vices | | As required |
| 358. | Tool Cabinet - | 6½ " x 3" x 1½" | 2 Nos. |
| 359. | Trainees locker | 6½ " x 3" x 1½" | As required |
| <p>Note: -</p> <p>1. <i>Internet facility is desired to be provided in the class room.</i></p> | | | |

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all others who contributed in revising the curriculum. Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

| List of Expert members contributed/ participated for finalizing the course curriculum of Mechanic Agricultural Machinery Trade. | | | |
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| 2. | G Satish Kumar, Manager | Ashok Leyland | MEMBER |
| 3. | GM Cholanrajan, Sr. Manager, Training | Lansun Toyota, Chennai | MEMBER |
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| 14. | J. Dharsan, Asst. Mgr | Toyoto Kirloskar, Bangalore | MEMBER |
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| 17. | T.N. Umashankar, Head Manufacturing | Delphi TVS Ltd. | MEMBER |
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| DGT & Training Institute | | | |
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| 23. | Yuvraj, DDT | ATI Chennai | MEMBER |
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| 44. | S Horlyok Chelladurai, Retd. ITI Principal | | MEMBER |

ABBREVIATIONS

| | |
|------|--|
| CTS | Craftsmen Training Scheme |
| ATS | Apprenticeship Training Scheme |
| CITS | Craft Instructor Training Scheme |
| DGT | Directorate General of Training |
| MSDE | Ministry of Skill Development and Entrepreneurship |
| NTC | National Trade Certificate |
| NAC | National Apprenticeship Certificate |
| NCIC | National Craft Instructor Certificate |
| LD | Locomotor Disability |
| CP | Cerebral Palsy |
| MD | Multiple Disabilities |
| LV | Low Vision |
| HH | Hard of Hearing |
| ID | Intellectual Disabilities |
| LC | Leprosy Cured |
| SLD | Specific Learning Disabilities |
| DW | Dwarfism |
| MI | Mental Illness |
| AA | Acid Attack |
| PwD | Person with disabilities |

