



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

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
Kolkata-700091

MECHANIC AGRICULTURAL MACHINERY

(Engineering Trade)

(Revised in August 2025)

Version: 3.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4



Directorate General of Training

Developed By

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1. COURSE INFORMATION

During the two-year duration of Mechanic Agricultural Machinery trade, candidates are trained on Professional Skill, professional knowledge and Employability Skills related to job roles. In addition to this, candidates are 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 Broad components covered professional skill, subjects 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 Tires 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 equipment; 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 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 appear in 10+2 examination through National Institute of Open Schooling (NIOS) for acquiring higher secondary certificate and can go further for General/ Technical education.
- 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 |
| On the Job Training (OJT)/ Group Project* | | 150 | 150 |
| Optional Courses** | | 240 | 240 |
| Grand Total | | 1590 | 1590 |

* The trainee has to undergo 150 hours of mandatory OJT (On the Job Training) at nearby industry or wherever industry not available then group project has to be done with the supervision of the trade instructor for every year.

** Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for obtaining 10th/ 12th class certificate from NIOS along with ITI certification, or, short term courses for extra skills/knowledge.

2.4 ASSESSMENT & CERTIFICATION:

The trainee will be tested for his/her skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment 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.cstaricalcutta.gov.in or 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 DGT as per the guidelines. 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 & one year duration courses *and* 50% weightage is applied to each examination for two years courses. The minimum pass percentage for Trade Practical and Formative assessment are 60% & for all other subjects are 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 to be given while assessing for team work, avoidance/reduction of scrap/wastage and disposal of scarp/wastage as per procedure, behavioral attitude, sensitive to environment and regularity in training. The sensitivity towards Occupational Safety, Health and Environment (OSHE) and self-learning attitude 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 and records 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 formative assessment:

| Marks Allotted during Assessment | Performance Level | Evidence |
|---|--|---|
| Marks between 60% to 75% | 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. | <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. |
| Marks above 75% to 90% | 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. | <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 Above 90% | 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. | <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. |

3. JOB ROLE

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

4. GENERAL INFORMATION

| | |
|---|---|
| Name of the Trade | MECHANIC AGRICULTURAL MACHINERY |
| Trade Code | DGT/1064 |
| NCO – 2015 | 7233.1500, 8341.0101, 8341.0300 |
| NSQF Level | 4 |
| Duration of Craftsmen Training | Two Years |
| 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 | <p>B.Voc/Degree in Agriculture Engineering from AICTE/UGC recognized Engineering College/ university with one-year teaching or industry experience in the Mechanic Agricultural Machinery field.</p> <p style="text-align: center;">OR</p> <p>03 years Diploma in Agriculture Engineering from AICTE recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' teaching or industry experience in the Mechanic Agricultural Machinery field.</p> <p style="text-align: center;">OR</p> <p>NTC/NAC passed in the trade of "Mechanic Agricultural Machinery" with three years' teaching or industry experience in the Mechanic Agricultural Machinery field.</p> <p>Essential Qualification: Relevant National Craft Instructor Certificate (NCIC) in "Mechanic Agricultural Machinery" trade under DGT.</p> <p>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.</p> |
| 2. Workshop Calculation & Science | <p>B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year of teaching or industry experience.</p> <p style="text-align: center;">OR</p> <p>03 years Diploma in Engineering from AICTE / recognized</p> |

| | |
|--------------------------------------|--|
| | <p>board of technical education with two years' of teaching or industry experience.</p> <p style="text-align: center;">OR</p> <p>NTC/ NAC in any one of the engineering trades with three years' of teaching or industry experience.</p> <p><u>Essential Qualification:</u> Regular / RPL variants of National Craft Instructor Certificate (NCIC) in any one of the engineering trades or RoDA.</p> |
| 3. Engineering Drawing | <p>B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year of teaching or industry experience.</p> <p style="text-align: center;">OR</p> <p>03 years Diploma in Engineering from AICTE / recognized board of technical education with two years' teaching or industry experience.</p> <p style="text-align: center;">OR</p> <p>NTC/ NAC in any one of the engineering/ Draughtsman group of trades with three years' of teaching or industry experience.</p> <p><u>Essential Qualification:</u> Regular / RPL variants of National Craft Instructor Certificate (NCIC) in any one of the engineering trades or RoDA.</p> |
| 4. Employability Skill | <p>MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' of teaching or industry experience with short term ToT Course in Employability Skills conducted by DGT institutions. (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 conducted by DGT institutions.</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

| Sl. No. | Learning Outcome | Duration | | |
|-------------------|---|-----------|--------|-------|
| | | Practical | Theory | Total |
| First Year | | | | |
| 1. | Make choices to carryout marking of the components for basic fitting operations in the workshop following safety precautions. | 76 | 14 | 90 |
| 2. | Perform precision measurements on the components in automotive workshop practices. | 56 | 19 | 75 |
| 3. | Use different types of fastening and locking devices in a vehicle and interpret importance of Lock Nut and Torque Wrench. | 10 | 5 | 15 |
| 4. | Use cutting tools in the workshop, following safety precautions while grinding. | 10 | 5 | 15 |
| 5. | Use different types of tools and work shop equipment in the workshop. | 10 | 5 | 15 |
| 6. | Perform basic fitting operations used in the workshop practices and inspection of dimensions. | 10 | 5 | 15 |
| 7. | Produce sheet metal components using various sheet metal operations. | 10 | 5 | 15 |
| 8. | Develop electrical circuits and test its parameters by using electrical measuring instruments. | 10 | 5 | 15 |
| 9. | Perform basic electrical testing in a vehicle. | 12 | 3 | 15 |
| 10. | Perform battery testing and charging operations. | 27 | 3 | 30 |
| 11. | Develop/ Assemble basic electronic circuits and testing. | 10 | 5 | 15 |
| 12. | Manufacture components with different types of welding processes in the given job. | 12 | 3 | 15 |
| 13. | Identify the hydraulic and pneumatic components in a vehicle. | 69 | 6 | 75 |
| 14. | Demonstrate Major Assemblies of different types of Tractor. | 69 | 6 | 75 |
| 15. | Overhaul Diesel Engine of Tractor. | 81 | 24 | 105 |
| 16. | Perform servicing of Cooling and Lubrication system of Tractor in a workshop. | 54 | 6 | 60 |
| 17. | Service Intake and Exhaust System of Tractor in a | 26 | 4 | 30 |

| | | | | |
|-----------------------------|--|------------|------------|-------------|
| | workshop. | | | |
| 18. | Service Fuel Feed System of Tractor in a workshop. | 53 | 7 | 60 |
| 19. | Overhaul Clutch and Gearbox of Tractor in a workshop. | 25 | 5 | 30 |
| 20. | Overhaul Differential and PTO (Two Wheel Drive / Four Wheel Drive) Unit of Tractor in the workshop. | 23 | 7 | 30 |
| 21. | Overhaul Steering System of Tractor in the workshop. | 51 | 9 | 60 |
| 22. | Carry out Repair of Wheels and Tires of Tractor in the Workshop. | 25 | 5 | 30 |
| 23. | Overhaul Brake system of Tractor in the workshop. | 36 | 9 | 45 |
| 24. | Overhaul Major Assemblies of Power Tiller and carryout Field Operation. | 26 | 4 | 30 |
| 25. | Overhaul Implements of Tractor. | 24 | 6 | 30 |
| 26. | Overhaul Charging system, Starting System, Lightning System of Tractor. | 25 | 5 | 30 |
| 27. | Read and apply engineering drawing for different application in the field of work. | - | 30 | 30 |
| 28. | Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. | - | 30 | 30 |
| Employability Skills | | - | 120 | 120 |
| Total | | 840 | 360 | 1200 |
| Second Year | | | | |
| 29. | Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. | 37 | 8 | 45 |
| 30. | Check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator. | 25 | 5 | 30 |
| 31. | Troubleshoot & test the functionality of major components and assemblies of disc harrows (Off set Type/Double action and single action) and Power harrows. | 20 | 10 | 30 |
| 32. | Check and Service proper functionality of major components and assemblies of cultivators and soil forming equipment. | 25 | 5 | 30 |
| 33. | Identify and check functionality of major components and assemblies of Laser leveler, trencher & post hole digger. | 25 | 5 | 30 |
| 34. | Dismantle, assemble and troubleshoot seed cum fertilizer drills. | 50 | 10 | 60 |
| 35. | Test and verify functions of major components and assemblies of planters, transplanters and fertilizer applicators. | 83 | 22 | 105 |

| | | | | |
|-----------------------------|--|-------------|------------|-------------|
| 36. | Identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump. | 50 | 10 | 60 |
| 37. | Service irrigation valves and hydrants. | 25 | 5 | 30 |
| 38. | Service and Trouble shoot power tillers/ power weeder. | 20 | 10 | 30 |
| 39. | Identify and troubleshoot faults in major components and assemblies of sprayers & dusters. | 48 | 12 | 60 |
| 40. | Detect and troubleshoot major components and assemblies of reaper, reaper Binder, straw- reapers. | 38 | 7 | 45 |
| 41. | Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator. | 25 | 5 | 30 |
| 42. | Identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit and Super SMS (Straw Management System). | 65 | 25 | 90 |
| 43. | Test and troubleshoot functionality of major components and assemblies of mower, fodder harvester, power chaff/silage cutter. | 79 | 26 | 105 |
| 44. | Detect and rectify functionality of major components and assemblies of rotary harvester, haybailer. | 25 | 5 | 30 |
| 45. | Find and troubleshoot faults in major components and assemblies of groundnut digger, potato / onion digger. | 50 | 10 | 60 |
| 46. | Operation, Service and troubleshoot winnower, cleaner & grader. | 50 | 10 | 60 |
| 47. | Maintain and service rice huller, polisher, feed grinder-cum-mixer, hammermill. | 50 | 10 | 60 |
| 48. | Detect and rectify functionality of grain handling seed treating and drying equipment. | 50 | 10 | 60 |
| 49. | Read and apply engineering drawing for different application in the field of work. | - | 45 | 45 |
| 50. | Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. | - | 45 | 45 |
| Employability Skills | | - | 60 | 60 |
| Total | | 840 | 360 | 1200 |
| Grand Total | | 1680 | 720 | 2400 |

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. | <ul style="list-style-type: none"> • 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 in automotive workshop practices. | <ul style="list-style-type: none"> • 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 different types of fastening and locking devices in a vehicle and interpret importance of Lock Nut and Torque Wrench. | <ul style="list-style-type: none"> • 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. | <ul style="list-style-type: none"> • 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. | <ul style="list-style-type: none"> • Identify the different types of hand and power tools used in the automotive workshop. • Operate various tools and workshop equipment. |
| 6. Perform basic fitting operations used in the workshop practices and inspection of dimensions. | <ul style="list-style-type: none"> • Mark according to drawing by using marking tools on flat 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. |

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| | <ul style="list-style-type: none"> Identify and use hand tools for internal and external threading with taps and dies. Measure all dimensions in accordance with standard specification and tolerances. |
| 7. Produce sheet metal components using various sheet metal operations. | <ul style="list-style-type: none"> 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. |
| 8. Develop electrical circuits and test its parameters by using electrical measuring instruments. | <ul style="list-style-type: none"> 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. |
| 9. Perform basic electrical testing in a vehicle. | <ul style="list-style-type: none"> 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. |
| 10. Perform battery testing and charging operations. | <ul style="list-style-type: none"> 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. |
| 11. Develop/ Assemble basic electronic circuits and testing. | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Plan and select appropriate method to produce |

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|--|---|
| <p>with different types of welding processes in the given job.</p> | <p>components with welding process.</p> <ul style="list-style-type: none"> • 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. |
| <p>13. Identify the hydraulic and pneumatic components in a vehicle.</p> | <ul style="list-style-type: none"> • 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. |
| <p>14. Demonstrate Major Assemblies of different types of Tractors.</p> | <ul style="list-style-type: none"> • 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 standard reading. • Repair / Replace the defective gauges as per standard operating practice. • Check for proper functionality. |
| <p>15. Overhaul Diesel Engine of Tractor.</p> | <ul style="list-style-type: none"> • 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. |

| | |
|--|---|
| | <ul style="list-style-type: none"> • 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. |
| <p>16. Perform servicing of Cooling and Lubrication system of Tractor in a workshop.</p> | <ul style="list-style-type: none"> • 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 |
| <p>17. Service Intake and Exhaust System of Tractor in a workshop.</p> | <ul style="list-style-type: none"> • 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. |
| <p>18. Service Fuel Feed System of Tractor in a workshop.</p> | <ul style="list-style-type: none"> • 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. |

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| | <ul style="list-style-type: none"> Start the Engine and check for proper functioning as per standard guidelines specified by manufacturer. |
| 19. Overhaul Clutch and Gearbox of Tractor in a workshop. | <ul style="list-style-type: none"> 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. |
| 20. Overhaul Differential and PTO (Two Wheel Drive / Four Wheel Drive) Unit of Tractor in the workshop. | <ul style="list-style-type: none"> 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. |
| 21. Overhauling Steering system of Tractor in the workshop. | <ul style="list-style-type: none"> 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. |
| 22. Carryout Repair of Wheels and Tires of Tractor in the Workshop. | <ul style="list-style-type: none"> Check and service Rim, tires and tube and perform repair/replace if necessary. Inflate tires as per manufacturer recommended inflation pressure. |
| 23. Overhaul Brake system of Tractor in the workshop. | <ul style="list-style-type: none"> Test the brake of tractor for effectiveness. Service Brake. Remove Hydraulic Brake cylinder. |

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| | <ul style="list-style-type: none"> • Service Hydraulic brake cylinder. • Bleed the brake system. |
| 24. Overhaul Major Assemblies of Power Tiller and carryout Field Operation. | <ul style="list-style-type: none"> • 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. |
| 25. Overhaul Implements of Tractor. | <ul style="list-style-type: none"> • 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). • Adjust agricultural implements for correct functioning during field operations. |
| 26. Overhaul Charging system, Starting System, Lightning System of Tractor. | <ul style="list-style-type: none"> • 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. |
| 27. Read and apply engineering drawing for different application in the field of work. | <ul style="list-style-type: none"> • 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. |
| 28. Demonstrate basic mathematical concept and principles to perform practical operations. | <ul style="list-style-type: none"> • Solve different mathematical problems • Explain concept of basic science related to the field of study |

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| <p>Understand and explain basic science in the field of study.</p> | |
| <p>SECONDYEAR</p> | |
| <p>29. Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements.</p> | <ul style="list-style-type: none"> • 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. • Measure and adjust disc and tilt angle. • Identity the common fault and take corrective action for tillage system as per technical manual. • 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. • Ensure replaced components and assemblies conform to the specified operating specification. |
| <p>30. Check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator.</p> | <ul style="list-style-type: none"> • Select and use PPE while dismantling and assembling chisel plough. • 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 chisel plough. • Dismantle and assemble chisel plough. by reviewing: Technical data removal and replacement procedures. • Carryout hitching of sub soiler/ chisel plough. • Use the tools and equipment in the way specified by manufacturers to dismantle and assemble rotavator. • Dismantle and assemble rotavator by reviewing: Technical data for removal and replacement procedures complying. • Carry out workshop adjustments of rotavator • Identify the common fault and take corrective action for |

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| | <p>rotavator system as per technical manual</p> <ul style="list-style-type: none"> • Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements. |
| <p>31. Troubleshoot & test the functionality of major components and assemblies of disc harrows (Off set Type/Double action and single action) and Power harrows.</p> | <ul style="list-style-type: none"> • Use PPE, tools and equipment as per manufacturer's specified way while dismantling and assembling of disc harrows. • Dismantle and assemble disc harrows. • Measure and adjust gang angle. • Perform Depth adjustment and side deflector. • Identity the common fault and take corrective action for harrows system as per technical manual. • 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. |
| <p>32. Check and Service proper functionality of major components and assemblies of cultivators and soil forming equipment.</p> | <ul style="list-style-type: none"> • 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 assembles cultivators. • Dismantle and assemble cultivator by reviewing: Technical data for removal and replacement procedures. • Carryout setting of cultivator as per flow diagram. • Identity 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, ditches and bund formers/dozer/dumper by reviewing technical data removal and replacement procedures. • Carryout servicing of post hole digger as per technical manual. |
| <p>33. Identify and check functionality of major components and</p> | <ul style="list-style-type: none"> • Use PPE while dismantling and assembling of Lazar leveler, trencher & post hole digger. • Select tools and materials for the job and make this |

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| <p>assemblies of Laser leveler, trencher & post hole digger.</p> | <p>available for use in a timely manner</p> <ul style="list-style-type: none"> • Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles of Lazar leveler, trencher & post hole digger. • Dismantle and assemble Lazar leveler, trencher & post hole digger by reviewing technical data removal and replacement procedures. |
| <p>34. Dismantle, assemble and troubleshoot seed cum fertilizer drills.</p> | <ul style="list-style-type: none"> • Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles of seed drills • Carryout their Dismantling and assembling of seed drills by reviewing technical data removal and replacement procedures. • Carryout Calibration of seed & fertilizer rates. • Carryout Workshop adjustments of special drills such as zero till strip drill/rotto drill & Happy seeder. • Identity the common fault and take corrective action for seed drills as per technical manual. |
| <p>35. Test and verify functions of major components and assemblies of planters, transplanters and fertilizer applicators.</p> | <ul style="list-style-type: none"> • Select and use PPE while dismantling and assembling of planters. • 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 planters • Carryout dismantling and assembling of planters by reviewing technical data for removal and replacement procedures. • Set planter with different seed plates & adjust for planting. • Carryout vegetable trans planter adjustments. • Carryout raising bed and adjustments of paddy trans planter. • Dismantle and assemble fertilizer applicators by reviewing given technical data parameters. • Carryout calibration of fertilizer applicators. |
| <p>36. Identify and check functionality of major components and assemblies of volute type centrifugal pump and</p> | <ul style="list-style-type: none"> • Use PPE while dismantling and assembling of volute type centrifugal pump. • 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 |

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| <p>submersible pump.</p> | <p>manufacturers to dismantle and assembles volute type centrifugal pump.</p> <ul style="list-style-type: none"> • Dismantle and assemble volute type centrifugal pump by reviewing technical data for removal and replacement procedures. • Carryout adjustments process of centrifugal pump. • Measure discharge of water. |
| <p>37. Service irrigation valves and hydrants.</p> | <ul style="list-style-type: none"> • Use PPE while servicing of irrigation valves and hydrants. • 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’ 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). |
| <p>38. Service and Trouble shoot power tillers/ power weeder.</p> | <ul style="list-style-type: none"> • 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. • Identity the common fault and take corrective action for power tillers/power weeder as per technical manual. |
| <p>39. Identify and troubleshoot faults in major components and assemblies of sprayers & dusters.</p> | <ul style="list-style-type: none"> • 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 • Carryout Field adjustment and operation of sprayers and dusters • Identity the common fault and take corrective action for |

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| | <p>sprayers & dusters as per technical manual.</p> <ul style="list-style-type: none"> • 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. |
| <p>40. Detect and troubleshoot major components and assemblies of reaper, reaper Binder, straw-reapers.</p> | <ul style="list-style-type: none"> • 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 • Identity 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. |
| <p>41. Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator.</p> | <ul style="list-style-type: none"> • 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 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 |

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| | <ul style="list-style-type: none"> • Identity the common fault and take corrective action for Thresher, Maize seller, Ground nut decorticator as per technical manual. |
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| <p>42. Identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit and Super SMS (Straw Management System).</p> | <ul style="list-style-type: none"> • 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. |
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| <p>43. Test and troubleshoot functionality of major components and assemblies of mower, fodder harvester, power chaff/silage cutter.</p> | <ul style="list-style-type: none"> • 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 • Identity 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. • Identity the common fault and take corrective action for rotary harvester, hay bailer as per technical manual. |
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| <p>44. Detect and rectify functionality of major components and assemblies of rotary</p> | <ul style="list-style-type: none"> • 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. |

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| <p>harvester, haybailer.</p> | <ul style="list-style-type: none"> • 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. |
| <p>45. Find and troubleshoot faults in major components and assemblies of groundnut digger, potato / onion digger.</p> | <ul style="list-style-type: none"> • 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 digger by reviewing technical data of removal and replacement procedures. • Carryout Field operation and workshop adjustment for groundnut digger, hay bailer, potato / onion digger. • Identity the common fault and take corrective action for groundnut digger, hay bailer, potato / onion digger as per technical manual. |
| <p>46. Operation, Service and troubleshoot winnower, cleaner & grader.</p> | <ul style="list-style-type: none"> • 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. • 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. |
| <p>47. Maintain and service rice huller, polisher, feed grinder-cum-mixer,</p> | <ul style="list-style-type: none"> • 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 |

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| <p>hammermill.</p> | <p>available for use in a timely manner</p> <ul style="list-style-type: none"> • 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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| <p>48. Detect and rectify functionality of grain handling seed treating and drying equipment.</p> | <ul style="list-style-type: none"> • Identity 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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| <p>49. Read and apply engineering drawing for different application in the field of work.</p> | <ul style="list-style-type: none"> • 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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| <p>50. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.</p> | <ul style="list-style-type: none"> • Solve different mathematical problems • Explain concept of basic science related to the field of study |
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| 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. | 1. Make choices to carryout marking of the components for basic fitting operations in the workshop following safety precautions. | 1. Familiarization with institute, Job opportunities in the automobile 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 provided 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. | Admission & introduction to the trade: Introduction to the Course duration, course content, study of the syllabus. General rule per training to the Institute, facilities available- Hostel, Recreation, Medical and Library working hours and time table. 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. |
| | | 6. Practice using all marking aids, like steel rule with spring calipers, dividers, scriber, punches, Chisel etc. 7. Layout a workpiece-for line, circle, arcs and circles. | Hand & Power Tools: - Marking scheme, Marking material-chalk, Prussian blue. Cleaning tools- Scraper, wire brush, Emery paper, Description, care and use of Surface plates, steel rule, measuring tape, try square. |

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| | | <p>8. Practice to measure a wheel base of a vehicle with measuring tape.</p> <p>9. Practice to measure valve spring tension using spring tension tester.</p> <p>10. Practice to remove wheel lug nuts with use of an air impact wrench.</p> <p>11. Practice on General workshop tools & power tools.</p> | <p>Calipers-inside and outside. Dividers, surface gauges, scribe, punches-prick punch, center punch, pin punch, hollow punch, number and letter punch.</p> <p>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 pincer pliers, Side cutters, Tin snips, Circlippliers, external circlips 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 19 Hrs.</p> | <p>2. Perform precision measurements on the components in automotive workshop practices.</p> | <p>12. Practice on measuring the various components using precision instruments Vernier Caliper, Micrometer, Dial Bore Gauge, Telescopic Gauge, Feeler Gauge, Pressure Gauge, Dial Test Indicator by given Job.</p> | <p>Systems of measurement, Description, care & use of- Micrometers-Outside and depth micrometer, Micrometer (Analog/Digital) adjustments, Vernier calipers, Telescope gauges, Dial bore gauges, Dial indicators, straight edge, feeler gauge, thread pitch gauge, vacuum gauge, Tyre pressure gauge, Telemetry System, Tachometer.</p> |
| <p>Professional</p> | <p>3. Use different</p> | <p>13. Practice on General</p> | <p>Fasteners- Study of different</p> |

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| <p>Skill 10 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>types of fastening and locking devices in a vehicle and interpret importance of Lock Nut and Torque Wrench.</p> | <p>cleaning, checking and use of nut, bolts, & studs etc.</p> <p>14. Removal of stud/bolt from blind hole.</p> | <p>types of keys, screws, nuts, studs & bolts, locking devices, such as locknuts, cotter, split pins, keys, circlips, lock rings, lock washers and locating where they are used. Washers & chemical compound can be used to help secure these fasteners. Function of Gaskets, Selection of materials for gaskets and packing, oil seals.</p> |
| <p>Professional Skill 10 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>4. Use cutting tools in the workshop, following safety precautions while grinding.</p> | <p>15. Practice on cutting tools like Hacksaw, file, chisel, Sharpening of Chisels, center punch, safety precautions while grinding.</p> <p>16. Practice on Hacksawing and filing to given dimensions.</p> | <p>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.</p> |
| <p>Professional Skill 10 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>5. Use different types of tools and workshop equipment in the workshop.</p> | <p>17. Practice on Marking and Drilling clear and Blind Holes, Sharpening of Twist Drills Safety precautions to be observed while using a drilling machine.</p> <p>18. Use of Deburring Tools.</p> | <p>Limits, Fits & Tolerances: - Definition and Demonstration of limits, fits & tolerances with examples used in auto components.</p> <p>Drilling machine – Description and study of Bench type Drilling machine, Portable electrical Various types of Drills and Drilling machine and Special Uses, drill holding devices, Work Holding devices.</p> |
| <p>Professional Skill 10 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>6. Perform basic fitting operations used in the workshop practices and inspection of dimensions.</p> | <p>19. Practice on Tapping a Clear and Blind Hole, Selection of tap drill Size, use and selection of Lubrication, Use of stud extractor.</p> <p>20. Cutting Threads on a Bolt/ Stud.</p> <p>21. Adjustment of two - piece Die, reaming a</p> | <p>Taps and Dies: Hand Taps and wrenches, Electrical Flexible Tapping Machines, Calculation of Tap drill sizes for metric and inch taps. Different type of Die and Diestock. Screw extractors. Hand Reamers- Different Type of hand reamers, Drill size for reaming, Lapping, Lapping abrasives,</p> |

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| | | hole/ Bush to suit the given pin/ shaft. | type of Laps. |
| Professional Skill 10 Hrs.; | 7. Produce sheet metal components using various sheet metal operations. | 22. Brazing of Pipes, include the details in this. 23. Butt joint of M.S. Pipe (1/2-inch OD) by flame brazing process using brass filler rod. | Brazing. Fluxes used on common joints. Brazing: Its' principle and types. Filler rod and fluxes used on common brazing process. |
| Professional Knowledge 05 Hrs. | | | |
| Professional Skill 10 Hrs.; | 8. Develop electrical circuits and test its parameters by using electrical measuring instruments. | 24. Practice in joining wires using soldering Iron. 25. Construct simple electrical circuits. 26. Measure current, voltage and resistance using digital multimeter. 27. Practice continuity test for fuses, jumper wires, fusible links, circuit breakers. | Basic electricity, Ground connections, Multimeter, Conductors & insulators, Wires, Shielding, Length vs. resistance, Resist or ratings, Auto Electric. |
| Professional Knowledge 05 Hrs. | | | |
| Professional Skill 12 Hrs.; | 9. Perform basic electrical testing in a vehicle. | 28. Diagnose series, parallel, series-parallel circuits using Ohm's law. 29. Check electrical circuit with a test lamp. 30. Perform voltage drop test in circuits using multimeter. 31. Measure current flow using multimeter/ ammeter. 32. Use service manual wiring diagram for Troubles hooting. | Fuses & circuit breakers, Ballast resistor, Stripping wire insulation, cable colour codes and sizes, Resistors in Series circuits, Parallel circuits and Series-parallel circuits, Capacitors and its applications, Capacitors in series and parallel. |
| Professional Knowledge 03 Hrs. | | | |
| Professional Skill 27 Hrs.; | 10. Perform battery testing and charging operations. | 33. Carry out cleaning and topping up of a lead acid battery. 34. Test battery with hydrometer. 35. Connect battery to a charger for battery charging. 36. Inspect & test a battery | Description of Batteries & cells, Lead acid batteries, Lithium-ion Batteries & Stay Maintenance Free (SMF) batteries, Thermistors, Thermo couples, Relays, Solenoids, Charging system circuit. |
| Professional Knowledge 03 Hrs. | | | |

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| | | <p>after charging.</p> <p>37. Measure and Diagnose the cause(s)of excessive Key-off battery drain (parasitic draw) and do corrective action.</p> <p>38. Test relay and solenoids and its circuit.</p> | |
| <p>Professional Skill 10 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>11. Develop/ Assemble basic electronic circuits and testing.</p> | <p>39. Identify and test power and signal connectors for continuity.</p> <p>40. Identify and test different type of Diodes, NPN & PNP Transistors for its functionality.</p> <p>41. Construct and test simple logic circuits OR, AND & NOT and Logic gates using switches.</p> | <p>Basic electronics: Description of Semiconductors, Solid state devices-Diodes, Transistors, Thyristors, Uni Junction Transistors (UJT), Metal Oxide Field Effect Transistors (MOSFETs), Logic gates-OR, AND & NOT and Logic gates using switches.</p> |
| <p>Professional Skill 12 Hrs.;</p> <p>Professional Knowledge 03 Hrs.</p> | <p>12. Manufacture components with different types of welding processes in the given job.</p> | <p>42. Perform setting of Gas welding flames.</p> <p>43. Practice to make a straight beads and joints Oxy-Acetylene welding.</p> | <p>Introduction to welding and Heat Treatment Welding processes- Oxy–Acetylene welding-principles, equipment, welding parameters, edge preparation & fit up and welding techniques.</p> |
| <p>Professional Skill 69 Hrs.;</p> <p>Professional Knowledge 06 Hrs.</p> | <p>13. Identify the hydraulic and pneumatic components in a vehicle.</p> | <p>44. Identify Hydraulic components used in vehicle.</p> <p>45. Trace hydraulic circuit on hydraulic jack, hydraulic power steering, and Brake circuit.</p> <p>46. Identify different type of Vehicle.</p> <p>47. Demonstrate vehicle specification data.</p> <p>48. Identify Vehicle Information Number (VIN).</p> <p>49. Demonstrate Garage,</p> | <p>Introduction to Hydraulics & Pneumatics: - Definition of Pascal law, pressure, Force, viscosity. Description, symbols and application in automobile of Gear Pump-Internal & External, single acting, double acting & Double ended cylinder; Directional controlvalves-2/2, 3/2, 4/2, 4/3 way valve, Pressure life valve, Non return valve, Flow control valve used in automobile. (03 Hrs.)</p> |

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| | | <p>Service station equipment. -Vehicle hoists-Two post and four post hoist, Engine hoists, Jacks, Stands, Fitting and uses of Pressure gauge in the system and Take the Reading.</p> <p>50. Case Study</p> | <p>Auto Industry-History, leading manufacturers, development in automobile industry, trends, new product. Brief about Ministry of Road transport & Highways, Definition:-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 69 Hrs.;</p> <p>Professional Knowledge 06 Hrs.</p> | <p>14. Demonstrate Major Assemblies of different types of Tractor.</p> | <p>51. Demonstrate tractor specification data.</p> <p>52. Identify different major assemblies of tractor & cleaning of tractors, oil greasing and lubricating all moving parts of tractor.</p> <p>53. Practice on starting and stopping of tractor engine.</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>54. Dismantle tractor engine as per procedure & Inspect components for dimension and wear.</p> | <p>Engine Basics: Classification of engines, Principle & working of 2 & 4 stroke diesel engine (Compression ignition Engine (C.I), Principle of Spark Ignition 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,</p> |

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| <p>Professional Skill 81 Hrs.;</p> <p>Professional Knowledge 24 Hrs.</p> | <p>15. Overhaul Diesel Engine of Tractor.</p> | <p>55. Remove cylinder head from engine.</p> <p>56. Overhaul cylinder head assembly with use of service manual for clearance and other parameters.</p> <p>57. Practice on removing rocker arm assembly manifolds, fitting of valve guide.</p> <p>58. Overhaul cylinder block.</p> <p>59. Check measurement of cylinder liner & crank shaft for ovality and taperness.</p> <p>60. Overhaul piston and connecting rod assembly with use of service manual for clearance and other parameters.</p> <p>61. Practice removing oil sump and oil pump – clean the sump.</p> <p>62. Practice removing the big end bearing, connecting rod with the piston.</p> <p>63. Practice removing the piston rings, Dismantle the piston and connecting rod.</p> <p>64. Check the side clearance of piston rings in the piston groove & lands for wear.</p> <p>65. Check piston skirt and crown for damage and scuffing, clean oil holes.</p> | <p>Compression ratio.</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>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>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 for the cylinder liners & rings. Bearing failure & its causes-care & maintenance. Description of crank shaft & Camshafts. Types of their drives. Description of</p> |
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| | | <p>66. Measure-the piston ring close gap in the cylinder, clearance between the piston and the liner, clearance between crankpin and the connecting rod big end bearing.</p> <p>67. Check connecting rod for bend and twist.</p> <p>68. Perform setting of Connecting rod big end & main bearing.</p> <p>69. Assemble crankshaft, main bearings, connecting rods and piston assembly in the engine, fitting cylinder head.</p> <p>70. Setting valve timing.</p> <p>71. Identify New Age Engines (Sensors).</p> | <p>Overhead camshaft, importance of Camlobes. Crank case ventilation (PCV). Camshaft, Crank-shaft balancing, Firing order of the engine.</p> <p>Descriptionandfunctionoftheflywheelandvibrationdamper.Timingmark.</p> <p>Introduction of New Age Engines (Sensors)</p> |
| <p>Professional Skill 54 Hrs.;</p> <p>Professional Knowledge 06 Hrs.</p> | <p>16. Perform servicing of Cooling and Lubrication system of Tractor in a workshop.</p> | <p>72. Check cooling system for overheating /under-cooling.</p> <p>73. Carry out Dismantling, cleaning, assembling & testing of water pumps, reverse flushing the system.</p> <p>74. Check thermostat valve, pressure cap.</p> <p>75. Adjust the fan belt tension.</p> <p>76. Identify lubrication oil flow circuit in an engine.</p> <p>77. Overhaul oil pump, service oil cooler & centrifugal oil filter.</p> <p>78. Test oil pressure.</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. Cooling system components, water pump, function of thermostat, pressure cap, Recovery system & Thermo-switch. Function & types of Radiator.</p> <p>Lubrication system: - purposes & characteristics of oil, type of lubricants, grade as per SAE, & their application, oil additives, type of lubrication system. Lubrication system components- different type of</p> |

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| | | | Oil pump, Oil filters& oil cooler. Probable reasons for low/high oil pressure, high oil consumption and their remedies. |
| Professional Skill 26 Hrs.; Professional Knowledge 04 Hrs. | 17. Service Intake and Exhaust System of Tractor in a workshop. | 79. Carry out servicing of air cleaner (Oil bath) check & change an air filter. 80. Dismantle & assemble turbocharger, check for axial clearance as per service manual. 81. Perform Intercoolers Servicing. 82. Check Exhaust Gas Recirculation. 83. Check Exhaust system for rubber mounting for damage, deterioration and out of position; for leakage, loose connection, dent and damage. 84. Practice Exhaust manifold removal and installation. 85. Practice Catalytic converter removal and installation. | Intake & exhaust systems- Description of Diesel induction & Exhaust systems. Description & function of air compressor, Super charger, Intercoolers, turbocharger, variable turbo Charger mechanism. Intake system components- Description and function of Air cleaners, Different type air cleaner, Description of Intake manifolds and material. 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). |
| Professional Skill 53 Hrs.; Professional Knowledge 07 Hrs. | 18. Service Fuel Feed System of Tractor in a workshop. | 86. Practice engine tune up in a vehicle-testing vacuum and compression of engine. 87. Perform tracing of different parts of fuel system. 88. Repair fuel leaks in pipeline and unions. 89. Perform Servicing and testing of fuel feed pump, Servicing of fuel filters, Servicing of fuel Injection Pump. | Diesel fuel characteristics, concept of Quiet diesel technology & Clean 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 & |

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| | | <p>90. Perform Servicing of pressure pump of (C.R.D.I.),</p> <p>91. Regulator's and Elect/ Electronic injectors.</p> <p>92. Check operation of C.R.D.I. system.</p> <p>93. Overhaul & test injectors.</p> <p>94. Set injection timing.</p> <p>95. Bleed fuel lines for Airlocks, Tracing Airlock.</p> <p>96. Perform testing cylinder compression, checking idle speed, Obtaining & interpreting scan tool data.</p> <p>97. Fault finding & remedy, care & maintenance.</p> | <p>Detroit Diesel injection. Diesel electronic control-Diesel electronic control systems (DEC), Common rail diesel injection System.</p> <p>Method of bleeding fuel supply system.</p> |
| <p>Professional Skill 25 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>19. Overhaul Clutch and Gearbox of Tractor in a workshop.</p> | <p>98. Dismantle clutch assembly.</p> <p>99. Inspect the parts of clutch.</p> <p>100. Perform relining of clutch plate & assemble.</p> <p>101. Couple the clutch with fly wheel & join the engine with gearbox.</p> <p>102. Adjust clutch pedal free play.</p> <p>103. Dismantle gearbox of a tractor & inspect the parts.</p> <p>104. Assemble the gear box.</p> <p>105. Overhaul Transfer case and auxiliary gear box.</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. Gear box layout.</p> <p>Components of tractor gear box. Principle of epicyclical gear box. Necessity of torque convertor, need of 4 x 4-wheel drive/ Front wheel drive, Low & high gear ratio, universal joint and propeller shaft.</p> <p>Inspection and Measurement of Flywheel</p> |
| <p>Professional Skill 23 Hrs.;</p> | <p>20. Overhaul Differential and PTO (Two</p> | <p>106. Overhaul of differential.</p> <p>107. Perform Servicing of reduction gear, rear axle</p> | <p>Final Drive & Drive Shafts Differential carriers double reduction gearing,</p> |

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| <p>Professional Knowledge 07 Hrs.</p> | <p>Wheel Drive / Four Wheel Drive) Unit of Tractor in the workshop.</p> | <p>wheel hub. 108. Perform Servicing of PTO (Power Take Off). 109. Measure rpm of PTO shaft & speed of belt pulley. 110. Practice Backlash and Preloading Adjustment of Tapper roller bearing. 111. Perform Inspection and Measurement of Flywheel 112. Carry out Servicing of Front wheel drive Tractor and Front PTO shaft</p> | <p>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. Effect of Mis Adjustment of Backlash and Preloading. Introduction of Two wheel / Four-wheel drive.</p> |
| <p>Professional Skill 51 Hrs.; Professional Knowledge 09 Hrs.</p> | <p>21. Overhaul Steering System of Tractor in the workshop.</p> | <p>113. Practice checking, Layout of Mechanical steering system. 114. Perform Checking/ Inspection of Steering linkage and necessary repair (Wheel Alignment). 115. Remove steering wheel. Overhauling of steering gearbox of tractor. 116. Remove front axle and spindle hub and steering linkage. 117. Reassemble steering assembly and Test for correct function. 118. Check, inspect layout of different parts of Hydraulic steering system. 119. Practice visual inspection of chassis frame for crack, bent and twists. 120. Overhaul and Inspect</p> | <p>Steering Systems- Function and types of steering system. 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, pipeline and hoses etc. Development of mechanical framing. Use of Power tiller, Tractor & Bulldozer, Chassis frame of tractor. Types of Steering system including Auto Steering System</p> |

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| | | shackle, front & rear suspension. 121. Lubricate a suspension system. | |
| Professional Skill 25 Hrs.; Professional Knowledge 05 Hrs. | 22. Carry out Repair of Wheels and Tires of Tractor in the Workshop. | 122. Remove wheels from tractor. 123. Dismantle wheel for checking rims, run out of Wheel rims, tires for wear and tubes for leaks. 124. Perform Repairing, de-rusting, painting. 125. Practice Fitting of tires and tubes on rim & inflate to correct pressure. 126. Practice tire rotation. 127. Practice Fitting wheels on tractors. 128. Practice Tightening of wheel in correct sequence. 129. Check & adjust tire pressure by use of air or by Nitrogen. 130. Perform Wheel Track Adjustment. 131. Check Auxillary Attachment of wheels/ Traction aids for different Terrains. | Wheels & Tires- Description, construction and function of Wheel, Rim sizes, Types & sizes of tires, Solid, pneumatic & Radial, Plyrating, Tire materials, Hysteresis & designations, Tire information, Tire tread designs, Tire ratings for temperature & traction. Importance of in-Flatting tires to correct pressure. Repair and maintenance of tires and tubes. Storage of tires. Descriptions Tire wear Patterns and causes Nitrogen vs atmospheric air entries. Wheel Track Adjustment |
| Professional Skill 36 Hrs.; Professional Knowledge 09 Hrs. | 23. Overhaul Brake system of Tractor in the workshop. | 132. Overhaul brakes including cleaning and inspection of all components, relining shoes, setting and actuating shoe clearance. 133. Check Inspection spring of both shoe and lever. 134. Inspect and set parking | Braking Systems-Braking fundamentals Principles of braking, Different types of Breaking system, Drum & disc brakes, Lever/mechanical advantage, Hydraulic pressure & force, Brake fade. Braking systems - Brake type used on tractor-principles, Airbrakes, |

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| | | brakes. 135. Inspect and set hydraulic main brake including replacement of washer and oil seals. 136. Overhaul serves mechanism (as applicable) inspecting piston and valves. 137. Carry out Bleeding and adjustment of brakes. 138. Perform Fault tracing and remedy. 139. Practice Skimming of brake drum and disc plate. | Braking system components- Park brake system, Brake pedal, Brake lines, Brake fluid, Bleeding, Master cylinder, Divided systems, Tandem master cylinder, Power booster or brake unit, Hydraulic brake booster, Applying brakes, Brake force, Brake light switch 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, Proportion in gvalves, Proportioning valve operation, Brake friction materials. |
| Professional Skill 26 Hrs.; Professional Knowledge 04 Hrs. | 24. Overhaul Major Assemblies of Power Tiller and carryout Field Operation. | 140. Practice Overhauling power tiller transmission system includes main clutches, steering clutch/brakes mechanism-gear box and wheel hub testing for field operation without implements and with implements. 141. Practice driving with trolley/trailer. | 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/brakes mechanism method of power transmission to implement (Rotation), irrigation pump, thresher. Hitching of M.B. Plough, trailer disc harrow. |
| Professional Skill 24 Hrs.; Professional Knowledge 06 Hrs. | 25. Overhaul Implements of Tractor. | 142. Check implements such as plough harrows, cultivators, seed drills, tractor trailer, & P.T.O. units etc. for service ability before use. 143. Lubricate the mast | Tractor equipment: - Description, function of harrows, cultivators, seed drills & tractor trailer. Hitching of equipment. Danger in overloading & incorrect field operation. Average life of |

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| | | <p>required. Hitching practice (single & three point).</p> <p>144. Exercise in driving a tractor with different implements.</p> | <p>Agriculture implements. Description and function of tractor accessories such as Draw bar, top link & Belly Pulley. Setting of drawbar to correct height. Use of Hydraulic lift. Maintenance of tractor accessories.</p> |
| <p>Professional Skill 25 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>26. Overhaul Charging system, Starting System, Lightning System of Tractor.</p> | <p>145. Practice removing alternator from vehicle dismantling, cleaning checking for defects, assembling and testing for RPM measurements and motoring action of alternator & fitting to vehicles.</p> <p>146. Practice removing starter motor vehicle and overhauling the starter motor, Servicing of Gear Reduction Starter motor, testing of starter motor.</p> <p>147. Carry out servicing storage batteries, tracing lighting circuit fault rectification.</p> | <p>Tractor Electrical Maintenance:</p> <p>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, Introduction of Gear Reduction Starter motor, common troubles and remedy in starter circuit. Description of lighting circuit. Charging & discharging of lead acid battery. Introduction of Future Technology (New Aged Engines)</p> |
| ENGINEERING DRAWING | | | |
| <p>Professional Knowledge</p> <p>ED- 30 Hrs.</p> | <p>27. Read and apply engineering drawing for different application in the field of work.</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> | |

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| | | <p>Angle, Triangle, Circle, Rectangle, Square, Parallelogram. Lettering & Numbering – Single Stroke. Dimensioning Types of arrowhead Leader line with text 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 | | |
| <p>Professional Knowledge WCS- 30 Hrs.</p> | <p>28. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.</p> | <p>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</p> |

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| | | <p>Speed and velocity - Related problems on speed & velocity Work, power, energy, HP, IHP, BHP and efficiency</p> <p>Heat & Temperature and Pressure</p> <p>Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals</p> <p>Concept of pressure - Units of pressure, atmospheric pressure, absolute pressure, gauge pressure and gauges used for measuring pressure</p> <p>Basic Electricity</p> <p>Introduction and uses of electricity, electric current AC,DC their comparison, voltage, resistance and their units</p> <p>Mensuration</p> <p>Area and perimeter of square, rectangle and parallelogram Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder</p> <p>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</p> <p>Simple machines - Effort and load, mechanical advantage, velocity ratio, efficiency of machine, relationship between efficiency, velocity ratio and mechanical advantage</p> <p>Lever & Simple machines - Lever and its types</p> <p>Trigonometry</p> <p>Measurement of angles Trigonometrical ratios Trigonometrical tables</p> |
| In Plant Training/Project Work | | |

| SYLLABUS – MECHANIC AGRICULTURAL MACHINERY | | | |
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| Second Year | | | |
| Duration | Reference Learning Outcome | Professional Skills (Trade Practical) | Professional Knowledge (Trade Theory) |
| Professional Skill 37 Hrs.; Professional Knowledge 08 Hrs. | 29. Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. | 148. Use PPE while dismantling and assembling of Reversible Mould Board plough. 149. Interpret range of machinery used in the trade & their features. 150. Demonstrate precautions to be observed in handling farm machinery. 151. Dismantle Mould Board plough. Check, repair & replace their Component. 152. Assemble MB plough, measure Horizontal & Vertical suction. 153. Dismantle disc plough, check, repair & replace their components. 154. Assemble disc plough, measure disc & tilt angle of disc plough. Workshop adjustments. 155. Perform Hitching of ploughs. Field operation & adjustments. 156. Identify Faults and apply remedies. 157. 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 05 Hrs. | 30. Check, test and troubleshoot faults in functionality of major components and assemblies of | 158. Service sub soiler and dismantle chisel plough. 159. Check, repair & replace the component. 160. Assemble chisel plough. 161. Hitch sub soiler/ chisel plough. | Function & working of sub soiler/ chisel plough. Constructional details. Function & working of Rotavator. Workshop adjustments. Method of hitching. |

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| | Chisel Plough and Rotavator. | <p>162. Dismantle Rotavator/Roto Cultivators, check repair and replace its components.</p> <p>163. Assemble Rotavator and conduct workshop adjustments.</p> <p>164. Perform field operations & adjustments.</p> <p>165. Find Faults and apply remedies.</p> <p>166. Perform Care and maintenance.</p> | Importance of weight transfer. Method of ploughing. Method of Field operation. Recommended speeds for operation of rotavators. Daily and periodical maintenance |
| <p>Professional Skill 20 Hrs.;</p> <p>Professional Knowledge 10 Hrs.</p> | 31. Troubleshoot & test the functionality of major components and assemblies of disc harrows (Off set Type/Double action and single action) and Power harrows. | <p>167. Dismantle & assemble disc harrows (Off set Type/Double action).</p> <p>168. Dismantle & assemble disc harrows (Single action).</p> <p>169. Measure gang angle.</p> <p>170. Dismantle & assemble bar/power harrows.</p> <p>171. Service spring/blade harrow.</p> <p>172. Plan and prepare Hitching arrangements.</p> <p>173. Perform field operation & adjustments.</p> <p>174. Detect Faults and apply Remedies.</p> <p>175. Perform Care and maintenance.</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>Professional Skill 25 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | 32. Check and Service proper functionality of major components and assemblies of cultivators and soil forming equipment. | <p>176. Dismantle the cultivator (Spring /Rigid) and check, repair & replace the components.</p> <p>177. Assemble the cultivator.</p> <p>178. Illustrate setting of cultivators with the help of floor diagram.</p> <p>179. Demonstrate Workshop adjustments, and perform field operation &</p> | Types of cultivator. Working Principles & their constructional details, adjustments. Common types of shovels & seeps. Adjustments, mode of operation. Trouble shooting. Care & Maintenance. |

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| | | <p>adjustments.</p> <p>180. Trace Faults and implement Remedies.</p> <p>181. Perform Care and maintenance.</p> | |
| <p>Professional Skill 25 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>33. Identify and check functionality of major components and assemblies of Laser leveler, trencher & post hole digger.</p> | <p>182. Dismantle and assemble levelers, scrapers/ blade terracer, ditchers and bund formers/dozer/dumper.</p> <p>183. Service Laser leveler, post hole digger.</p> <p>184. Perform Calibration of Receiver and transmitter of laser Leveler.</p> <p>185. Dismantle, check, repair & replace the components of Laser leveler, trencher & post hole digger.</p> <p>186. Assemble Laser leveler, trencher & post hole digger.</p> <p>187. Arrange and perform Workshop adjustments.</p> <p>188. Set, adjust and troubleshoot field operation.</p> | <p>Soil forming equipment & their types. Constructional details of levelers, scrapers/ blade terracer, ditchers and bund formers.</p> <p>Constructional details of Laser leveler, trencher & dozer/dumper and post hole digger.</p> <p>Prime mover & driving practice. Adjustments, mode of operation. Method of Field operation.</p> <p>Recommended speeds for operation. Daily and periodical maintenance, Care & Maintenance.</p> <p>Introduction of Receiver and transmitter of laser Leveler.</p> |
| <p>Professional Skill 50 Hrs.;</p> <p>Professional Knowledge 10 Hrs.</p> | <p>34. Dismantle, assemble and troubleshoot seed cum fertilizer drills.</p> | <p>189. Dismantle & assemble seed drills.</p> <p>190. Calibrate seed & fertilizer rates.</p> <p>191. Perform Workshop adjustments of special drills such as zero till, strip drill/rotto drill & Happy seeder.</p> <p>192. Conduct Field operation & adjustments of special drills such as zero till, strip drill/rotto drill & Happy seeder/super seeder/ smart seeder/ surface seeder.</p> | <p>Types of seed drills & their uses. Constructional details of seed cum fertilizer drill. Seed & fertilizer metering devices.</p> <p>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 calibration and mode of operation. Guide chart for mixing fertilizers.</p> |

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| | | 193. Trace Faults and apply remedies. | Recommended speeds for operation. Care & maintenance. Introduction of Happy seeder/super seeder/ smart seeder/ surface seeder. |
| Professional Skill 83 Hrs.; | 35. Test and verify functions of major components and assemblies of planters, transplanters and fertilizer applicators. | 194. Dismantle & assemble of planters, Pneumatic planters, calibrate seed & fertilizer rates. | 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. |
| Professional Knowledge 22 Hrs. | | 195. Conduct Workshop adjustments and set planter with different seed plates & adjusts for planting. 196. Repair furrow openers. 197. Carry out Servicing of veg. transplanter. 198. Use veg. transplanter and adjustments. 199. Service paddy transplanter and nursery seeder for MAT type nursery. 200. Use paddy transplanter. and adjustments. 201. Use cage-wheels 202. Use Puddlers. | |
| | | 203. Dismantle and assemble fertilizer applicators. 204. Perform minor repairs of fertilizer applicator; calibrate fertilizer applicator. 205. Perform field operation & adjustments of fertilizer applicators and troubleshoot the problems. 206. Follow precautions to be observed in handling fertilizer. | 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. |
| Professional Skill 50 Hrs.; | 36. Identify and check functionality of | 207. Visit to a tube well boring sites for study of boring | Source of water. Study common irrigation and |

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| Professional Knowledge 10 Hrs. | major components and assemblies of volute type centrifugal pump and submersible pump. | and its operation. 208. Dismantle and assemble a volute, diffuser type, centrifugal pump, Submersible pump and Turbine pump. 209. Prepare foundations and install a pumping set. 210. Check Adjustments and operation of a pumping set. | drainage systems. Types of irrigation systems. Types of pumps. Working principles & constructional details of centrifugal pumps. Introduction of diffuser type, centrifugal pump, Submersible pump and Turbine pump. |
| | | 211. Service a submersible pump. 212. Measure discharge of water and install HDPE, QRC, PVC & dipper pipe line. | 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 Development/resurging the tube well to improve its discharge. |
| Professional Skill 25 Hrs.; Professional Knowledge 05 Hrs. | 37. Service irrigation valves and hydrants. | 213. Repair and adjust irrigation valves and hydrants. 214. Install sprinkler and fogger. 215. Install pop-up and drippers. 216. Install drippers on level/hilly ground. 217. Field operation & adjustment (angular/ full circle). Faults and reme Troubleshooting. | 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/Underground Pipeline system. Working principles of drippers. Methods of field operation & adjustment. Daily and periodical maintenance. Precautions to be observed. Care & Maintenance. |
| Professional Skill 20 Hrs.; Professional Knowledge | 38. Service and Trouble shoot power tillers/ power weeder. | 218. Service Power tiller/power weeder. 219. Perform field operation with different attachments with Common | Types of power tillers, their uses, constructional details. Method of power transmission for different field operation with |

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| <p>10 Hrs.</p> | | <p>adjustments. 220. Dismantle and assemble a cultivator and performer pairing and maintenance. 221. Adjust the cultivator with the help of floor diagram. 222. Set shovels and sweeps. 223. Perform field operation of cultivator with shovels and sweeps. 224. Troubleshoot faults and apply remedies. 225. Plan and prepare care and maintenance work.</p> | <p>different attachments. Common types of weeds and their control. Methods of weed control. Constructional detail of power weeder. Pre emergence and post emergence applications. Recommended weedicides for different crops. Equipments used for their applications. Trouble shooting and remedies. Daily and periodical maintenance. Precautions in handling weedicides.</p> |
| <p>Professional Skill 48 Hrs.;</p> <p>Professional Knowledge 12 Hrs.</p> | <p>39. Identify and troubleshoot faults in major components and assemblies of sprayers & dusters.</p> | <p>226. Dismantle and assemble of different types of pumps (HTP, Diaphragm). 227. Calibrate sprayers and carryout field adjustments & operation of sprayers. 228. Service fogging machine and calibrate common dusters. 229. Service high clearance/ cotton sprayers. 230. Service Aero blast sprayers. 231. Calibrate & adjust high clearance/ cotton sprayers & Aero blast sprayers. 232. Carryout repairs and maintenance work. 233. Perform field operation & adjustments. 234. Troubleshoot faults and apply remedies. 235. Apply precaution measure while handling insecticides and pesticides.</p> | <p>Safety precautions Types of sprayers & dusters. Working principles. Calibrations of sprayers & dusters. Method of operation. Common prime movers. Workshop adjustments. Constructional details, working principles & calibration of high clearance sprayers/ cotton & Aero blast sprayers. Methods of operation. Field operation. Common accidents and their prevention. Care and maintenance.</p> |
| <p>Professional</p> | <p>40. Detect and</p> | <p>236. Dismantle and assemble a</p> | <p>Reapers & their types</p> |

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| <p>Skill 38 Hrs.;</p> <p>Professional Knowledge</p> <p>07 Hrs.</p> | <p>troubleshoot major components and assemblies of reaper, reaper Binder, straw-reapers.</p> | <p>reaper.</p> <p>237. Carryout Workshop adjustments.</p> <p>238. Dismantle and assemble reaper winder (Knotting Mechanism) and demonstrate workshop adjustments.</p> <p>239. Dismantle and assemble straw-reapers and carry out their workshop adjustments.</p> <p>240. Carryout hitching and fitting with prime mover.</p> <p>241. Perform field operation& adjustment of reapers/ reaper winder/ straw - reapers.</p> <p>242. Trace faults and ensure correct functioning.</p> | <p>Functions, working principles (Weights-90degree), constructional details (blades, pulleys, belts). Field adjustments & operation Care and maintenance. Trouble shooting. Precautions in working & transporting.</p> |
| <p>Professional Skill 25 Hrs.;</p> <p>Professional Knowledge</p> <p>05 Hrs.</p> | <p>41. Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator.</p> | <p>243. Dismantle and assemble thresher.</p> <p>244. Carryout workshop adjustments. Fit with prime mover.</p> <p>245. Select tools and use for adjusting and operating in field.</p> <p>246. Dismantle and assemble Maize seller.</p> <p>247. Dismantle and assemble groundnut decorticator; fit with prime mover.</p> <p>248. Measure important speeds affecting the performance.</p> <p>249. Detect fault and apply remedies.</p> <p>250. Demonstrate precautionary measures for safe operation.</p> | <p>Types of threshers, maize Sheller and ground nut decorticators. Working principles, constructional details. Adjustments and operations. Prime mover and driving systems. Troubleshooting and remedies. Transmission of power belts, and pulleys. Safety precautions (08Hrs)</p> |
| <p>Professional Skill 65 Hrs.;</p> | <p>42. Identify and check functionality of</p> | <p>251. Perform on different components systems of</p> | <p>Purpose of a combine harvester.</p> |

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| <p>Professional Knowledge 25 Hrs.</p> | <p>major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit and Super SMS (Straw Management System).</p> | <p>combine harvester. 252. Describe drive mechanism and controls of combine harvester. 253. Drive combine harvester. 254. Dismantle cutter bar assembly. 255. Dismantle feeder unit. 256. Dismantle threshing unit /separating unit. 257. Check, repair and replace the defective components. 258. Assemble the components of different systems of combine harvester. 259. Carryout workshop adjustments. 260. Transport practice of the combine. 261. Operate the combine in the field and adjust according to the field and crop conditions. 262. Carryout its servicing and maintenance work. 263. Compute grain losses. Storage during off season and perform care and maintenance work. 264. Adjustment of Super SMS system 265. Servicing of HST (Hydro Static Transmission System)</p> | <p>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 condition. Types of grain losses, their causes and remedies. 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. Super SMS system Concept of HST (Hydro Static Transmission System)</p> |
| <p>Professional Skill 79 Hrs.;; Professional Knowledge 26 Hrs.</p> | <p>43. Test and troubleshoot functionality of major components and assemblies of mower, fodder harvester, power</p> | <p>266. Dismantle and assemble mower / fodder harvester. 267. Demonstrate dismantling and assembling of power chaff/ silage-cutter. 268. Perform Workshop adjustments. 269. Perform hitching and</p> | <p>Need of green harvesting equipment. Working principles, constructional details of mover. Functions, working principles, constructional details of folder harvester. Functions, working principles,</p> |

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| | chaff/silage cutter. | <p>fitting with prime-mover.</p> <p>270. Carryout field operation and adjustments.</p> <p>271. Perform servicing and maintenance.</p> | <p>constructional details power chaff/ silage- cutter.</p> <p>workshop and field adjustments.</p> <p>Methods of field operation. care and maintenance.</p> <p>Trouble shooting.</p> <p>Precautions in working & transporting.</p> |
| <p>Professional Skill 25 Hrs.;</p> <p>Professional Knowledge 05 Hrs.</p> | <p>44. Detect and rectify functionality of major components and assemblies of rotary harvester, haybailer.</p> | <p>272. Dismantle and assemble rotary harvester/ hay bailer.</p> <p>273. Carryout Workshop adjustments.</p> <p>274. Perform Hitching and fitting with prime- mover.</p> <p>275. Perform field operation and adjustments.</p> <p>276. Use Safety precautions while servicing and maintenance.</p> <p>277. Troubleshoot Faults and apply remedies for proper functioning.</p> | <p>Function and working of rotary harvester. Function and working of hay-bailer.</p> <p>Workshop adjustments.</p> <p>Method of field operation.</p> <p>Method of transportation.</p> <p>Common accidents and their prevention. Trouble shooting.</p> <p>Care and maintenance.</p> |
| <p>Professional Skill 50 Hrs.;</p> <p>Professional Knowledge 10 Hrs.</p> | <p>45. Find and troubleshoot faults in major components and assemblies of groundnut digger, potato / onion digger.</p> | <p>278. Dismantle groundnut digger /potato / onion digger.</p> <p>279. Check, repair and replace the defective components.</p> <p>280. Assemble groundnut digger potato /onion digger.</p> <p>281. Carryout Workshop adjustments. Attachment of diggers with prime-movers.</p> <p>282. Perform field operation and adjustments, servicing and maintenance work.</p> <p>283. Identify and troubleshoot faults following safety precautions and apply remedies for proper</p> | <p>Need & importance of root harvesting machine. Types & working of diggers.</p> <p>Components of diggers.</p> <p>Prime mover attachments and driving system.</p> <p>Transporting the root harvesting machinery.</p> <p>Settings & Adjustments.</p> <p>Troubles & Maintenance.</p> <p>Safety precautions.</p> |

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| Professional Skill 50 Hrs.; | 46. Operation, Service and troubleshoot winnower, cleaner & grader. | 284. Service and adjust the winnower, cleaner & graders. | 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. |
| Professional Knowledge 10 Hrs. | | 285. Fit with primem over attachment. 286. Operate winnower, cleaner and grader. 287. Trace Common troubles and its causes. | |
| Professional Skill 50 Hrs.; | 47. Maintain and service rice huller, polisher, feed grinder-cum-mixer, hammermill. | 288. Service and adjust the rice huller, polisher, the feed grinder-cum- mixer. | Importance of rice huller and polisher, feed grinder-cum-mixer, hammer mill, oil extractor and sugarcane crusher. Constructional details, materials used. Principles of operation. Common faults and remedies. Care & maintenance. Safety precautions. |
| Professional Knowledge 10 Hrs. | | 289. Service and adjust the hammer mill and fit with prime mover. 290. Operate rice huller, polisher, hammer mill. 291. Trace Common troubles and its causes. | |
| Professional Skill 50 Hrs.; | 48. Detect and rectify functionality of grain handling seed treating and drying equipment. | 292. Visit to a grain drying and storing plant and study different aspects of the construction, adjustments, controls. | Working of fans and blowers. Purpose of grain auger, bucket elevator etc., Constructional details and working of a grain drier. Grain storage structure i.e. concrete and sheet metal bins (sylo structure). Methods and instruments used for measuring moisture contents of grains. Equipment and methods used for treating and fumigating seeds and grains. |
| | | 293. Operate grain handling seed treating and drying equipment. 294. Explain silo structure. | |
| Professional Knowledge 10 Hrs. | | 295. Prepare Log books. 296. Maintain necessary records i.e. Log books of tractors, combines etc. 297. Plan and prepare service | Operation of transporting and handling equipment i.e. Tractor, tractor trailer, power tiller & combine harvester. |

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| | | schedules, off season storage of farm equipment. | |
| | | 298. Visit to a Government Farms, Custom Hiring centers and Co-operative Societies. 299. Describe farm records, accounts and log books. 300. Plan and prepare service schedule of farm machinery, off season storing of farm equipment. 301. Plan and prepare layout and list of equipment of a typical farm workshop. | Procedure and principle for efficient management and organization of a farm. Discussion on different farm shop layout. |
| ENGINEERING DRAWING | | | |
| Professional Knowledge ED- 45 Hrs. | 49. Read and apply engineering drawing for different application in the field of work. | Reading of Electrical, Electronic & Mechanical Sign and Symbols used in Automobile. Sketches of Electrical, Electronic & Mechanical components used in Automobile. Reading of Electrical wiring diagram and Layout diagram used in Automobile. Drawing of Electrical circuit diagram used in Automobile. Drawing of Block diagram of Instruments & equipment of trades | |
| WORKSHOP CALCULATION & SCIENCE | | | |
| Professional Knowledge WCS- 45 Hrs. | 50. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. | Friction Friction - Advantages and disadvantages, simple problems related to friction Friction - Lubrication Estimation and Costing Estimation and costing - Simple estimation of the requirement of material etc., as applicable to the trade Estimation and costing - Problems on estimation and costing | |
| In Plant Training/Project Work | | | |

SYLLABUS FOR CORE SKILLS

1. Employability Skills (Common for all CTS trades) (120 Hrs. for 1st year + 60 Hrs. for 2nd year)

Learning outcomes, assessment criteria, syllabus and Tool List of Employability Skills is provided separately in www.cstaricalcutta.gov.in / www.bharatskills.gov.in / www.dgt.gov.in.

| List of Tools & Equipment | | | |
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| MECHANIC AGRICULTURAL MACHINERY (For batch of 24 Candidates) | | | |
| 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 | up to 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 | | 1 No. |
| 21. | Adjustable spanner | Pipe wrench 350 mm | 2 Nos. |
| 22. | Air blow gun with standard accessories | | 1 No. |
| 23. | Air impact wrench with standard accessories | | 4 Nos. |
| 24. | Air ratchet with standard accessories | | 4 Nos. |
| 25. | Alternator for tractor – different type | | 2 Nos. |
| 26. | Ammeter | 300A/ 60A DC with external shunt | 4 Nos. |
| 27. | Angle plate adjustable | 250x150x175 | 1 No. |
| 28. | Anvil 50 Kgs with Stand | | 1 No. |
| 29. | Arbor press hand operated | 2-ton capacity | 1 No. |
| 30. | Auto Electrical test bench | | 1 No. |
| 31. | Battery –charger | | 2 Nos. |
| 32. | Belt Tensioner gauge | | 1 No. |

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| 33. | Car Jet washer with standard accessories | | 1 No. |
| 34. | Carburetor repair tool kit | | 1 No. |
| 35. | Chain Pulley Block- | 3 ton capacity with tripod stand | 1 No. |
| 36. | Chaser hard W/V | 9 to 40 T.P.I. set of 11 external. | 1 set |
| 37. | Chaser, hand W/W | 9 to 40 T.P.I. set of 11 internal. | 1 set |
| 38. | Chisel | 10 cm flat | 4 Nos. |
| 39. | Chisels cross cut | 200 mm X 6mm | 4 Nos. |
| 40. | Circlip pliers Expanding and contracting type | 15cm and 20cm each | 4 Nos. |
| 41. | Clamps C | 100mm | 2 Nos. |
| 42. | Clamps C | 150mm | 2 Nos. |
| 43. | Clamps C | 200mm | 2 Nos. |
| 44. | Cleaning tray | 45x30 cm. | 4 Nos. |
| 45. | Clutches, different types such as cone type, disc type | | 1 each |
| 46. | Compression testing gauge suitable for diesel Engine | | 2 Nos. |
| 47. | Connecting rod alignment fixture | | 1 No. |
| 48. | Copper bit soldering iron | 0.25 Kg | 4 Nos. |
| 49. | Cut section model of fuel filter | | 1 No. |
| 50. | Cylinder bore gauge capacity | 20 to 160 mm | 4 Nos. |
| 51. | Cylinder liner- Dry & wet liner, press fit & slidefit liner | | 1 each |
| 52. | Ohmmeter | 0 to 300 Ohms, mid scales at 20 Ohms | 2 Nos. |
| 53. | Depth micrometer | 0-25mm | 4 Nos. |
| 54. | Dial gauge type | 1 Gr. A (complete with clamping devices and stand) | 4 Nos. |
| 55. | Different type of Engine Bearing model | | 1 set |
| 56. | Different type of piston model | | 1each |
| 57. | Drift Punch Copper | 15 cm | 4 Nos. |
| 58. | Drift, copper | 10 x 15 1/2 mm | 2 Nos. |
| 59. | Drill point angle gauge | | 1 No. |
| 60. | Drill twist | 1.5 mm to 15 mm (various sizes) by 0.5 mm | 4 Nos. |
| 61. | Electric Soldering Iron | 230 V 60 watts 230 V 25 watts | 2 each |
| 62. | Electric testing screw driver | | 2 Nos. |
| 63. | Engineer's square | 15 cm. Blade | 2 Nos. |
| 64. | Engineers stethoscope | | 1 No. |
| 65. | Equipment puncture, in box, | | 1 No. |
| 66. | Feeler gauge | 20 blades (metric) | 2 Nos. |
| 67. | File flat | 20 cm bastard | 4 Nos. |
| 68. | File, half round | 20 cm second cut | 4 Nos. |
| 69. | File, Square | 20 cm second cut | 4 Nos. |
| 70. | File, Square | 30 cm round | 4 Nos. |

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| 71. | File, triangular | 15 cm second cut | 4 Nos. |
| 72. | Files assorted sizes and types including safe edge file | (20 Nos) | 2 set |
| 73. | Flat File | 25 cm second cut | 4 Nos. |
| 74. | Flat File | 35 cm bastard | 4 Nos. |
| 75. | Fuel feed pump for diesel | | 2 Nos. |
| 76. | Fuel injection pump (Diesel) inline | | 1 No. |
| 77. | Glow plug tester | | 2 Nos. |
| 78. | Granite surface plate | 1600 x 1000 with stand and cover | 1 No. |
| 79. | Grease Gun | | 2 Nos. |
| 80. | Grover | 3, 4, 6mm. | 1 Each |
| 81. | Growler | | 2 Nos. |
| 82. | Hacksaw frame adjustable | 20-30 cm | 10 Nos. |
| 83. | Hammer Ball Peen | 750Gm/800Gm/1KG | 4 Nos. |
| 84. | Hammer Chipping | 0.25 Kg | 4 Nos. |
| 85. | Hammer copper | 1 Kg with handle | 4 Nos. |
| 86. | Hammer Mallet | | 4 Nos. |
| 87. | Hammer Plastic | (i) for crimping up to 4mm and (ii) for crimping up to 10mm | 4 Nos. |
| 88. | Hand operated crimping tool | | 2 Nos. |
| 89. | 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 |
| 90. | Hand Shear Universal | 250mm | 2 Nos. |
| 91. | Hand vice | 37 mm | 2 Nos. |
| 92. | High rate discharge tester (cell tester) | | 1 No. |
| 93. | Hollow Punch set of seven pieces | 6mm to 15mm | 2 sets each |
| 94. | Hydraulic jack HI-LIFT type - | 3-ton capacity, | 1 No. |
| 95. | Injector – Multi hole type, Pintle type | | 4 each |
| 96. | Injector cleaning unit | | 1 No. |
| 97. | Injector testing set (Hand tester) | | 1 No. |
| 98. | Insulated Screw driver | 20 cm x 9mm blade | 4 Nos. |
| 99. | Insulated Screw driver | 30 cm x 9mm blade | 4 Nos. |
| 100. | Left cut snips | 250mm | 4 Nos. |
| 101. | Lifting jack screw type | 3 ton, 5ton | 1 each |
| 102. | Magneto spanner | set with 8 spanners | 1 set |
| 103. | Magnifying glass | 75mm | 2 Nos. |
| 104. | Marking out table | 90X60X90 cm. | 1 No. |
| 105. | Multi Scan Tool | | 1 No. |
| 106. | Multimeter digital | | 5 Nos. |
| 107. | Oil can | 0.5/0.25 liter capacity | 2 Nos. |
| 108. | Oil pump for dismantling and assembling. | | 2 Nos. |
| 109. | Oil Stone | 15 cm x 5 cm x 2.5 cm | 1 No. |

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| 110. | Oscilloscope | 20MHz | 1 No. |
| 111. | Outside micrometer | 0 to 25 mm | 4 Nos. |
| 112. | Outside micrometer | 25 to 50 mm | 4 Nos. |
| 113. | Outside micrometer | 50 to 75 mm | 1 No. |
| 114. | Outside micrometer | 75 to 100 mm | 1 No. |
| 115. | Pat melting | | 2 Nos. |
| 116. | Pipe cutting tool | | 2 Nos. |
| 117. | Pipe flaring tool | | 2 Nos. |
| 118. | Piston ring compressor | | 2 Nos. |
| 119. | Piston Ring expander and remover. | | 2 Nos. |
| 120. | Piston Ring groove cleaner. | | 1 No. |
| 121. | Pliers flat nose | 15 cm | 2 Nos. |
| 122. | Pliers round nose | 15 cm | 2 Nos. |
| 123. | Pliers side cutting | 15 cm | 2 Nos. |
| 124. | Poker | | 2 Nos. |
| 125. | Portable electric drill Machine | | 1 No. |
| 126. | Portable oil monitoring Indicator | | 1 No. |
| 127. | Power Supply | 0-12 v, lamp | 1 No. |
| 128. | Prick Punch | 15 cm | 4 Nos. |
| 129. | Punch Letter | 4mm | 2 set |
| 130. | Radiator cut section-cross flow | | 1 No. |
| 131. | Radiator cut section-down flow | | 1 No. |
| 132. | Rear axle assembly-gear box steering box assembly of the diesel engine | | 2 set |
| 133. | Ridger | | 2 Nos. |
| 134. | Right cut snips | 250mm | 4 Nos. |
| 135. | Rivet sets snap and Dolly combined | 3mm, 4mm, 6mm | 4 Nos. |
| 136. | Scraper flat | 25 cm | 2 Nos. |
| 137. | Scraper half round | 25 cm | 2 Nos. |
| 138. | Scraper Triangular | 25 cm | 2 Nos. |
| 139. | Scriber | 15 cm | 2 Nos. |
| 140. | Scriber with scribing black universal | | 2 Nos. |
| 141. | Set of stock and dies - Metric | | 2 sets |
| 142. | Shear Tin Man's | 450 mm x 600mm | 4 Nos. |
| 143. | Sheet Metal Gauge | | 2 Nos. |
| 144. | SherTinmans | 300mm | 4 Nos. |
| 145. | Shovel | | 2 Nos. |
| 146. | Soldering Copper Hatchet type | 500gms | 4 Nos. |
| 147. | Solid Parallels in pairs (Different size) in Metric | | 2 Nos. |
| 148. | Spanner Clyburn | 15 cm | 1 No. |
| 149. | Spanner D.E. | set of 12 pieces (6mm to 32mm) | 4 Nos. |
| 150. | Spanner T. flocks for screwing up and up-screwing inaccessible positions | | 2 Nos. |

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| 151. | Spanner, adjustable | 15cm. | 2 Nos. |
| 152. | Spanner, ring | set of 12 metric sizes 6 to 32 mm. | 2 Nos. |
| 153. | Spanners socket with speed handle, T-bar, ratchet and universal | upto 32 mm set of 28 pieces with box | 2 Nos. |
| 154. | Spark lighter | | 2 Nos. |
| 155. | Spark plug spanner | 14mm x 18mm x Size | 2 Nos. |
| 156. | Spirit level | 2V 250, 05 metre | 2 Nos. |
| 157. | Spring tension tester | | 1 No. |
| 158. | Stake grooving. | | 2 Nos. |
| 159. | Stake, hatchet. | | 2 Nos. |
| 160. | Starter motor for tractor –different type | | 2 Nos. |
| 161. | Steel measuring tape | 10 meter in a case | 4 Nos. |
| 162. | Steel rule and metric | 15 cm inch | 4 Nos. |
| 163. | Steel rule and metric | 30 cm inch | 4 Nos. |
| 164. | Steel wire Brush | 50mmx150mm | 5 Nos. |
| 165. | Stone, carborandum | 15 x 5 x 4 cm smooth and rough. | 1each |
| 166. | Straight edge gauge | 2 ft. | 2 Nos. |
| 167. | Straight edge gauge | 4 ft. | 2 Nos. |
| 168. | Stud extractor | set of 3 | 2 sets |
| 169. | Stud remover with socket handle | | 1 No. |
| 170. | Surface gauge with dial test indicator plunger type | 0.01 mm | 2 Nos. |
| 171. | Tachometer (Counting type) | | 1 No. |
| 172. | Taps and Dies complete sets (5 types) | | 1 set |
| 173. | Taps and wrenches -Metric | | 2 sets |
| 174. | Telescope gauge | | 4 Nos. |
| 175. | Temperature gauge | 0-100 degree | 2 Nos. |
| 176. | Thread pitch gauge metric, BSW | | 1 No. |
| 177. | Timing lighter | | 1 No. |
| 178. | Torque wrenches | 5-35 Nm, 12-68 Nm & 50-225 Nm | 1 each |
| 179. | Trammel | 30 cm | 2 Nos. |
| 180. | Turbocharger cut sectional view | | 1 No. |
| 181. | Tire pressure gauge with holding nipple | | 2 Nos. |
| 182. | Universal puller for removing pulleys, bearings | | 1 No. |
| 183. | V'Block with Clamps | 75 x38 mm pair | 2 Nos. |
| 184. | Vacuum gauge to read | 0 to 760 mm of Hg. | 2 Nos. |
| 185. | Valve Lifter | | 1 No. |
| 186. | Valve spring compressor universal. | | 1 No. |
| 187. | Vernier calliper | 0-300 mm with least count 0.02mm | 4 Nos. |
| 188. | Vice grip pliers | | 2 Nos. |
| 189. | Voltmeter | 50V/DC | 4 Nos. |

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| 190. | Water pump for dismantling and assembling | | 2 Nos. |
| 191. | Wing compass | 25 cm | 2 Nos. |
| 192. | Wire Gauge (metric) | | 4 Nos. |
| 193. | Work bench | 250 x 120 x 60 cm with 4 vices 12cm Jaw | 4 Nos. |
| C. General Installation/Machineries | | | |
| 194. | 3 furrow disc plough with scraper | | 1 No. |
| 195. | 9 tyne cultivator-spring loaded mounted type | | 1 No. |
| 196. | Air conditioner | | As Required |
| 197. | Arbor press hand operated | 2 ton capacity | 1 No. |
| 198. | Automotive exhaust | 5 gas analyzer (petrol & Diesel) or Diesel Smoke meter | 1 No. |
| 199. | Axle flow vegetable thresher | | 1 No. |
| 200. | Bench lever shears | 250mm Blade x 3mm Capacity | 1 No. |
| 201. | Bund maker (disc type) | | 1 No. |
| 202. | Centrifugal Pump with electric motor | | 1 No. |
| 203. | Chaff cutter and silage cutter | | 1each |
| 204. | Chisel Plough- | 5/7 tone | 1 No. |
| 205. | Dal Mill | | 1 No. |
| 206. | Diesel GEN SET- | 25/50 KVA with AMF facility | 1 No. |
| 207. | Disc Harrow | (14 Mounted type) off set | 1 No. |
| 208. | Disc Harrow | 8x8 trailed type | 1 No. |
| 209. | Disc Plough | 3 Bottom | 1 No. |
| 210. | Discrete Component Trainer / Basic Electronics Trainer | | 1 No. |
| 211. | Drier (Solar/Heater) | | 1 No. |
| 212. | Drilling machine bench to drill | up to 12mm dia along with accessories | 1 No. |
| 213. | Dual Magnetization Yoke | AC / HWDC, 230 VAC, 50Hz | 1 set |
| 214. | Electric motor | 3 Phase 10 H.P. | 1 No. |
| 215. | Electric motor | 3 Phase 7.5 H.P. | 1 No. |
| 216. | Engine - for walking and riding type reapers | | 2 Nos. |
| 217. | Floor Mill | | 1 No. |
| 218. | Fodder Harvester/ Chopper Flale type | | 1 No. |
| 219. | Fodder kit for self Propelled reaper | | 1 No. |
| 220. | Gas Welding Table | 1220mm x760mm | 2 Nos. |
| 221. | Grinding machine (general purpose) D.E. pedestal | 300 mm dia wheels rough and smooth | 1 No. |
| 222. | Groundnut decorticator | | 1 No. |
| 223. | Header Assembly for maize and sun-flower | | 1 No. |
| 224. | High capacity multi crop thresher | | 1 No. |
| 225. | Kino/ Orange grader | | 1 each |

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| 226. | Knapsack /foot sprayer | | 1 No. |
| 227. | Laser Leveler complete with transmitter, receiver, control box, survey | | 1 No. |
| 228. | Leveler/spike Leveler | 3 meter width | 1 No. |
| 229. | Liquid penetrant Inspection kit | | 1 set |
| 230. | Maize crophresher | | 1 No. |
| 231. | Power Weeder | | 1 each |
| 232. | Mould Board Plough | | 1 No. |
| 233. | Mower/Grass Cutter | | 1 No. |
| 234. | Multi crop thresher | | 1 No. |
| 235. | Multi Scan Tool | | 1 No. |
| 236. | P.T.O. operated rotary lawn mower | | 1 No. |
| 237. | Paddy harrow | (14 Disc mounted type) | 1 No. |
| 238. | Paddy transplanter | | 1 No. |
| 239. | Picking platform | | 1 No. |
| 240. | Pipe Bending Machine (Hydraulic type) | 12mm to 30mm | 1 No. |
| 241. | Pneumatic rivet gun | | 2 Nos. |
| 242. | Power Operated Cleaner | | 1 No. |
| 243. | Power operated fogging machine | | 1 No. |
| 244. | Power operated Grader (wheat, maize) | | 1 No. |
| 245. | Power operated manure spreader | | 1 No. |
| 246. | Power operated potato Grader | | 1 No. |
| 247. | Power operated soybean reaper | | 2. Nos. |
| 248. | Power Tiller | | 1 No. |
| 249. | Prime movers (Engine Stationery type) | | 2 Nos. |
| 250. | Pulverizing Roller (Tractor Mounted) with spring loaded (11tyne) cultivator | | 1 No. |
| 251. | Rice Mill/Paddy de husker | | 1 No. |
| 252. | Rice Polisher | | 1 No. |
| 253. | Rotary Harvester | | 1 No. |
| 254. | Rotavator | 5.5" cutting Width | 1 No. |
| 255. | Self-propelled Combine Harvester axial flow/Track type combine Harvester | | 1 No. |
| 256. | Self-propelled high clearance boom sprayer | 22 hp diesel engine | 1 No. |
| 257. | Self-propelled riding type Reaper/Reaper Binder | | 1 No. |
| 258. | Semi-axial flow multi crop thresher | | 1 No. |
| 259. | Sewing Machine/Bag stitcher | | 1 No. |
| 260. | Solar streetlight | | 1 No. |
| 261. | Spring tension tester | | 1 No. |

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| 262. | Sprinkler type and drip irrigation systems complete sets. | <p>Pipes (Different material & Sizes) Such as :- PVC, HDPE, QRC & Poly Tubing Dripper(Different material & Sizes) Jets, Foggers & Mister Sprinkler (Mini, Micro, angular and circular type) Lawn sprinkler and garden pop-ups Accessories and fitting for spray pop-ups Low volume & High volume rain gun range 15 to 30 meter die Accessories and fitting for rain gun Compression Fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.) HDPE fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.) PVC Fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.) PVC Control valve different sizes Air Release Valve different sizes Butterfly / G.M. Gate Valves different sizes Fertigation Tank 30 to 160 Litres Fertigation Equipment Pump 30 to 160 Litres Filters (Primary filter) Sand, Hydro cyclone, Screen, Plastic/metal & Disc and Drip line Poly joiner, reducer, Tee, Elbow, End stop different sizes Grommet hole plug different sizes Pressure gauge Three way cock for gauge PVC valve box different sizes Water meter, Brase pressure regulator and irrigation drum Jain spanner repair tool kit & Drip line binder Single phase electric motor 3 HP high speed (Booster)</p> | As desired |
| 263. | Straw reaper | | 1 No. |
| 264. | Sub soiler | 24 -30 inch. | 1 No. |
| 265. | Submersible Pump complete unit | | 1 No. |
| 266. | Sugar cane transplanter | | 1 No. |
| 267. | Thresher rasp bar type | | 1 No. |
| 268. | Tin smiths bench folder | 600 x 1.6mm | 1 No. |
| 269. | Tractor PTO operated aero blast spray | | 1 No. |
| 270. | Tractor PTO operated sprayer for | | 1 No. |

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| | cotton | | |
| 271. | Tractor | 60 HP power steering | 1 No. |
| 272. | Tractor | 75 HP 4WD | 1 No. |
| 273. | Tractor Diesel Engine | 4 stroke for Dismantling and assembling with swiveling stand | 2 Nos. |
| 274. | Tractor operated bed farmer cum three rows planter | | 1 No. |
| 275. | Tractor Operated Combine Harvester multi- crops | | 1 No. |
| 276. | Tractor operated ground nut digger | | 1 No. |
| 277. | Tractor operated hay bailer | | 1 No. |
| 278. | Tractor operated implement loading beam | | 1 No. |
| 279. | Tractor operated onion digger | | 1 No. |
| 280. | Tractor operated potato digger | | 1 No. |
| 281. | Tractor operated two rows Semi /automatic potato planter | | 1 No. |
| 282. | Tractor operated two rows vegetable trans planter (semi automatic) | | 1 No. |
| 283. | Tractor operated Angle blade Tracer | | 1 No. |
| 284. | Tractor Operated ditcher | | 1 No. |
| 285. | Tractor operated Front mounted dozer with Hydraulic single cylinder | | 1 No. |
| 286. | Tractor Operated post hole digger | | 1 No. |
| 287. | Tractor operated scraper and bucket scraper | | 1 No. |
| 288. | Tractor Operated Seed cum fertilizer drill cum planter | | 1 No. |
| 289. | Tractor Operated trencher | 10" to 16" Width & 4 ft depth | 1 No. |
| 290. | Tractor Operated Zero/ strip till Seed cum fertilizer drill | 9/11 rows | 1 No. |
| 291. | Tractor PTO operated multi - crop direct sowing happy seeder | | 1 No. |
| 292. | Tractor trailer with hydraulic system | | 1 No. |
| 293. | 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. |
| 294. | Vaccine Machine | | 1 No. |
| 295. | Weighing balance | | 2 Nos. |
| 296. | Welding plant Oxy-Acetylene complete (high pressure) | | 1 No. |
| 297. | Welding Transformer (150-300 Amps) | | 1 No. |
| 298. | Wheel type tractor fitted with diesel engine with standard accessories and special tools (30 to 40 draw-bar H.P). | | 2 Nos. |
| 299. | Wind mill | | 1 No. |

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| 300. | Winnower | | 1 No. |
| List of Consumable: | | | |
| 301. | Automatic Transmission oils | | As required |
| 302. | Battery- SMF | | As required |
| 303. | Brake fluids | | As required |
| 304. | Chalk, Prussian blue. | | As required |
| 305. | Chemical compound for fasteners | | As required |
| 306. | Diesel | | As required |
| 307. | Different type gasket material | | As required |
| 308. | Different type of oil seal | | As required |
| 309. | Drill Twist (assorted) | | As required |
| 310. | Emery paper | 36–60 grit, 80–120 | As required |
| 311. | Engine coolant | | As required |
| 312. | Engine oil | | As required |
| 313. | Gear oils | | As required |
| 314. | Hacksaw blade (consumable) | | As required |
| 315. | Hand rubber gloves tested | 5000 V | 5 pair |
| 316. | Holdes, lamp teakwood boards, plug sockets, solders, flux wires and cables batteries round consumable blocks and other consumables as required | | As required |
| 317. | Hydrometer | | 8 Nos. |
| 318. | Lapping abrasives | | As required |
| 319. | Leather Apron | | 5 Nos. |
| 320. | Petrol | | As required |
| 321. | Power steering oil | | As required |
| 322. | Radiator Coolants | | As required |
| 323. | Safety glasses | | As required |
| 324. | Steel wire Brush | 50mmx150mm | 5 Nos. |
| 325. | Engine Spare Parts | | As per req. |
| 326. | Field crops like wheat, Soya bean, paddy etc. | | As desired |
| 327. | Gloves for Welding (Leather and Asbestos) | | 5 sets |
| Workshop Furniture | | | |
| 328. | Book shelf (glass panel) | 6½ „ x 3“ x 1½“ | As required |
| 329. | Computer Chair | | 1+1 Nos. |
| 330. | Computer Table | | 1+1 Nos. |
| 331. | Desktop Computer | CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. 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. | 1+1 Nos. |

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| | | Licensed Operating System and Antivirus compatible with trade related software. | |
| 332. | Discussion Table | 8" x 4" x 2½ " | 2 Nos. |
| 333. | Fire Extinguishers, | Arrange all proper NOCs and equipment from municipal / competent authorities. | As required |
| 334. | Instructional Material – NIMI Books/Ref. books | | As required |
| 335. | Internet connection with all accessories | | As required |
| 336. | Laser printer | | 1 No. |
| 337. | Smart pannel | 75" (Min) | 1 No. |
| 338. | Multimedia DVD for Automotive application/subjects | | As required |
| 339. | Online UPS | | As required |
| 340. | Stools | | 26 No. |
| 341. | Storage Rack | 6½ " x 3" x 1½ " | As required |
| 342. | Storage shelf | 6½ " x 3" x 1½ " | As required. |
| 343. | Suitable class room furniture | | As required |
| 344. | Suitable Work Tables with vices | | As required |
| 345. | Tool Cabinet - | 6½ " x 3" x 1½ " | 2 Nos. |
| 346. | Trainees locker | 6½ " x 3" x 1½ " | As required |
| Note: - | | | |
| 1. Internet facility is desired to be provided in the class room. | | | |

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| 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 |

