LIFT MECHANIC

COMPETENCY BASED CURRICULUM

(Duration: 2 Yrs.)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 5

SECTOR – POWER

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

LIFT MECHANIC

(Revised in 2018)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL – 5
Version 1.0

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN-81, Sector-V, Salt Lake City,
Kolkata – 700 091

ACKNOWLEDGEMENT

The DGT sincerely expresses appreciation for the contribution of the Industry, State Directorate, Trade Experts and all others who contributed in revising the curriculum. Special acknowledgement to the following industries/organizations who have contributed valuable inputs in revising the curricula through their expert members:

Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

Sl. No.	Name & Designation Sh./Mr./Ms.	Organization	Expert Group Designation
1.	Nikhilbhai B. Patel IMC Chairman	Bhavani Packaging Industries. Odhav, Ahmedabad.	Chairman
2.	Mahendra Patel, Director	Orbis Elevator, Diamond Park, G.I.D.C. Naroda, Ahmedabad.	Member
3.	Paresh J.Soni Manager Operation	Orbis Elevator, Diamond Park, G.I.D.C. Naroda, Ahmedabad.	Member
4.	R.D.Parmar Service Engineer Workshop	Apex Automotive, Kankariya, Ahmedabad.	Member
5.	N. Damodarn, Service Engineer	Sunrise Auto Craft, Ahmedabad.	Member
6.	D.V.Patel, Automobile Engg.	Sunrise Auto Craft, Ahmedabad.	Member
7.	V.B.Babariya, Professor	L.D. college of Engg, Ahmedabad	Member
8.	M.S.Shah Training Incharge	Omega Elevators, Rakhiyal, Ahmedabad	Member
9.	Dharmendra K Sharma, MD	Technology Exchange Services Pvt Ltd.	Member
10.	V. Dandapani, Engineer	Sunrise Auto Craft Pvt Ltd	Member
11.	S.A. Pandhav, Regional Deputy	Regional Office, Rajkot	Member

	Director		
12.	G.N. Parekh, Regional Deputy Director	Regional Office, Ahmedabad	Member
13.	P.A. Mistry, Principal Class I	I.T.I. Kubernagar, Ahmedabad	Member
14.	M.H. Anklesariya, Director	TRIO Elevators, Ahmedabad	Member
15.	S.M.Tank, Managing Director	TRIO Elevators, Ahmedabad	Member
16.	Manoj A. Rathod, Senior Engineer	Sintex Industries Ltd., Kalol	Member
17.	Laxmanbhai Patel, Manager Technical	La- Gajjar Machineries Pvt. Ltd. Ahmedabad	Member
18.	P.B. Bhavsar, SI	I.T.I. Kubernagar, Ahmedabad	Member
19.	P.M. Dabhi, SI	I.T.I. Kubernagar, Ahmedabad	Member
20.	Paresh Dave Surpervisor	La- Gajjar Machineries Pvt. Ltd. Ahmedabad	Member
21.	P.B. Vyas, Principal CL-II	I.T.I. Kubernagar, Ahmedabad	Member
22.	L. K. Mukherjee, Deputy Director	C.S.T.A.R.I., Kolkata	Member

CONTENTS

1. BACKGROUND

1.1 Apprenticeship Training Scheme under Apprentice Act 1961

The Apprentices Act, 1961 was enacted with the objective of regulating the programme of training of apprentices in the industry by utilizing the facilities available therein for imparting on-the-job training. The Act makes it obligatory for employers in specified industries to engage apprentices in designated trades to impart Apprenticeship Training on the job in industry to school leavers and person having National Trade Certificate(ITI pass-outs) issued by Directorate General of Training (DGT) to develop skilled manpower for the industry**.** There are four categories of apprentices namely**; trade apprentice, graduate (engineers), technician (diploma) and technician (vocational) apprentices.**

Entry Qualifications and period of apprenticeship training of **trade apprentices** vary from trade to trade. The apprenticeship training for trade apprentices consists of basic training followed by practical training. At the end of the training, the apprentices are required to appear in a trade test conducted by DGT and those successful in the trade tests are awarded the National Apprenticeship Certificate (NAC) by DGT having worldwide recognition.

The period of apprenticeship training for graduate (engineers), technician (diploma) and technician (vocational) apprentices is one year. Certificates are awarded on completion of training by the Department of Education, Ministry of Human Resource Development.

1.2 Changes in Industrial Scenario

Recently we have seen huge changes in the Indian industry. The Indian Industry registered an impressive growth during the last decade and half. The number of industries in India have increased manifold in the last fifteen years especially in services and manufacturing sectors. It has been realized that India would become a prosperous and a modern state by raising skill levels, including by engaging a larger proportion of apprentices. It will ensure stronger collaboration between industry and the trainees which will augment supply of skilled workforce and enable development through employment. Various initiatives to build up an adequate infrastructure for rapid industrialization and improve the industrial scenario in India have been taken.

1.3 Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22nd December 2014 to make it more responsive to industry and youth. Key reforms are as given below:

- Prescription of number of apprentices to be engaged at establishment level instead of trade-wise.
- Establishment can also engage apprentices in optional trades which are not designated, with the discretion of entry level qualification and syllabus.
- Scope has been extended also to non-engineering occupations.
- Establishments have been permitted to outsource basic training in an institute of their choice.
- The burden of compliance on industry has been reduced significantly through various schemes.

2. TRAINING SYSTEM

2.1 GENERAL

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

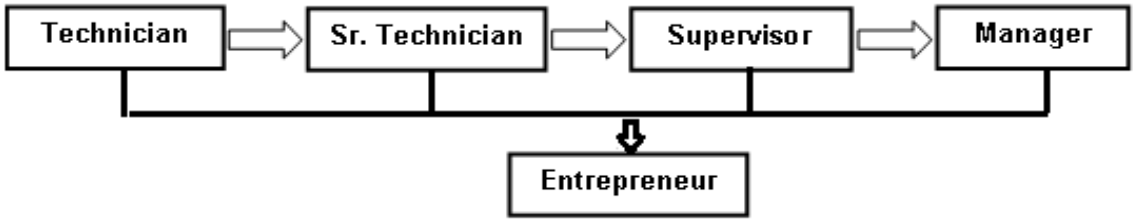
Lift Mechanic trade under ATS is delivered nationwide through different industries. The course is of two years duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by DGT having worldwide recognition.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/document, 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 skill, knowledge, core skills & employability skills while performing jobs and solve problem during execution.
- Check the job/assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS:

- Indicative pathways for vertical mobility :-



2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of two years (*Basic Training and On-Job Training*): -

Total training duration details: -

Time (in months)	**1-3**	**4-12**	**13-15**	**16-24**
Basic Training (BT)	**BT– I**	**-----**	**BT – II**	**------**
Practical Training (On - job training)	**----**	**OJT – I**	**------**	**OJT – II**

A. Basic Training

For 02 yrs. Course (Engg) :-(Total 06 months: 03 months in 1st yr. + 03 months in 2nd yr.)

S No.	Course Element	Total Notional Training Hours (For 02 Yrs. Course)
1.	Professional Skill (Trade Practical)	550
2.	Professional Knowledge (Trade Theory)	240
3.	Workshop Calculation & Science	40
4.	Engineering Drawing	60
5.	Employability Skills	110
	Total (Including formative assessment)	**1000**

B. On-Job Training: -

For 02 yrs. Course (Engg): -**Total 18 months:** 09 months in 1st yr. + 09 months in 2nd yr.

Notional Training Hours for On-Job Training: 3120 Hrs.

C. Total training hours: -

Duration	Basic Training	On-Job Training	Total
For 02 yrs. course (Engg)	1000 hrs.	3120 hrs.	4120 hrs.

2.4 ASSESSMENT & CERTIFICATION:

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

a) The **Internal assessment** 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 formative assessment will be as per the template (Annexure – II).

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NAC will be conducted by DGT on completion of course as per guideline of Govt of India. The pattern and marking structure is being notified by govt of India 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

The minimum pass percentage is 40% for each Theory Examination (except for Employability Skill it is 34%) and 60% marks for each Trade practical Examination. The candidate should pass in each subject conducted under All India Trade Test.

2.4.2 ASSESSMENT GUIDELINE

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

Assessment will be evidence based comprising 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

Evidences of formative assessments are to be preserved until forthcoming examination for audit and verification by examination body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate with occasional guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipments. • 60-70% accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b)Weightage in the range of above75% - 90% to be allotted during assessment	
For this grade, the candidate, with little guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of a reasonable standard of craftsmanship.	• Good skill levels in the use of hand tools, machine tools and workshop equipments. • 70-80% accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A good level of neatness and consistency in the finish. • Little support in completing the

	project/job.
(c) Weightage in the range of above 90% to be allotted during assessment	
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.	• High skill levels in the use of hand tools, machine tools and workshop equipments. • Above 80% accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • 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:

Liftman; operates electric lift to raise or lower cage, carrying passengers and goods from one floor to another in residential, office, hotel, hospital, commercial or industrial building according to bell or buzzer signals. Opens outer gate of lift entrance and inner gate of lift cage by turning handle or by electric switches to permit men and goods inside carrier cage, closes both gates manually or by electrical switches; presses electric push button of desired floor number as indicated in panel to move cage carrying men or material upward or downward as required. Stops lift at required floor by operating switches, opens double gates of lift for passengers and goods to move out and move in. Observes bell or buzzer sound to operate lift to called floor to take men and material. Ensures that lift is not loaded over authorized capacity. Reports to superior malfunctioning of lift when detected. May operate automatic lifts which by push button action closes gates, travels and stops at required floor, automatically.

Reference NCO 2015: 8343.1800 – Liftman

4. NSQF LEVEL COMPLIANCE

NSQF level for Lift Mechanic trade under ATS: **Level 5**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

a. Process
b. Professional knowledge,
c. Professional skill,
d. Core skill and
e. Responsibility.

The broad learning outcome of Lift Mechanic trade under ATS mostly matches with the Level descriptor at Level- 5.

The NSQF level-5 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context.	Knowledge of facts, principles, processes and general concepts, in a field of work or study.	A range of cognitive and practical skills required to accomplish tasks and solve problem by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and Learning and some responsibility for other's works and learning.

5. GENERAL INFORMATION

Name of the Trade	Lift Mechanic
NCO - 2015	8343.1800
Trade Code	DGT/3193
NSQF Level	Level – 5
Duration of Apprenticeship Training (Basic Training + On-Job Training)	Two years
Duration of Basic Training	a) B T – I : 3 months b) B T – II: 3 months **Total duration of Basic Training: 6 months.**
Duration of On-Job Training	a) OJT–I: 9 months b) OJT–II: 9 months **Total duration of On the Job Training: 18 months.**
Entry Qualification	Passed 10th Class under 10+2 system of education or its equivalent.
Selection of Apprenticeship	The apprentices will be selected as per Apprenticeship Act amended from time to time.
Instructors Qualification for Basic Training	Degree in Electrical/ Electrical and Electronics Engineering from recognized engineering college/ university with one year post qualification experience in the relevant field. **OR** Diploma in Electrical/ Electrical and Electronics Engineering from recognized board of technical education with two years post qualification experience in the relevant field. **OR** NTC/NAC passed in the Trade of "Lift and Escalator Mechanic" with 3 years post qualification experience in the relevant field. **<u>Essential Qualification</u>:** Relevant National Craft Instructor Certificate (NCIC) in any of the variants under DGT. ***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.
Infrastructure for Basic Training	As per Lift & Escalator Mechanic Trade of ITI.
Examination	The internal examination/assessment will be held on completion of each year. Final examination for all subjects will be held at the end of course and same will be conducted by DGT.
Rebate to Ex-ITI Trainees	1 year to the passed out ITI/ITC trainees in the trade of Lift & Escalator Mechanic.
CTS trades eligible for Lift Mechanic Apprenticeship	Lift & Escalator Mechanic

Note:

- *Industry may impart training as per above time schedule for different OJT, however this is not fixed. The industry may adjust the duration of training considering the fact that all the components under the syllabus must be covered. However, the flexibility should be given keeping in view that no safety aspects are compromised.*
- *For imparting Basic Training, the industry needs to tie-up with ITIs having such specific trade and affiliated to DGT.*

6. LEARNING OUTCOME

The following are minimum broad Specific Learning Outcome and Common Occupational Skills/Generic Learning Outcome which a learner will learn after completion of the Lift Mechanic course of 02 years duration under ATS.

6.1 SPECIFIC LEARNING OUTCOME

First Year:

1. Comply with personal safety, occupational hazards, working safety and job safety standard.
2. Check lift shaft and set template to fix racket.
3. Install and check rail, machine setting, lift cars, doors bottom springs, lift rail cables etc.
4. Test functioning of lift rope, lay out of rope through pulleys and lightening practice of rope at load end and lift car.
5. Mount and fix motors with its accessories and pedestral bearing, check connections and test it for proper functioning.
6. Install switch gear, install and adjust pulleys with motors, wiring and erection of control panel, mounting of main wire service switch and fuses.
7. Select and install lift with its accessories considering all the factors.
8. Test and adjust all moving contacts of the controller, tightening connections and secure wires.
9. Check brake shoe, magnetic coil, oil in magnet case, dash pot adjustment etc.
10. Test functional operation of various relays, connect relays in the circuits, trace control circuits, check diagram and perform necessary repair.
11. Demonstrate landing zone, top over travel, fixing of machine beam, fixing and adjustment of different types of ropes, guide, buffers etc.

Second Year:

12. Check oil level in worm gear, check and adjust shaft bearing, drum drive sheave for excessive play and proper lubrication.
13. Check safety governor for proper operating condition and lubrication, all ropes for any damage and broken wire and proper lubrication , main and counter weights , guide rail for lubrication and efficient functioning of brackets and rail clips.
14. Check car shoes for wear & tear, buffers and its lubricants and various safety devices.
15. Check tripping rod for its setting and check leveling for car platform.
16. Adjust and maintain other emergency safety devices.
17. Check movement of traveling cables for foul, top and bottom final shaft way.

18. Test the emergency cut out switches for door and gate contacts, light, fan switches and fixtures in the car for proper operations, clean up top, bottom and inside car.
19. Check and test the lift pit for accumulation of water or garbage, if any.
20. Fix V.F. control in door operation, door sensor, test tool, safety check.
21. Monitor recalibration and testing Earthquake devices.
22. Demonstrate power supply stabilizer UPS and SMPS, test connecting and disconnecting of ICs from circuits.

6.2 GENERIC LEARNING OUTCOME

23. Recognize & comply safe working practices, environment regulation and housekeeping.
24. Understand and explain different mathematical calculation & science in the field of study. [Different mathematical calculation & science – Conversion of Units, Percentage,& Mensuration-Area & Volume of different surfaces and solids, and Properties of materials, Mass, weight, Density, Specific Gravity etc.]
25. Interpret specifications, different engineering drawing and apply for different application in the field of work. [Different engineering drawing-Geometrical figures like Triangles, Square, Rectangle, Rhombus, Parallelogram, Circle etc., Lettering & Numbering, Freehand sketching of Hand tools used for Lift Mechanic.
26. Select and ascertain measuring instrument and measure dimension of components and record data.
27. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.
28. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.
29. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
30. Plan and organize the work related to the occupation.

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

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

SPECIFIC LEARNING OUTCOME	
LEARNING OUTCOMES	**ASSESSMENT CRITERIA**
First Year 1. Comply with personal safety, occupational hazards, working safety and job safety standard. 2. Check lift shaft and set template to fix racket. 3. Install and check rail, machine setting, lift cars, doors bottom springs, lift rail cables etc. 4. Test functioning of lift rope, lay out of rope through pulleys and lightening practice of rope at load end and lift car. 5. Mount and fix motors with its accessories and pedestral bearing, check connections and test it for proper functioning. 6. Install switch gear, install and adjust pulleys with motors, wiring and erection of control panel, mounting of main wire service switch and fuses. 7. Select and install lift with its accessories considering all the factors. 8. Test and adjust all moving contacts of the controller, tightening connections and secure wires. 9. Check brake shoe, magnetic coil, oil in magnet case, dash pot adjustment etc. 10. Test functional operation of various relays, connect relays in the circuits, trace control circuits, check diagram and perform necessary repair. 11. Demonstrate landing zone, top over travel, fixing of machine beam, fixing and adjustment of different types of ropes, guide, buffers etc. **Second Year**	Assessment Criteria for each specific learning outcome mentioned under **first year & second year** (section: 10) ensures the trainee achieves well developed skill with clear choice of procedure in familiar context. Assessment criteria should broadly cover the aspect of – **Planning** (Identification, ascertaining, estimating etc.); **Execution** (performing, illustration, demonstration etc. by applying – 1) a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information. 2) Knowledge of facts, principles, processes, and general concepts, in the field of work or study. 3) Desired Mathematical Skills and some skill of collecting and organizing information, communication and **Checking/ Testing** to ensure functionality during the assessment of each outcome. 4) The assessment parameters also ascertain that the candidate is responsible for own work and learning and some responsibility for other's work and learning.

12. Check oil level in worm gear, check and adjust shaft bearing, drum drive sheave for excessive play and proper lubrication. 13. Check safety governor for proper operating condition and lubrication, all ropes for any damage and broken wire and proper lubrication , main and counter weights , guide rail for lubrication and efficient functioning of brackets and rail clips. 14. Check car shoes for wear & tear, buffers and its lubricants and various safety devices. 15. Check tripping rod for its setting and check leveling for car platform. 16. Adjust and maintain other emergency safety devices. 17. Check movement of traveling cables for foul, top and bottom final shaft way. 18. Test the emergency cut out switches for door and gate contacts, light, fan switches and fixtures in the car for proper operations, clean up top, bottom and inside car. 19. Check and test the lift pit for accumulation of water or garbage, if any. 20. Fix V.F. control in door operation, door sensor, test tool, safety check. 21. Monitor recalibration and testing Earthquake devices. 22. Demonstrate power supply stabilizer UPS and SMPS, test connecting and disconnecting of ICs from circuits.	

GENERIC LEARNING OUTCOME	
LEARNING OUTCOME	**ASSESSMENT CRITERIA**
23. Recognize & comply safe working practices, environment regulation and housekeeping.	23.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	23.2 Recognize and report all unsafe situations according to site policy.
	23.3 Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	23.4 Identify, handle and store / dispose off dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	23.5 Identify and observe site policies and procedures in regard to illness or accident.
	23.6 Identify safety alarms accurately.
	23.7 Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	23.8 Identify and observe site evacuation procedures according to site policy.
	23.9 Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	23.10 Identify basic first aid and use them under different circumstances.
	23.11 Identify different fire extinguisher and use the same as per requirement.
	23.12 Identify environmental pollution & contribute to avoidance of same.
	23.13 Take opportunities to use energy and materials in an environmentally friendly manner.
	23.14 Avoid waste and dispose waste as per procedure
	23.15 Recognize different components of 5S and apply the same in the working environment.
24. Understand, explain different mathematical calculation & science in the field of study, apply in day to day work.*[Different*	24.1 Explain concept of basic science related to the field such as Material science - Properties of materials, Ferrous & non-ferrous metals, etc.
	24.2 Mass, weight, Density, Specific Gravity etc.

mathematical calculation & science - Conversion of Units, Percentage, & Mensuration-Area & Volume of different surfaces and solids, and Properties of materials, Mass, weight , Density, Specific Gravity etc.]	24.3 Use scale/ tapes to measure as per specification.
	24.4 Calculate area / volume of the materials.
	24.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	24.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
25. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing-. Geometrical figures like Triangles, Square, Rectangle, Rhombus, Parallelogram, Circle etc., Lettering & Numbering, Freehand sketching of Hand tools used for Lift Mechanic.*	25.1 Read & interpret the information on drawings and apply in executing practical work.
	25.2 Read & analyse the specification to ascertain the material requirement, tools, and machining /assembly /maintenance parameters.
	25.3 Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
	25.4 Read & interpret the signs and symbols for electrical components and AC/DC systems.
	25.5 Encounter drawings with electrical circuit diagrams and layout diagrams.
26. Select and ascertain measuring instrument and measure dimension of components and record data.	26.1 Select appropriate measuring instruments such as Ammeter, voltmeter, meggar, earth tester etc. (as per tool list).
	26.2 Ascertain the functionality & correctness of the instrument.
	26.3 Measure dimension of the components & record data to analyse the with given drawing/measurement.
27. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.	27.1 Explain the concept of productivity and quality tools and apply during execution of job.
	27.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	27.3 Knows benefits guaranteed under various acts.
28. Explain energy conservation, global	28.1 Explain the concept of energy conservation, global warming, pollution and utilize the available recourses

warming and pollution and contribute in day to day work by optimally using available resources.	optimally & remain sensitive to avoid environment pollution.
	28.2 Dispose waste following standard procedure.
29. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	29.1 Explain personnel finance and entrepreneurship.
	29.2 Explain role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.
	29.3 Prepare Project report to become an entrepreneur for submission to financial institutions.
30. Plan and organize the work related to the occupation.	30.1 Use documents, drawings and recognize hazards in the work site.
	30.2 Plan workplace/ assembly location with due consideration to operational stipulation.
	30.3 Communicate effectively with others and plan project tasks.
	30.4 Assign roles and responsibilities of the co-trainees for execution of the task effectively and monitor the same.

8. SYLLABUS

BASIC TRAINING (BT – I) Duration: (03) Three Months		
Week No.	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
1	Identify safety symbols and hazards. Use of personal protective equipments. Identify trade tools, machineries and different accessories pertaining to the trade. Practice on cleanliness and procedure to maintain it. Basic workshop on 5S concept and practices.	Basic safety introduction and Personal protection. Use of Helmet, shoes, belt, safety glass, hand gloves insulation of hand tools and connecting devices. Working safety-sign board, safety curtain at each Floor Opening, handling of devices with proper way, initial fulfillment of wiring in lift shaft, cleaning and dryness of pit. Proper storage of lift materials.
2	Perform lighting methods at lift pit and lift shaft. Identify safety measures while operating lift pit and lift shaft.	Appropriate lighting in lift pit and lift shaft. Awareness on occupation hazards and related safety. Awareness on environmental pollution, its causes, consequences, mitigation and remedies.
3	Identify and check chain block, hoist, pulleys, shackle, ceiling and derricks etc. Trace various components of a control panel viz. DIN rails, plastic trunking, connector blocks and terminals etc. Check various components of different relays and contactors their specifications, fittings in the control panel and labelling.	Operation of Lift Working principal of lift. Types of lift on different basics. Basic features of lift. Constructional features of lift. List of components and their drawing.
4	Identify various switches, push buttons, lamps used in control panels, their specifications and fitment in the panel. Practice on various analog and digital measuring Instruments viz. multimeter, megger, frequency meter, tachometer, clamp meter, etc. Measure power and energy in single phase circuits. Measure Voltage, Current, Power, Frequency, Energy and Power Factor in three phase circuit.	Power supply, switches, fuses, contactor, relay and circuit breaker. Distribution of power Earthling of lift. Use of Volt meter, ammeter, multi meter, Megger Meter insulation tester earth tester and watt meter-connection-construction-operation-testing. Resistance, types color code .Capacitor, types use as filter.

5-6	Identify transformers/ toroidal inductors, resistors and capacitors their specifications, marking and fitment in the panels. Verify terminals, identify components and calculate transformation ratio of single phase transformers. Perform connections of three phase transformer and control transformers (CT & PT). Pass cables through strain relief plate in an Electrical cabinet and secure the cables properly using cable tie/clamp. Practice earthing and screening of cabinets as per IE rules and ensure proper earth continuity. Practice mounting and connections of various control elements e.g. MCB, MCCB, relays, contactors, measuring instruments, sensors and timers etc. Test the control panel for its proper functioning.	Transformer -construction-operation-types-toppings. Diode ,transistor - use of diode as rectifier half wave , full wave and bridge rectifier-connection and testing Motors , Three phase motors ,single and double cage induction motor -construction-operation-speed control permanent magnate motor . UPS-MPS , Constructional Features using Block Diagram –Specifications phase sequence indicator.
7	Troubleshoot defects in simple power supply circuit. Test, analyze defects and repair UPS. Identify pins of various ICs used in power electronic circuits. Demonstrate functioning and checking of DA/ AD converters. Check various registers, counters and timers. Identify the different front panel control of a CRO. Practice measuring of the Amplitude, Frequency and time period of typical electronic signals using CRO.	Relays- NO-NC contacts, contactors timers. Drive for control of motors using invertors. Microprocessor and PLC-basic features and applications for lift control, input output devices for Microprocessor and PLC. Digital display at floor, LED, seven segment/scrolling display. Sensors for motor and door control. Different limit switches for over speed and over travel.
8	Monitor over speed Governor, safety circuit, overhead clearance and car bottom clearance. Plan and check construction and parts of different elevators. Identify and check different types of elevator well/ pit. Carry out inspection of car top. Perform	A mechanical construction of lift cabin and balancing weights. Constructional features of car shaft, platform, paneling cabin top, different door systems, cable trench for safety on car top, door seal.

	fixing and checking of electromagnet brake.	
9	Test landing zone, top over travel. Fix cams and pulleys. Adjust counter weight, buffer, car frame, emergency stop switch. Practice of installation of cage. Practice fitting of rope. Practice installation of travelling cable.	Landing door frame and landing doors - different types-construction- installation. Balancing weight frame, counter weight, buffers, lift rope-attachment with car and counter weight.
10	Demonstrate fixing of machine beam and beam support. Demonstrate fixing of spur gear, worm gear and Bearings. Practice fixing of car components. Practice fixing of car lighting and fan.	Roping types of rope, connection with car and counter weight by thimble, guide rains and brackets ,guide shoes for vertical transportation.
11-12	Fix and adjust compensation chain and governor tension weight. Practice installation of different types of ropes, guide, buffers, counter weight, etc. Practice installation of governor and pulley. Practice installation of car gate. Calculate car area for different no. of passengers. Calculate elevator speed for different applications.	Different types of motor connections with pulley, gears with roping to cars. Safety of doors. Over speed governor-roping with cars-construction of over speed governor .Use of diverter pulley for maintaining distance between car and counter weight. Use of pulley for speed reduction of car.
13	**Assessment/ Examination 03 days**	

Note: - *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

BASIC TRAINING (BT – II) **Duration: (03) Three Months**		
Week No.	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
1-2	Measure and adjust clearance between wall and car. Measure and adjust clearance between adjacent cars. Calculate car area for different no. of passengers. Calculate elevator speed for different applications. Calculate capacity of elevator (Kg) as per no. of passengers. Installation of different types of ropes, guide, buffers, counter weight, etc. Installation of governor and pulley Installation of car gate.	Measurement of lift shaft and lift pit. Height between different floors. Size and capacity of lift and its motors, general arrangement drawing preparation for lift installation. Measurement of doors and machine room Scaffolding in lift shaft, template and its fixing with leveling. Marking template for landing doors, car and counter weight, guide rails, brackets. Marking of brackets, fixing of lift shaft. Fixing of guide rails.
3-4	Familiarize with different control system. Its installation and repair. Understate the automatic leveling function. Practice and set various operations. Practice manual and automatic push bottom operation. Identify different alarming modes. Identification of different components of control circuits. Trace control circuit diagram and necessary repair. Inspect performance during Test& Trial. Record of observation. Practice alteration and adjustment as necessary.	Marking and fixing of landing door seal and landing door frame at each floor. Fixing of car safety at ground floor level. Fixing of platform. Fixing of counter weight frame at top floor. Installation of motor with pulley, drilling of holes in machine room for roping of car and over speed governor.
5-6	Practice fixing Guide rails, reed switch and magnet. Observe running clearance. Fix limit switches. Inspect car top. Check and fix electromagnet brake. Demonstrate fixing of car components. Fix car lighting and fan. Demonstrate safe use of scaffolding. Check wiring, motor and check-list before start up. Inspection run and normal run.	Roping-removal of scaffolding, Installation of panel and different wiring, power wiring, control wiring, motor wiring for carrying out wiring at different floors and cabin top.
7-8	Test and check Machine beam and beam support. Fix cams and pulleys. Demonstrate spur gear, worm gear and	Cable trench in lift shaft , installation of mid way junction, paneling car cabin and cabin top fixing, cabin door fixing

	bearings. Fix compensation chain, governor tension weight. Demonstrate installation of door and cage. Practice rope fitting. Practice installation of travelling cable.	with header, fixing of devices on cabin top near lift pit and near lift top of shaft.
9-10	Report on Commissioning of Elevators. Report on Commissioning of Escalators and moving walkways. Prepare check list for commissioning and its report. Prepare documents for licensing.	Commissioning of Lift. Check the commissioning of Lift step by step Keeping safety in mind. If all operations are correct, prepare commissioning report and papers for license and annual report.
11-12	Check physical location of all components of lift as per drawing. Practice repairing and replacement of different mechanical components. Practice repairing and replacement of different electrical and electronic components. Check physical location of all components of escalators and moving walkways as per drawing. Service various mechanical/electrical parts of escalators and moving walkways as per drawing.	Routine maintenance, brake down maintenance and Emergency maintenance along with its remedies.
13	**Assessment/Examination 03 days**	

Note: - *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

9. SYLLABUS - CORE SKILLS

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Basic Training – I		
Sl. No.	**Workshop Calculation and Science (Duration: 20 hrs.)**	**Engineering Drawing (Duration: 30 hrs.)**
1.	**Unit:** Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units.	**Engineering Drawing:** **Introduction and its importance** Viewing of engineering drawing sheets. Method of Folding of printed Drawing Sheet as per BIS SP:46- 2003 **Drawing Instruments** : their Standard and uses - Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips.
2.	**Fractions & Simplification:** Fractions, Decimal fraction, Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems. Simplification using BODMAS.	**Lines :** - Definition, types and applications in Drawing as per BIS SP:46-2003. - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section). - Drawing lines of given length (Straight, curved). - Drawing of parallel lines, perpendicular line. - Methods of Division of line segment.
3.	**Square Root:** Square and Square Root, method of finding out square roots, Simple problem using calculator.	**Drawing of Geometrical Figures:** Definition, nomenclature and practice of - - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.
4.	**Ratio &Proportion:** Simple calculation on related problems.	**Lettering and Numbering** as per BIS SP46-2003: - Single Stroke, Double Stroke, inclined, Upper case and Lower case.

5.	**Percentage:** Introduction, Simple calculation. Changing percentage to decimal and fraction and vice versa.	**Free Hand sketch:** Hand tools and measuring instruments used in electronics mechanics trades.
6.	**Material Science** : properties - Physical & Mechanical, Types – Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous metals, Non-Ferrous Alloys.	**Free hand drawing :** - Lines, polygons, ellipse, etc. - geometrical figures and blocks with dimension. - Transferring measurement from the given object to the free hand sketches.

Basic Training – II		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration: - 30 hrs.)**
1.	**Mass ,Weight and Density :** Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals.	**Symbolic Representation** (as per BIS SP:46-2003) of : - Fastener (Rivets, Bolts and Nuts). - Bars and profile sections. - Weld, brazed and soldered joints. - Electrical and electronics element. - Piping joints and fittings.
2.	**Work, Power and Energy:** work, unit of work, power, unit of power, Horse power of engines, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy.	**Construction of Scales and diagonal scale**
3.	-	**Three phase Induction motor** Free hand sketching of Slip-ring and Squirrel cage Induction motor. Typical wiring diagram for drum controller operation of A.C. wound rotor motor.
4.	**Algebra:** Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	Drawing the schematic diagram of Autotransformer starter, DOL starter and Star Delta Starter. Drawing the schematic diagram of A.C. motor speed control by SCR /AC Drive.
5.	**Mensuration :** Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle. Volume of solids – cube, cuboid, cylinder and Sphere. Surface area of solids – cube, cuboid, cylinder and Sphere.	**Distribution of Power** Types of insulator used in over head line (Half sectional views). Different type of distribution systems and methods of connections. Layout diagram of a substation. Single line diagram of substation feeders.

9.2 EMPLOYABILITY SKILLS

(DURATION: - 110 HRS.)

Basic Training – I (Duration – 55 hrs.)	
1. English Literacy	Duration: 20 Hrs. Marks : 09
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech).
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment.
Writing	Construction of simple sentences Writing simple English.
Speaking / Spoken English	Speaking with preparation on self, on family, on friends/ classmates, on known, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. I.T. Literacy	Duration : 20 Hrs. Marks : 09
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, switching on-Starting and shutting down of computer.
Computer Operating System	Basics of Operating System, WINDOWS, the user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc., Use of Common applications.
Word processing and Worksheet	Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text,

	Formatting the Text, Insertion & creation of Tables. Printing document. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets.
Computer Networking and Internet	Basic of computer Networks (using real life examples), Definitions of Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, opening an email account and use of email. Social media sites and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cybercrimes.
3. Communication Skills	Duration : 15 Hrs. Marks : 07
Introduction to Communication Skills	Communication and its importance, Principles of Effective communication, Types of communication - verbal, nonverbal, written, email, talking on phone. Nonverbal communication -characteristics, components- Paralanguage, Body language, Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening hearing and listening, effective listening, barriers to effective listening guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active Listening Skills.
Motivational Training	Characteristics Essential to Achieving Success. The Power of Positive Attitude. Self-awareness, Importance of Commitment, Ethics and Values. Ways to Motivate Oneself. Personal Goal setting and Employability Planning.

Facing Interviews	Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview.
Behavioral Skills	Problem Solving, Confidence Building, Attitude.
Basic Training – II Duration – 55 hrs.	
4. Entrepreneurship Skills	**Duration: 15 Hrs. Marks : 06**
Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises: -Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, the process of setting up a business.
Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale &Large-Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.
Institutions Support	Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes& procedure & the available scheme.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.
5. Productivity	**Duration : 10 Hrs. Marks : 05**
Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation - How improves or slows down.
Comparison with developed countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.

Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.
6. Occupational Safety, Health and Environment Education	**Duration : 15 Hrs. Marks : 06**
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.
First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India. safety, health, welfare under legislative of India.
Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in -house environment.
7. Labour Welfare Legislation	**Duration : 05 Hrs.**

	Marks : 03
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.
8. Quality Tools	**Duration : 10 Hrs.** **Marks : 05**
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of Housekeeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples.

10. DETAILS OF COMPETENCIES (ON-JOB TRAINING)

The **competencies/ specific outcomes** on completion of On-Job Training are detailed below: -

OJT –I:

1. Comply with personal safety, occupational hazards, working safety and job safety standard.
2. Check lift shaft and set template to fix racket.
3. Install and check rail, machine setting, lift cars, doors bottom springs, lift rail cables etc.
4. Test functioning of lift rope, lay out of rope through pulleys and lightening practice of rope at load end and lift car.
5. Mount and fix motors with its accessories and pedestral bearing, check connections and test it for proper functioning.
6. Install switch gear, install and adjust pulleys with motors, wiring and erection of control panel, mounting of main wire service switch and fuses.
7. Select and install lift with its accessories considering all the factors.
8. Test and adjust all moving contacts of the controller, tightening connections and secure wires.
9. Check brake shoe, magnetic coil, oil in magnet case, dash pot adjustment etc.
10. Test functional operation of various relays, connect relays in the circuits, trace control circuits, check diagram and perform necessary repair.
11. Demonstrate landing zone, top over travel, fixing of machine beam, fixing and adjustment of different types of ropes, guide, buffers etc.

OJT-II:

12. Check oil level in worm gear, check and adjust shaft bearing, drum drive sheave for excessive play and proper lubrication.
13. Check safety governor for proper operating condition and lubrication, all ropes for any damage and broken wire and proper lubrication , main and counter weights , guide rail for lubrication and efficient functioning of brackets and rail clips.
14. Check car shoes for wear & tear, buffers and its lubricants and various safety devices.
15. Check tripping rod for its setting and check leveling for car platform.
16. Adjust and maintain other emergency safety devices.
17. Check movement of traveling cables for foul, top and bottom final shaft way.
18. Test the emergency cut out switches for door and gate contacts, light, fan switches and fixtures in the car for proper operations, clean up top, bottom and inside car.
19. Check and test the lift pit for accumulation of water or garbage, if any.

20. Fix V.F. control in door operation, door sensor, test tool, safety check.
21. Monitor recalibration and testing Earthquake devices.
22. Demonstrate power supply stabilizer UPS and SMPS, test connecting and disconnecting of ICs from circuits.

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on-job training.
2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.

ANNEXURE – I

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

LIFT MECHANIC			
LIST OF TOOLS AND EQUIPMENT for Basic Training (For 20 Apprentices)			
A. TRAINEES TOOL KIT			
S No.	**Name of the Tool & Equipment**	**Specification**	**Quantity**
1.	Steel Tape	5 m length	20+1
2.	Plier Insulated	150 mm	20+1
3.	Plier Side Cutting	150 mm	20+1
4.	Screw Driver	100 mm	20+1
5.	Screw Driver	150 mm	20+1
6.	Electrician Connector, screw driver	100 mm	20+1
7.	Heavy Duty Screw Driver	200 mm	20+1
8.	Electrician Screw Driver thin stem	250 mm	20+1
9.	Punch Centre	150 mm X 9 mm	20+1
10.	Knife Double Bladed Electrician		20+1
11.	Neon Tester		20+1
12.	Steel Rule	300 mm	20+1
13.	Hammer, cross peen with handle		20+1
14.	Hammer, ball peen with handle		20+1
15.	Gimlet	6 mm	20+1
16.	Bradawl		20+1
17.	Scriber (Knurled centre position)		20+1
18.	Pincer	150 mm	20+1
B : INSTRUMENTS & GENERAL SHOP OUTFIT			
19.	First aid box		1 set
20.	C- Clamp	200 mm, 150 mm and 100	2 each
21.	Spanner Adjustable	150 mm,300mm	2 each
22.	Blow lamp	0.5 L	1
23.	Vernier Caliper		1
24.	Pressure Guage	Air	1
25.	Chisel Cold firmer	25 mm X 200 mm	2
26.	Chisel	25 mm and 6 mm	2 each
27.	Hand Drill Machine		1
28.	Portable Electric Drill Machine	6 mm	1
29.	Pillar Electric Drill Machine	12 mm capacity	1
30.	Allen Key		1 set
31.	Oil Can	0.12 L	1
32.	Grease Gun		1
33.	Out Side Micrometer		2
34.	Motorised Bench Grinder		1
35.	Rawl plug tool and bit		2 sets

36.	Pulley Puller		2
37.	Bearing Puller		2
38.	Pipe vice		4
39.	Thermometer	0 to 100 deg Centigrade	1
40.	Scissors blade	150 mm	4
41.	Crimping Tool		2 sets
42.	Wire stripper	20 cm	2
43.	Chisel Cold flat	12 mm	2
44.	Mallet hard wood	0.50 kg	4
45.	Hammer Extractor type	0.40 kg	4
46.	Hacksaw frame	200 mm 300 mm	2
47.	Try Square	150 mm blade	4
48.	Outside and Inside Divider Calipers		2
49.	Pliers flat nose	150 mm	4
50.	Pliers round nose	100 mm	4
51.	Tweezers	100 mm	4
52.	Snip Straight and Bent	150 mm	2 each
53.	D.E. Metric Spanner	6 to 32 mm	2
54.	Drill hand brace		4
55.	Drill S.S. Twist block	2 mm, 5 mm 6 mm set of 3	4 Set
56.	Plane, smoothing cutters	50 mm	2 each
57.	Gauge, wire imperial		2
58.	File flat	200 mm 2nd cut	8
59.	File half round	200 mm 2nd cut	4
60.	File round	200 mm 2nd cut	4
61.	File flat	150 mm rough	4
62.	File flat	250 mm bastard	4
63.	File flat	250 mm smooth	4
64.	File Rasp, half round	200 mm bastard	4
65.	Soldering Iron	25 watt, 65 watt, 125 watt	2 each
66.	Copper bit soldering iron	0.25 kg.	2
67.	Desoldering Gun		4
68.	Hand Vice	50 mm jaw	4
69.	Table Vice	100 mm jaw	8
70.	Pipe Cutter to cut pipes	upto 5 cm. dia	4
71.	Pipe Cutter to cut pipes	above 5 cm dia	2
72.	Stock and Die set pipe	for 20 mm to 50 mm G.I.	1 set
73.	Stock and Dies conduit		1
74.	Ohm Meter; Series Type & Shunt Type		2 each
75.	Multi Meter (analog)	0 to 1000 M Ohms, 2.5 to	2
76.	Digital Multi Meter		6
77.	A.C. Voltmeter M.I.	0 -500V A.C	1
78.	Milli Voltmeter centre zero	100 - 0 - 100 m volt	1
79.	D.C. Milli ammeter	0 -500m A	1
80.	Ammeter MC	0-5 A, 0- 25 A	1 each
81.	A.C. Ammeter M.I.	0-5A, 0-25 A	1 each

82.	Kilo Wattmeter	0-1-3 KW	1
83.	A.C. Energy Meter	Single phase 5 amp. Three	1 each
84.	Power Factor Meter		1
85.	Frequency Meter		1
86.	Flux meter		1
87.	Wheat Stone Bridge with galvanometer		1
88.	Laboratory Type Induction Coil		1
89.	DC Power Supply	0-30V, 2 amp	1
90.	Rheostat	0 -1 Ohm, 5 Amp	1 each
91.	Variable Auto Transformer	1 Phase	1
92.	Battery Charger		1
93.	Hydrometer		1
94.	Miniature Breaker	16 amp (Raw Material)	1
95.	Mini Drafter		8
96.	Drawing Compass set		4
97.	Dial gauge		2
98.	Chain pulley block	2 ton	1
99.	Shackle		2
100.	Ceiling rope nylon/steel		50 m
101.	Control transformer single phase	250 W With 12v, 24v, 48v,	1
102.	Single phase transformer	1 KVA with enclosure and	1
103.	Current transformer	50/5, 20/5, 20/1 ampere	1 each
104.	Potential transformer	240/110, 415/110 volt	1 each
105.	Analog/Digital converter	with four input/output	2
106.	Digital /Analog converter	with four input/output	2
107.	Soft starter	3 phase, 415 V, 15 A	1
108.	Slings	2 ton capacity	1
109.	Elevator rope cutter	upto 32mm	2
110.	Elevator limit switches		4
111.	Electric Hammer type drill machine 22mm capacity with all accessories	750W, 240V	1
112.	Electric Hand grinding machine with 110 mm wheel diameter	750W, 240V	1
113.	Electric hand blower	750 W, 240V	1
114.	Rail alignment gauge		2
115.	Working Plank	10 x 15 inch	4
C. General Machinery & Equipment			
116.	Mini welding machine - (With connecting cable, electrode holder, earthing clamp, safety glass and safety gloves)	150 A, 240V	1
117.	Elevator control panel suitable for 5/8 passenger lift having separate input, output and cable alley chamber. Fitted with PLC controller and related accessories		1
118.	DC compound motor with switch fuse unit, voltmeter, ammeter, field regulator, armature regulator and four point starter	2 KW, 220 V	1

119.	Single phase capacitor start induction motor with starting panel	1 KW, 240 V	1
120.	Universal motor with starting panel	0.75 KW, 240 V	1
121.	Three phase Squirrel cage induction motor with DOL starting panel	3 KW, 415 V	1
122.	Synchronous permanent magnet motor with starting panel - (can be used as generator when coupled with DC compound motor)	2 KW, 3 phase, 415 V	1
123.	Digital AC drive trainer	3 Phase, 2 KW	1
124.	Servo motor Trainer	250 W, 220/110 V	1
125.	Desktop multimedia computer - With suitable UPS and computer table	i3/i5 processor, 2GB RAM, 500 GB HDD, 19.5" TFT monitor.	1
126.	Working model of Escalator		1
127.	Electromagnet break assembly		1
128.	Over speed governor for passenger lift		1
129.	Door simulator set (car door, landing door and door drive unit)		1
130.	5/8 Passenger lift installed with all control and safety accessories		1
D. Safety Equipment			
131.	Industrial safety hat		4
132.	Industrial safety shoe	different size	4
133.	Fall arrest personnel safety belt		4
134.	Life line rope - nylon braided made from	13 mm dia.	4
135.	Safety net 3 x 3 meter		2
136.	Head lamp 3 W with battery		2
137.	Fire Extinguisher	CO2, 2 KG	2
138.	Fire Buckets	With Stand	2
E. Furniture & Accessories			
139.	Instructor's table		1
140.	Instructor's chair		2
141.	Working Bench	2.5 m x 1.20 m x 0.75 m	4
142.	Metal Rack	100cm x 150cm x 45cm	4
143.	Lockers with 16 drawers standard size		2
144.	Almirah	2.5 m x 1.20 m x 0.5 m	1
145.	Black board/white board		1
146.	Welding Table		1
All the tools and equipment are to be procured as per BIS specification.			

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: LIFT MECHANIC

LIST OF TOOLS& EQUIPMENTS FOR -20APPRENTICES

1) **Space Norms** : 45 Sq.m.(For Engineering Drawing)

2) Infrastructure:

A : TRAINEES TOOL KIT:-			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1.	Draughtsman drawing instrument box		21
2.	Set square celluloid	45^o (250 X 1.5 mm)	21
3.	Set square celluloid	30^o-60^o (250 X 1.5 mm)	21
4.	Mini drafter		21
5.	Drawing board	700mm x500 mm IS: 1444	21
B : Furniture Required			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1.	Drawing Board		20
2.	Models: Solid & cut section		as required
3.	Drawing Table for trainees		as required
4.	Stool for trainees		as required
5.	Cupboard (big)		01
6.	White Board	(size: 8ft. x 4ft.)	01
7.	Trainer's Table		01
8.	Trainer's Chair		01

TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS		
Sl. No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	10 Nos.
2.	UPS - 500VA	10 Nos.
3.	Scanner cum Printer	1 No.
4.	Computer Tables	10 Nos.
5.	Computer Chairs	20 Nos.
6.	LCD Projector	1 No.
7.	White Board 1200mm x 900mm	1 No.
Note: - Above Tools &Equipments not required, if Computer LAB is available in the institute.		

ANNEXURE-II

FORMAT FOR FORMATIVE ASSESSMENT

Name & Address of the Assessor:												**Year of Enrollment:**			
Name & Address of BTP/Establishment (Govt./Pvt.) :												**Date of Assessment :**			
Name & Address of the Industry :												**Assessment location: Industry s/ ITI**			
Trade Name :		**Examination:**										**Duration of the Trade/course:**			
Learning Outcome:															
Sl. No	**Maximum Marks (Total 100 Marks)**		**15**	**5**	**10**	**5**	**10**	**10**	**5**	**10**	**15**	**15**	**Total formative assessment Marks**	**Result (Y/N)**
	Candidate Name	**Father's/Mother's Name**	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA		
1														
2														