

CURRICULUM

FOR THE TRADE OF

BUILDING MAINTENANCE TECHNICIAN

UNDER

APPRENTICESHIP TRAINING SCHEME



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

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1. Construction Skills Consultant,
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2. 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 National Council for Vocational Training (NCVT) to develop skilled manpower for the industry. There are four categories of apprentices namely; **trade apprentice, graduate, technician and technician (vocational) apprentices.**

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 NCVT and those successful in the trade tests are awarded the National Apprenticeship Certificate.

The period of apprenticeship training for graduate (engineers), technician (diploma holders) 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, will be critical to success; as will stronger collaboration between industry and the trainees to ensure the supply of skilled workforce and drive 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 amendments 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.

3. RATIONALE

(Need for Apprenticeship in BUILDING MAINTENANCE TECHNICIAN trade)

Apprenticeship is a workplace-based training program for people who want to work in a skilled trade.

- the apprenticeship is on-the-job training under the supervision of skilled trades people
- Apprentices are workers, so they can earn while they learn the trade

Benefits of Apprenticeship Training:

EMPLOYERS:

- Employers gain a skilled workforce that can produce and deliver goods and services to meet customer demand.

APPRENTICES:

- Apprentices earn while they learn a skilled trade.
- Apprenticeships fuel the engine of a strong economy.

Building Maintenance Technician gain experience by performing basic construction duties and aid an experienced Building Maintenance Technician . They can enter an apprenticeship where they perform more advanced duties under the supervision of another Building Maintenance Technician .

Building Maintenance Technician should be in good physical health to walk and lift blocks, bricks and stones. Cooperation with other construction professionals is necessary to meet specific goals. An important aspect of Building Maintenance is cost estimation; Building Maintenance Technician must be able to accurately evaluate the cost of Building Maintenance services and materials. They should be able to read construction blueprints and follow structural plans and safety regulations.No matter what part of the country we travel to, the overwhelming concern of every Building Maintenance contractor we meet is where can we find enough quality Building Maintenance Technician to do all of the work? Nationwide, contractors are looking for Building Maintenance Technician that are well skilled with the dedication to the trade that the older Building Maintenance Technician exhibited. Of course, they also want to know who can solve the problem.

Apprenticeship programs in Building Maintenance include classroom instruction and on-the-job training. Apprentices are sponsored by an employer or government and paid on a scale during training; as they progress in their program, apprentices earn a higher wage and additional job benefits. They also attend classes, to learn knowledge related to their trade.Classroom instruction is part of the apprenticeship, and the combination of classroom teaching and practical experience allows Building Maintenance Technician to become proficient in Maintenance of Building. Apprenticeships are typically arranged by contractors or construction industries. The classroom learning in a Building Maintenance apprenticeship includes instruction in reading blueprints, construction math, etc. Apprentices also learn about the tools and materials used in their trade.

Apprentices who complete their program may start work as skilled Building Maintenance Technician.

4. JOB ROLES: REFERENCE NCO

Brief description of Job roles:

Building Maintenance Technician lays brick or stone with mortar, and other construction material to repair building-walls, arches, floors, pillars and other structures. Repairs damaged roofs. Receives instructions regarding nature and type of work to be done. Directs Laborers to prepare mortar in required proportions and water bricks. Dismantles masonry / other wooden or steel structures for reconstruction or facility of work. Does plastering, decoration pointing and repair work. Erects scaffolding. Paints walls (white washing / putty / distemper colour / acrylic emulsion), wooden structures, steel structures, varnishing, polishing. Repairs false ceiling, wall panels. Replaces glasses, glazed tiles. Does anti termite treatment in building. Repairs and maintains sanitary and drainage works.

Reference NCO: 3112.90

5. GENERAL INFORMATION

1. **Name of the Trade** : **BUILDING MAINTENANCE TECHNICIAN**

2. **N.C.O. Code No.** : 3112.90

3. **Duration of Apprenticeship Training**

(Basic Training + Practical Training): 15 Months

3.1 **Duration of Basic Training: -**

Block –I: 3 months

Total duration of Basic Training: 3 months

Duration of Practical Training (On -job Training): -

Block–I: 12 months

Total duration of Practical Training: 12 months

3.2 **For ITI Passed :-Duration of Basic Training: - NIL**

Duration of Practical Training (On -job Training): 12 months

4. **Entry Qualification** : Passed 10th class examination under 10+2 system of education with Science and Mathematics or its equivalent.

5. **Selection of Apprentices:** The apprentices will be selected as per Apprentices Act amended time to time.

6. **Rebate to ITI Passed out Trainees :Three months** for the trade of **MASON (Building Constructor) or Building Maintenance.**

Note: Industry may impart training as per above time schedule, 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 aspect is compromised and duration of industry training to be remain as 1 year.

6. COURSE STRUCTURE

Training duration details: -

Time (in months)	1-3	4-15
Basic Training	Block– I	-----
Practical Training (On - job training)	----	Block – I

Components of Training	Duration of Training in Months														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Basic Training Block - I															
Practical Training Block - I															

7. SYLLABUS
7.1 BASIC TRAINING
(BLOCK – I)
DURATION: 03MONTHS

GENERAL INFORMATION

- 1) **Name of the Trade** : **Building Maintenance Technician**
- 2) **Hours of Instruction** : 500Hrs.
- 3) **Batch size** : 16
- 4) **Power Norms** : 2.5 KW for Workshop
- 5) **Space Norms** : 64Sq.m.
- 6) **Examination** : The internal assessment will be held on completion of the Block.
- 7) **Instructor Qualification** :

i) Degree/Diploma in **Civil Engineering** from recognized university/Board with one/two year post qualification experience respectively in the relevant field.

OR

ii) NTC/NAC in the trade of **Building Maintenance Technician or Mason (Building Constructor)** with three year post qualification experience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

- 8) **Tools, Equipments & Machinery required** : - As per Annexure – I

7.1.1 DETAILS SYLLABUS OF CORE SKILL

Block– I Basic Training

Topic No.	a) Engineering Drawing	Duration (in hours)	b) Workshop Science & Calculation	Duration (in hours)
1	<ul style="list-style-type: none"> Free hand Sketching of masonry tools. Drawing practice and Properties of lines, angles, triangles, Square, circles & polygons. 	30	Metric System: Measurement of length, breadth & height in metric units Measurement of weight in metric system. Unit conversion. Reading of plain scales. Reading of tapes & foot rules.	20
2	<ul style="list-style-type: none"> Freehand sketching of bricks, queen closers, king closers and bats. Isometric views of simple objects such as cubes, cuboids, square & rectangular prisms, pyramids and cylinders. 		Ratio and proportion: Problems to find out quantities of materials for various mortar & concrete mixes.	
3	<ul style="list-style-type: none"> Preparation of freehand sketches of rat trap bond and other ornamental panels. Use of drawing instruments-‘T’ square, drawing board, etc. Printing of letters & numbers. 		Mensuration: Areas & perimeters of rectangles, squares and triangles, circles, sectors, segments, quadrilaterals, trapezium, parallelogram & rhombus , polygons such as pentagons, hexagons & octagons.	
4	<ul style="list-style-type: none"> Types of lines & symbols used in building drawings. Drawing architectural drawings such as ovolo, cavetto, bolten, scotia, cyma recta, cyma reversa, astragal, etc. 		<ul style="list-style-type: none"> Volume & surface area of simple geometrical solids such as cubes & prisms. Mensuration applied to area & volume of brickwork. Calculation of cement & sand required. 	
5	<ul style="list-style-type: none"> Simple isometric scaled drawings, isometric views of simple objects such as cubes, cuboids, square & rectangular prism and pyramids, etc. Projections of solids. Freehand sketches in plan & elevation of 4 ½” wall-Quoins & Junctions. 		<ul style="list-style-type: none"> Simple cost comparison between facing bricks & common bricks. Cost comparison between walls built in English/Flemish/garden wall bonds/cavity walls. Problems on areas. Allowances for simple rectangular window & other openings. 	
6	<ul style="list-style-type: none"> Drawing to scale: a) 4 ½” stepped wall, b) 4 ½” wall racked back, c) 9” walls in English & Flemish bonds showing stepped end, racking back &toothing. Drawing to scale: a) 4 ½” quoin wall with stepped end & racking back, b) 4 ½” junction wall, c) 9” quoin wall in 		<ul style="list-style-type: none"> Weight of walling supported by lintels and arches-simple problems. Calculation of rise & span for arches. 	

	English & Flemish bonds, d) 9" Flemish bonded wall junction, e) 9" wall in garden wall bond, f) 13 ½" main wall in garden wall bond & 9" cross wall in English/Flemish bond.		
7	<ul style="list-style-type: none"> • Drawing to scale: 18" wall in English garden wall bond. • Hexagonal & octagonal pillars showing bonds and cavities. 		<ul style="list-style-type: none"> • Volume of brickwork in mass retaining walls. • Volume of stonework or concrete work required for a given piece of work.
8	<ul style="list-style-type: none"> • Preparation of drawing showing timbering in trenches • Preparation of drawings showing methods of setting out simple segmental, circular & elliptical arches. 		<ul style="list-style-type: none"> • Mensuration applied to area of marble works. • Calculation of length & weight of steel reinforcement from detailed RCC drawings.
9	<ul style="list-style-type: none"> • Interpretation of building drawing. Preparation of plan, elevation & section of a simple building. 		<ul style="list-style-type: none"> • Calculation of quantities of cement, sand, aggregate & reinforcement for a given RCC work. • Calculation of quantities of various materials for brick / tile / cement concrete/terrazzo flooring. Quantities of materials required for skirting.
10	<ul style="list-style-type: none"> • Reading of a building plan showing drainage line, position of manhole, etc. • Drawing of manhole and inspection chamber with details 		<ul style="list-style-type: none"> • Calculation of length of drainage pipe & materials for foundation & covering concrete. • Calculation of materials required for a manhole from given drawing.
11	<ul style="list-style-type: none"> • Constructional details of hollow block roof with precast RCC joints. • Stonework: Drawing of random rubble, coursed rubble & ashlar masonry. Layout of stairs. • Drawing of stone pillar showing architectural moulding. 		

7.1.2DETAIL SYLLABUS OF PROFESSIONAL SKILLS & PROFESSIONAL KNOWLEDGE

Block –I

Basic Training

Week No.	Professional Skills (275 Hrs.)	Professional Knowledge (120 Hrs.)
1	<p>Introduction to Training Make the trainees familiar with workshop discipline, layout of the shop, tools and equipments, and safety precautions.</p> <p>Mortar & Concrete Prepare mortar and concrete of given mix.</p> <p>Stone Masonry and Brick Masonry Raise a brick wall of half, full and one & half with English or Flemish bond to a height of 1.0m, on spread footing.</p>	<p>Introduction to trade, scope of training, its importance and safety precaution.</p> <p>Different types of bricks, cements, lime, and tiles. Concept of water cement ratio workability and curing.</p> <p>Tools & plants required for preparation, transporting and placing of mortar and concrete. Factor affecting strength of mortar and concrete. Methods of laying bricks in walls. Precaution to be taken in Construction of Walls.</p>
2	<p>Repair and finish cracks in old brickwork and stone Masonry. Pointing Knowledge required.</p> <p>Construct Floors of various types of an area of 1.00m x 1.00m.</p> <p>Repair a given defective floor.</p> <p>Maintenance of hurt tiles.</p>	<p>Defect in stone Masonry and their repair.</p> <p>Methods of fixing new work with old Work (tooting, racking back and block bonding)</p> <p>Defects in brickwork,</p> <p>Maintenance of brick Masonry construction. Merit and demerit of brick Masonry Work.</p> <p>Method of using concrete for repair work and concrete grouting.</p> <p>Causes of defects in Brick, cement concrete, terrazzo and Mosaic, marble and stone floors and their remedial measures.</p> <p>Repair of old floors.</p> <p>Methods of cleaning, cutting and polishing of mosaic, terrazzo and Marble floors/granite (Materials and tools required).</p> <p>Laying, repair and Maintenance of PVC and linoleum floor / wooden flooring.</p>
3	<p>R.C.C. Structure : Make R. C. C. or brick lintel of any span after making proper arrangement of centring.</p> <p>Repair cracks in various types of roofs to stop leakage.</p> <p>Repair the Mangalore tile roof covering.</p> <p>Repair of old damage structure reinforcement.</p>	<p>Knowledge of flat tiles & maintenance of ceramic tiles.</p> <p>Different types of lintel.</p> <p>Tools required to lay RCC & RBC roofs.</p> <p>Method of lay on R.C.C & R.B.C. (Including knowledge for bending, binding and placement of bars.</p> <p>Repair of cracks in R.C.C. roofs, methods, tools and materials required.</p> <p>Knowledge of roof and lintel and Chemical treatment.</p>
4	<p>Surface Finishing : Plaster a given brick surface of area 1m x 1m.</p> <p>Repair a defective plaster surface.</p> <p>PlinthProtection.</p> <p>Do pointing on old brick masonry work.</p>	<p>Tools required for Plastering.</p> <p>Methods of cement and lime plastering.</p> <p>Preparation of surface for plastering.</p> <p>Application of plaster coats.</p> <p>Curing of plaster.</p> <p>Defects in plaster work and their preparations.</p> <p>Repair of defective plaster. Repair of damp surface</p>

		of wall / ceiling. Tools and material required for pointing. Operation involved pointing of masonry works. Repair of old pointing.
5	<u>Painting :</u> Painting of wood/ steel work. Practice white washing /distempering/colourWashing/ cement paintingof area of 2mx2m. Repair woodenworkout door/ window/ventilators/ otherWooden structures. Replace broken glasspanes, acrylic emulsionover plaster of parish. Replace brokenglazed tiles. (The studentsshould be encouraged to undertake repair work in theinstitution building underthe guidance of the instructor; quality of workshould be the main objective.	Knowledge about painting different types of Washing i.e. water base, oil base primer applying with surface preparation before painting. Brush /Spray / roller used in painting. Texture painting. Preparation of wall surface with putty. Knowledge of timber, different type of fitting, knowledge of different type of doors and windows and different types of joints.
6	<u>Painting of Iron and steel Works :</u> paint on different steel structures and other surfaces of plasters.	Methods of painting old iron and steelwork.
7	<u>False ceiling, wall paneling and wall Decorating :</u> False ceiling wall and wallpapering & construction and repairing. Mode of Measurement.	Tools and materials required for false ceiling, wall panelling and wallpapering. Process for placing wallpaper.Method of wall panelling and false ceiling with different materials in old and new walls. Knowledge of false ceiling.
8	<u>Damp Proofing :</u> Construction of course for damp proofing.	Surface of dampness. Effect of dampness. Precautions to be taken to prevent dampness. Methods of damp proofing basements, ground floors, plinth and walls. Special damp proofing arrangement in bathroom WC and kitchen. Damp proofing for flat and pitched roofs and windowsills. Methods for laying damp proof course in existing buildings. Knowledge, reason and subsequent remedial measure. Knowledge required to different type of damp proofing material bonding agents.
9	<u>Varnishing and polishing :</u> Practice on varnishing and polishing coats in different methods.	Tool required for varnishing and polishing coats. Process of varnishing and polishing-preparation of surface, knotting and priming-Application of varnish coats. Methods of polishing on metal surfaces.
10	<u>Glazing Work :</u> Practice on cutting and fixing glasses and replacement.	Replacement and cleaning of glazing work. Tools required. Methods of cutting glass and fixing glass as desired.Materials required for cleaning old glass panes and method of cleaning.
11	<u>Vitrified tiled work :</u> Practice on method of cleaning of china clay.	Method of cleaning of china clay glazed tiles and materials required for cleaning.
12	<u>Sanitary and drainage works :</u> Cutting of pipes to required length and also thread on a	Brief idea of inspection chamber, manhole, intercepting chamber ventilating pipes, soak pit,

	<p>given piece of pipes. Jointing G.I.pipes, plastic pipes by suitable methods. Jointing of sewerage pipes cast- iron and stoneware. Exercises involving the fitting of various pipe fittings and also involving the fitting of various sewerage fittings. Student should be attached in batches to work with a plumber who is executing work locally or in Government public health work. Installation and maintenance of Water pumps. Prepare Layout Plan (from modification point of view) of concealed and open type Water line (G.I) of a bathroom. Visit to New Construction area.</p>	<p>septic tank and different type of fittings and specials. Gradient followed in house sewers, connection of house sewer with municipal service. Measurement, inspection and quality control parameters. Problem and remedies.</p>
13.	<p><u>Anti termite Treatment in Building :</u> Practice on application.</p>	<p>Method of Anti termite Treatment for walls. Anti termite Treatment for wood work in Building.</p>
Revision & Internal Assessment 03days		

7.1.3 EMPLOYABILITY SKILLS

GENERAL INFORMATION

- 1) **Name of the subject** : **EMPLOYABILITY SKILLS**
- 2) **Applicability** : **ATS- Mandatory for fresher only**
- 3) **Hours of Instruction** : **55Hrs.**
- 4) **Examination** : **The examination will be held at the end of two years Training by NCVT.**
- 5) **Instructor Qualification** :

i)MBA/BBA with two years experience or graduate in sociology/social welfare/Economics with two years experience and trained in Employability skill from DGET Institute.

And

Must have studied in English/Communication Skill and Basic Computer at 12th /diploma level

OR

ii) Existing Social Study Instructor duly trained in Employability Skill from DGET Institute.

7.1.3.1 SYLLABUS OF EMPLOYABILITY SKILLS

Block – I Basic Training

Topic No.	Topic	Duration (in hours)
	English Literacy	7
1.	Reading Reading and understanding simple sentences about self, work and environment	
2.	Writing Construction of simple sentences Writing simple English	
3.	Speaking / Spoken English Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. 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.	
	I.T. Literacy	10
1.	Basics of Computer Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.	
2.	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. Use of External memory like pen drive, CD, DVD etc,	
3.	Computer Networking and INTERNET 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.	
	Communication Skill	18
1	Introduction to Communication Skills Communication and its importance Principles of Effective communication Types of communication - verbal, non verbal, written, email, talking on phone. Non verbal communication - components-Para-language Body - language Barriers to communication and dealing with barriers.	
2	Listening Skills Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.	
3	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.	
4	Facing Interviews Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview	
	Entrepreneurship skill	8
1.	Concept of Entrepreneurship Entrepreneurship- Entrepreneurship - Enterprises:-Conceptual issue. Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.	
2.	Institutions Support 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.	
	Productivity	
1.	Productivity Definition, Necessity.	
2.	Affecting Factors Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	
3.	Personal Finance Management Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
	Occupational Safety, Health & Environment Education	6
1	Safety & Health Introduction to Occupational Safety and Health importance of safety and health at workplace.	
2	Occupational Hazards Basic Hazards, Chemical Hazards, Vibro-acoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.	
3	Accident & safety Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.	
4	First Aid Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person	
	Labour Welfare Legislation	
1	Welfare Acts Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Employees Provident Fund Act.	
	Quality Tools	6
1.	Quality Consciousness :	

	Meaning of quality, Quality Characteristic	
2.	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.	
3.	House Keeping : Purpose of Housekeeping, Practice of good Housekeeping.	
4.	Quality Tools Basic quality tools with a few examples	

7.2 PRACTICAL TRAINING (ON-JOB TRAINING)

(BLOCK – I)

DURATION: 12MONTHS

GENERAL INFORMATION

- 1) **Name of the Trade** : **BUILDING MAINTENANCE TECHNICIAN**
- 2) **Duration of On-Job Training** : As per Apprentices Act amended time to time.
- 3) **Batch size** : 16
- 4) **Examination** :
 - i) The internal assessment will be held on completion of the block
 - ii) NCVT exam will be conducted at the end of Apprenticeship Training
- 5) **Instructor Qualification** :

i) Degree/Diploma in **Civil Engineering** from recognized university/Board
With one/two year post qualification experience in the relevant field.

OR

ii) NTC/NAC in the trade of **Building Maintenance Technician or Mason (Building Constructor)** with three year post qualification experience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

- 6) **Tools, Equipments & Machinery required** : - As per Annexure – II

7.2.1 BROAD SKILL COMPONENT TO BE COVERED DURING ON-JOB TRAINING (12 Month)

BLOCK – I

Sr. No.	Skill Components
01.	Instruction of safety precaution on the shop floor.
02.	Construct brick wall 10, 20 & 30 cm. All types of bonds.
03.	Perform stone masonry & ashlar and rubble masonry.
04.	Repair and finish cracks in old brick work and stone work.
05.	Perform pointing and plastering.
06.	Perform cement concrete and line concrete work.
07.	Make RCC lintel and arch of any span after making arrangement of centering.
08.	Construction of floors of different types. Repairing of defective work.
09.	Repairing of crack in various types of roofs to stop leakage.
10.	Painting of wood/steel work.
11.	Whitewashing / distempering and colour washing of building.
12.	Construction of false ceiling and wall papering. Mode of measurement.
13.	Replacement of broken glass of window, ventilator etc.
14.	Construction of courses for damp proofing.
15.	Perform varnishing and polishing.
16.	Perform vitrified and glazed tiles work.
17.	Perform Pipe cutting & joining & its Plumbing and sanitary work.

8.

9. ASSESSMENT STANDARD

7.1 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 scrape/wastage and disposal of scarp/wastage as per procedure, behavioral attitude and regularity in training.

The following marking pattern to be adopted while assessing:

a)Weightage in the range of 60-75% to be allotted during assessment under following performance level:

For 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.

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- many tolerances while undertaking different work are in line with those demanded by the component/job.
- a fairly good level of neatness and consistency in the finish
- occasional support in completing the project/job.

b)Weightage in the range of above75%- 90% to be allotted during assessment under following performance level:

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.

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- the majority of tolerances while undertaking different work are in line with those demanded by the component/job.
- 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 under following performance level:

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.

In this work there is evidence of:

- high skill levels in the use of hand tools, machine tools and workshop equipment
- tolerances while undertaking different work being substantially in line 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

8.22FINAL ASSESSMENT- ALL INDIA TRADE TEST (SUMMATIVE ASSESSMENT)

SUBJECTS	Marks	Sessional Marks	Full Marks	Pass Marks	Duration of Exam.
Practical	300	100	400	240	08 hrs.
Trade Theory	100	20 10 20	120	48	3 hrs.
Workshop Cal. & Sc.	50		60	24	3 hrs.
Engineering Drawing	50		70	28	4 hrs.
Employability Skill	50		50	17	2 hrs.
Grand Total	550	150	700		

Note: - The candidate pass in each subject conducted under all India trade test.

10. FURTHER LEARNING PATHWAYS

- On successful completion of the course trainees can opt for Diploma course (Lateral entry).[Applicable for candidates only who undergone ATS after CTS – if eligibility condition fulfills]
- On successful completion of the course trainees can opt for CITS course.

Employment opportunities:

On successful completion of this course, the candidates shall be gainfully employed in the following industries:

1. Building & construction industries.
2. Service industries
3. Infrastructure organisations
4. In public sector (Central and State) and private industries of related field in India & abroad.
5. Self employment

10. TOOLS & EQUIPMENT FOR BASIC TRAINING**INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL
KNOWLEDGE****TRADE: BUILDING MAINTENANCE TECHNICIAN****LIST OF TOOLS & EQUIPMENTS FOR 16 APPRENTICES****A : TRAINEES TOOL KIT:-**

Sl. No.	Name of the items	Quantity (indicative)
1.	Bolster-100mm	17 nos.
2.	Pitching tool (Masons)	17 nos.
3.	Chisel Masons Hammer Headed Punch	17 nos.
4.	-do- 12mm	17 nos.
5.	-do- 25mm	17 nos.
6.	Cross cut type	17 nos.
7.	-do- 18mm	17 nos.
8.	-do- 35mm	17 nos.
9.	Hammer Masons (club) 1 kg	17 nos.
10.	Hammer brick mason (600-800gm)	17 nos.
11.	Helmets	17 nos.
12.	Leather gloves	17 nos.
13.	Goggles	17 nos.
14.	Level masons 1 mt (plumb level)	17 nos.
15.	Pins (line)	17 nos.
16.	Plumb bob	17 nos.
17.	Square (steel) 0.75m x .5m	17 nos.
18.	Trowel Plastering double	17 nos.
19.	Wooden floats	17 nos.
20.	Trowel brick 25cm long	17 nos.
21.	Trowel pointing 15cm	17 nos.
22.	Taslas (tin) pans	17 nos.
23.	Bucket	17 nos.
24.	Spirit level- 15 cm	17 nos.
25.	Pocket steel tape (2mts.)	17 nos.

26.	Four fold foot rule - 30 cm	17 nos.
27.	Scrapers	17nos.

B :TOOLS INSTRUMENTS AND GENERAL SHOP OUTFITS

Sl. No.	Name of the items	Quantity (indicative)
28.	Spade	8nos.
29.	Shovel	10 nos.
30.	Measuring tape steel 5 and 15 mt.	4 nos. each.
31.	Wooden straight edges 1.5mt.	1 nos.
32.	Ladders of different sizes -2,3&4mts.	1 no of each size
33.	Sledge hammers 4 kg.	2 nos.
34.	Drums-200lts.	2 nos.
35.	Rubber hose pipe 25 mm superior	200 mts.
36.	Bar Bending tool and cutting tool	1 set
37.	Screw Driver (assorted)	4 nos. each.
38.	Sprit level 30 cms	4 nos.
39.	Pick axes	4nos.
40.	Crow bars- 5 mt. Long	8nos.
41.	BUILDING MAINTENANCE tool kit consisting of a)Hand saw - 1 b)Mortise chisel - 1 c)Tennon saw - 1 d)Firmer chisel - 1 e)Mallet - 1 f) Claw hammer - 1 g) Hand brace with bits - 1 h) Plane - 1	
42.	Wheel barrow	3 nos.
43.	Tubular scaffolding 25mm dia. With coupling and fitting complete	As required
44.	Steel measuring boxes - (.06cft-3nos.&12cft- 3nos.)	6 nos.
45.	Adjustable props. Steel	24nos.
46.	Flat form - 1.5mx 1.5mx2mt.	2nos.
47.	Bending rods	2 nos.
48.	Steel shuttering- 200sq.mts.	1 no.
49.	Water pipe level 10 mts.	4 nos.

C :GENERAL MACHINERY INSTALLATIONS:-

Sl. No.	Name & Description of Machines	Quantity (indicative)
1.	Bench grinder	1 no.

Note: In case of basic training setup by the industry the tools, equipment and machinery available in the industry may also be used for imparting basic training.

**INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND
ENGINEERING DRAWING**

TRADE: BUILDING MAINTENANCE TECHNICIAN

LIST OF TOOLS& EQUIPMENTS FOR 16 APPRENTICES

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

2) Infrastructure:

A : TRAINEES TOOL KIT:-

Sl. No.	Name of the items	Quantity (indicative)
1.	Draughtsman drawing instrument box	17 nos.
2.	Set square celluloid 45 ⁰ (250 X 1.5 mm)	17 nos.
3.	Set square celluloid 30 ⁰ -60 ⁰ (250 X 1.5 mm)	17 nos.
4.	Mini drafter	17 nos.
5.	Drawing board (700mm x500 mm) IS: 1444	17 nos.

B : FURNITURE REQUIRED

Sl. No.	Name of the items	Quantity (indicative)
1	Models : Solid & cut section	as required
2	Drawing Table for trainees	as required
3	Stool for trainees	as required
4	Cupboard (big)	01
5	White Board (size: 8ft. x 4ft.)	01
6	Trainer's Table	01
7	Trainer's Chair	01

11. INFRASTRUCTURE FOR ON-JOB TRAINING

TRADE: BUILDING MAINTENANCE TECHNICIAN

For Batch of 16 APPRENTICES

Actual training will depend on the existing facilities available in the establishment.

However, the industry should ensure that the broad skills defined against On-Job–
Training part (i.e. 12 months) are imparted. In case of any short fall the concerned
industry may impart the training in cluster mode / in any other industry / at ITI.

12. GUIDELINES FOR INSTRUCTORS AND PAPER SETTERS

1. Due care to be taken for proper & inclusive delivery among the batch. Some of the following some method of delivery may be adopted:

- A) LECTURE
- B) LESSON
- C) DEMONSTRATION
- D) PRACTICE
- E) GROUP DISCUSSION
- F) DISCUSSION WITH PEER GROUP
- G) PROJECT WORK
- H) INDUSTRIAL VISIT

2. Maximum utilization of latest form of training viz., audio visual aids, integration of IT, etc. may be adopted.

3. The total hours to be devoted against each topic may be decided with due diligence to safety & with prioritizing transfer of required skills.