

CURRICULUM

FOR THE TRADE OF

MEDICAL LABORATORY TECHNICIAN
(CARDIOLOGY)

UNDER

APPRENTICESHIP TRAINING SCHEME

2017



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

CONTENTS

Sl. No.	Topics	Page No.
1.	Acknowledgement	3-4
2.	Background 2.1 Apprenticeship Training under Apprentice Act 1961 2.2 Changes in Industrial Scenario 2.3 Reformation	5
3.	Rationale	6
4.	Job roles: reference NCO	7
5.	General Information	8
6.	Course structure	9
7.	Syllabus 7.1 Basic Training 7.1.1 Detail syllabus of Professional Skill & Professional Knowledge - Block – I 7.1.2 Employability Skill (General Information) 7.1.2.1 Syllabus of Employability skill - Block – I 7.2 Practical Training (On-Job Training) 7.2.1 Broad Skill Component to be covered during on-job training- Block – I	10-20
8.	Assessment Standard 8.1 Assessment Guideline 8.2 Final assessment-All India trade Test (Summative assessment)	21-23
9.	Further Learning Pathways	24
10.	Annexure-I – Tools & Equipment for Basic Training	25
11.	Annexure-II – Tools & Equipment for On-Job Training	26
12.	Annexure-III - Guidelines for Instructors & Paper setter	27

1. ACKNOWLEDGEMENT

The DGT sincerely express 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:

1. Shivam Diagnostics & Cancer Research Institute, New Delhi
2. Sing's Dental Hospital (On panel C.G.H.S, govt. of India), New Delhi
3. Govt. General Hospital, Bahadurgarh, HR
4. Dynamic Physiotherapy Services, New Delhi
5. Kapoor Dental Care, Delhi
6. National Industrial Training Centre, Dwarka, New Delhi
7. Aelis Enterprise Learning & Implementation Solutions Pvt. Ltd. , Kolkata

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

Co-ordinator for the course:Shri L K Mukherjee, Deputy Director, CSTARI, Kolkata

Sl. No.	Name & Designation Sh./Mr./Ms.	Organization	Expert Group Designation
1.	Dr. RiteshGarg , M.B.B.S., D.M.R.D	Shivam Diagnostics & Cancer Research Institute,C- 41 Mahendru Enclave Lane , Delhi-110033	Chairman
2.	C. Shibu , Faculty	-Do-	Member
3.	Dr. Sushil Gupta , M.B.B.S, D.M.R.D.	-Do-	Member
4.	Dr. Anil Grover , M.B.B.S, M.D.	-Do-	Member
5.	Dr. Rajneesh Aggarwal , M.B.B.S., D.M.R.D.	-Do-	Member
6.	Dr. GauravMathur , Consultant	-Do-	Member
7.	Dr. PatwinderBedi , Consultant	-Do-	Member
8.	Dr. VeerpalNathoo , Surgeon	Sing's Dental Hospital (On panel C.G.H.S, govt. of India)	Member

9.	Dr. Rachna , BDS,MIDA	-Do-	Member
10.	Dr. Anamika Singh , B.D.S., M.I.D.A.	-Do-	Member
11.	Dr. Ritu , Faculty	-Do-	Member
12.	Dr. Madhavi Raj , Faculty	-Do-	Member
13.	PoojaRana , Faculty	-Do-	Member
14.	Dr. Priyanka , Faculty	-Do-	Member
15.	Dr. NishaGulia , Faculty	Govt. General Hospital, Bahadurgarh, HR	Member
16.	Dr. Sumit Nigam , BPT, Director	Dynamic Physiotherapy Services, 5495, 2 nd Floor ShorakothiPaharganj New Delhi- 110055	Member
17.	Dr. Sonia , BPT	-Do-	Member
18.	Dr. Rohit , MPT	-Do-	Member
19.	Dr. RashmiLohia , BPT	-Do-	Member
20.	Dr. S.K. Yadav , B.P.T., M.P.T. (Ortho), M.I.A.P, D.C.P	-Do-	Member
21.	Dr. SushantaKapoor , B.D.S.	Kapoor Dental Care, C-18, Model town-III, Delhi-110009	Member
22.	Kirti Sharma , Faculty	National Industrial Training Centre, Dwarka, New Delhi	Member
23.	Mukta Singh , Faculty	-Do-	Member
24.	GeetaDeswal , Faculty	-Do-	Member
25.	Preeti Singh , Faculty	-Do-	Member
26.	Akash Kumar , Faculty	-Do-	Member
27.	Bhawna , Instructor	-Do-	Member
28.	Dr. Urvashi Jain , M.D.	-Do-	Member
29.	Ramesh Kumar Garg , M.B.B.S, M.D.	-Do-	Member
30.	Dr. P.K. Anand , Faculty	-Do-	Member
31.	AmitSethi , Consultant	-Do-	Member
32.	Major Kalyan Bose	Aelis Enterprise Learning & Implementation Solutions Pvt.	Chairman & Director- Aelis

		Ltd. , Kolkata	
33.	Dr. Ashok Kumar Khandelwal, M.B.B.S, PG Diploma in Hospital Administration	Medical Director-Anandaloke Multi Speciality Hospital, Kolkata	Subject Expert
34.	Dr. Ujjal Das, M.B.B.S,M.D, FCCP(Lond), MYCP (USA),CME (RCP,UK)	Honorary Director, Niramoy Kendra, SarsunaSatelite Township, Kolkata-61	Subject Expert
35.	Dr. RekhaKhandelwal- M.B.B.S	Medical Officer-B.S.F, STC, Salugara	Subject Expert
36.	Dr. DebabratoLaha- M.B.B.S,M.S	Medical Officer In Charge of AELIS Healthcare Unit at PVUNL Patratu, Jharkahnd	Subject Expert
37.	SagarikaGhosh	Aelis Enterprise Learning & Implementation Solutions Pvt. Ltd. , Kolkata	COO- Aelis
38.	P.K. Bairagi, T.O.	CSTARI, Kolkata	Member
39.	K.V.S. Narayana, T.O.	CSTARI, Kolkata	Member

2. BACKGROUND

2.1 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.

2.2 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.

2.3 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 Medical Laboratory Technician (Cardiology)trade]

Medical assistants are vital to efficient and successful patient care. Working alongside doctors, nurses and other staff, these professionals help with patient procedures, take vital signs and blood pressure. Medical assistants in the cardiology field perform these basic functions in addition to more specialized duties.

Cardiologists specialize in diagnosing and treating conditions of the heart and blood vessels. Medical assistants in this field must be highly skilled and capable of this sensitive work. Cardiology medical assistants generally assist by preparing patients for cardiovascular procedures, accurately recording heart test results, applying Holter monitors to patients, taking electrocardiograms, and educating patients on medications and nutrition. Due to the nature of this work, medical assistants in this setting should have some knowledge of heart conditions, such as angina, heart failure, heart valve disease and heart attack.

4. JOB ROLES: REFERENCE NCO

Brief description of Job roles:

3212.0701

Medical Laboratory Technician (MLT); is also referred to as Clinical Laboratory Science professionals, Medical Technologists and Medical Laboratory Scientists. The Medical Laboratory Technician performs complex tests for diagnosis, treatment, and prevention of disease. These professionals are responsible for supporting and assisting doctors and scientists in their day-to-day healthcare work in a variety of roles. They function as the main support to biomedical scientists in laboratories. They are also sometimes responsible for imparting training and supervision to the staff.

3211.0801

Cardiac Care Technician (CCT); is a health care specialist who supports cardiologist in diagnosing and treatment of ailments of the human heart. Cardiac Care Technician in the health Industry is also known as a Cardiographic Technicians or Cardiovascular Technicians. Individuals in this job assist in performing invasive and non-invasive diagnostic examinations and therapeutic interventions of the heart and/or blood vessels at the request or direction of a provider.

Conducts electrocardiogram, phonocardiogram, echocardiogram, and stress tests by using electronic test equipment, recording devices, and laboratory instruments. Helps physicians with cardiac cauterizations by operating multi-channel physiologic monitor; measuring and recording functions of cardiovascular and pulmonary systems of patient during cardiac cauterizations; alerting physicians to instrument readings outside normal ranges during the procedures; providing test results.

Reference NCO-2015:

- i) 3212.0701
- ii) 3211.0801

5. GENERAL INFORMATION

1. Name of the Trade : Medical Laboratory Technician (Cardiology)

i) 2. N.C.O. Code No. : 3212.0701,3211.0801

3. Duration of Apprenticeship Training (Basic Training + Practical Training):15 Months

3.1 For Fresher's:- 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: - 3 months

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

4. Entry Qualification : Passed 12th Class Examination under (10+2) System of Education with Physics, Chemistry & Biology.

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



2. Rebate for ITI passed trainees : NIL

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 remains 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: 03 MONTHS

GENERAL INFORMATION

- 1) **Name of the Trade** : **Medical Laboratory Technician (Cardiology)**
- 2) **Hours of Instruction** : 500 Hrs.
- 3) **Batch size** : 20
- 4) **Power Norms** : 4 KW
- 5) **Space Norms** : 35 Sq.m.
- 6) **Examination** : The internal assessment will be held on completion of the Block.
- 7) **Instructor Qualification** :

- | | |
|---|----|
| i) MD Cardiology | OR |
| ii) DNB Cardiology | OR |
| iii) BSC MLT Trained Staff with one year experience | |

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

7.1 DETAIL SYLLABUS OF BASIC TRAINING

7.1.1 DETAIL SYLLABUS OF PROFESSIONAL SKILLS & PROFESSIONAL KNOWLEDGE

Block –I
Basic Training

Week No.	Professional Skills	Professional Knowledge
1	Familiarization of safety appliances, Laboratory works, solutions, storage of chemicals and Laboratory hazards.	
2-3	Basic of electricity, electrodes & electric charge Study of ECG machine different parts; their functions and controls.	Systemic Anatomy and physiology- Circulatory system:- blood , plasma, blood cells, blood groups , clotting mechanism , blood vessels , heart (circulation , nerve supply , function cardiac cycle), ECG , blood pressure, blood volume , aorta and main branches.
4-5	Preparation of the patient, placement of the electrodes.	Knowledge of ECG machine Knowledge about the leads and application. Knowledge & chemistry of jelly.
6-7	Practice on operation of the ECG machine.	Interpretation of the ECG waves –PQRST etc. Electrophysiology of ECG.
8-10	Monitoring of the ECG and interpretation of the PQRST configuration – Determination of the axis.	ECG changes Interpretation of the waves in the ECG and diagnostic criteria
11-13	Practice on identification of different parts of the human body.	Fundamentals of Anatomy: Basic terminologies, Anatomical regions, Cell, Tissue etc. Skeletal system: general structures, Arthrology. Muscular system: Origin, Insertion, Blood and Nerve supply, functions Organs related to Digestive, Circulatory and Respiratory system. Organs of special senses. Functional irregularities. Lymphatic system: atries, veins, capillaries and their functions.
14-16	Demonstration with Models & A.V. Show	Digestive system and Metabolism. Respiratory system (Rate Rhythm/ Tidal Vol./Vital capacity etc.) Circulatory system and details of blood picture/blood grouping/ blood pressure and its

		effects/causes of rise of E.S.R./details of Heart and its function. TMT (Tread Mill Test) Echo Cardiography
17-20	Examining a patient following prescribed steps.	Common diseases of digestive system, respiratory system, cardiovascular diseases, endocrine system.
21-22	Project work/Hospital Visit	
23-24	Revision	
25	Examination	

7.1.2 EMPLOYABILITY SKILLS

GENERAL INFORMATION

- 1) **Name of the subject** : **EMPLOYABILITY SKILLS**
- 2) **Applicability** : **ATS- Mandatory for fresher only**
- 3) **Hours of Instruction** : **110 Hrs.**
- 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.

7.1.2.1 SYLLABUS OF EMPLOYABILITY SKILLS

A. Block – I Basic Training

Topic No.	Topic	Duration (in hours)
	English Literacy	15
1	Pronunciation : Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)	
2	Functional Grammar Transformation of sentences, Voice change, Change of tense, Spellings.	
3	Reading Reading and understanding simple sentences about self, work and environment	
4	Writing Construction of simple sentences Writing simple English	
5	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. 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.	
	I.T. Literacy	15
1	Basics of Computer Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.	
2	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.	
3	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	
4.	<p>Computer Networking and INTERNET</p> <p>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),</p> <p>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.</p> <p>Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.</p>	
	Communication Skill	25
1	<p>Introduction to Communication Skills</p> <p>Communication and its importance</p> <p>Principles of Effective communication</p> <p>Types of communication - verbal, non verbal, written, email, talking on phone.</p> <p>Non verbal communication -characteristics, components-Para-language</p> <p>Body - language</p> <p>Barriers to communication and dealing with barriers.</p> <p>Handling nervousness/ discomfort.</p> <p>Case study/Exercise</p>	
2	<p>Listening Skills</p> <p>Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.</p> <p>Triple- A Listening - Attitude, Attention & Adjustment.</p> <p>Active Listening Skills.</p>	
3	<p>Motivational Training</p> <p>Characteristics Essential to Achieving Success</p> <p>The Power of Positive Attitude</p> <p>Self awareness</p> <p>Importance of Commitment</p> <p>Ethics and Values</p> <p>Ways to Motivate Oneself</p> <p>Personal Goal setting and Employability Planning.</p> <p>Case study/Exercise</p>	
4	<p>Facing Interviews</p> <p>Manners, Etiquettes, Dress code for an interview</p> <p>Do's & Don'ts for an interview</p>	

5	Behavioral Skills Organizational Behavior Problem Solving Confidence Building Attitude Decision making Case study/Exercise	
	Entrepreneurship skill	15
1	Concept of Entrepreneurship Entrepreneurship- 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.	
2	Project Preparation & Marketing analysis Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of Product Life Cycle (PLC), Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.	
3	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.	
4	Investment Procurement Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.	
	Productivity	10
1	Productivity Definition, Necessity, Meaning of GDP.	
2	Affecting Factors Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	
3	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.	
4	Personal Finance Management Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
	Occupational Safety, Health & Environment Education	15

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	
5	Basic Provisions Idea of basic provision of safety, health, welfare under legislation of India.	
6	Ecosystem Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.	
7	Pollution Pollution and pollutants including liquid, gaseous, solid and hazardous waste.	
8	Energy Conservation Conservation of Energy, re-use and recycle.	
9	Global warming Global warming, climate change and Ozone layer depletion.	
10	Ground Water Hydrological cycle, ground and surface water, Conservation and Harvesting of water	
11	Environment Right attitude towards environment, Maintenance of in -house environment	
	Labour Welfare Legislation	5
1	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.	
	Quality Tools	10
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	Quality Management System : Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.	
4	House Keeping : Purpose of Housekeeping, Practice of good Housekeeping.	
5	Quality Tools Basic quality tools with a few examples	

7.2 PRACTICAL TRAINING (ON-JOB TRAINING) (BLOCK – I)

DURATION: 12 MONTHS

GENERAL INFORMATION

- 1) **Name of the Trade** : **Medical Laboratory Technician (Cardiology)**
- 2) **Batch size** : a) Apprentice selection as per Apprenticeship Guidelines
b) Maximum 20 candidates
- 3) **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
- 4) **Instructor Qualification** :

- i) MD Cardiology
OR
- ii) DNB Cardiology
OR
- iii) BSC MLT Trained Staff with one year experience

- 5) **Infrastructure for On-Job Training** : - As per Annexure – II

7.2.1 BROAD SKILL COMPONENT TO BE COVERED DURING ON-JOB TRAINING

BLOCK – I

1. Safety and best practices (5S, KAIZEN etc.)
2. Record keeping and documentation

DURATION: 12MONTHS (52WEEKS)	
SL NO	LIST OF PRACTICAL SKILLS TO BE COVERED DURING ON JOB TRAINING
1.	Study of ECG machine different parts; their functions and controls.
2.	Preparation of the patient placement of the electrodes
3.	Practice on operation of the ECG machine.
4.	Monitoring of the ECG and interpretation of the PQRST configuration - Determination of the axis.
5.	Preparation of the patient for TMT (Tread Mill Test), Practice on operation of TMT.
6.	Preparation of the patient for Echo cardiography, Practice on operation of Echo cardiography.

8. ASSESSMENT STANDARD

8.1 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 above 75%- 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

**8.2 FINAL ASSESSMENT- ALL INDIA TRADE TEST
(SUMMATIVEASSESSMENT)**

SUBJECTS	Marks	Sessional Marks	Full Marks	Pass Marks	Duration of Exam.
Practical	300	100	400	240	08 hrs.
Trade Theory	100	20	120	48	3 hrs.
Employability Skill	50		50	17	2 hrs.
Grand Total	450	120	570	-	

9. FURTHER LEARNING PATHWAYS

1. DIPLOMA/GRADUATION IN MLT
2. ADVANCE COURCES IN MEDICAL FIELD

Employment opportunities:

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

1. Hospitals
2. Cardiology Lab
3. Diagnostic Centres
4. Forensic Lab

TOOLS & EQUIPMENT FOR BASIC TRAINING**INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE****TRADE: MEDICAL LABORATORY TECHNICIAN (CARDIOLOGY)****LIST OF TOOLS & EQUIPMENTS FOR 20 APPRENTICES****A: TRAINEES TOOL KIT:-**

Sl. No.	Name of the items	Quantity (indicative)
1.	Stethoscope	As required
2.	Lab coat	As required
3.	Hand gloves	As required
4.	Hand sanitizers	As required
5.	Syringe pumps	As required

B: TOOLS INSTRUMENTS AND GENERAL MACHINERY INSTALLATIONS:-

Sl. No.	Name of the items	Quantity (indicative)
1.	Monitor with all Accessories (ECG, SPO ₂ , temperature, NIBP, ABP mode)	04 Nos.
2.	ECG Machine	02 Nos.
3.	IABP Machine	02 Nos.
4.	Crash Cart trolley with all Accessories	02 Nos.
5.	Defibrillators	02 Nos.
6.	Cardiac monitor with all Accessories	01 No.
7.	Echo Machine with TEE	01 No.
8.	Holter Machine	01 No.
9.	TMT machine for stress test	01 No.
10.	DVD/VCD for practical with simulation	As required

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.

ANNEXURE – II

INFRASTRUCTURE FOR ON-JOB TRAINING

TRADE: MEDICAL LABORATORY TECHNICIAN (CARDIOLOGY)

For Batch of 20 APPRENTICES

Actual training will depend on the existing facilities available in the establishments. 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 concern industry may impart the training in cluster mode/ any other industry/ at ITI.

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.