Model Curriculum

8. CNC Setter cum Operator - Turning

SECTOR: CAPITAL GOODS
SUB-SECTOR: MACHINE TOOLS, DIES, MOULDS AND PRESS TOOLS, PLASTICS MANUFACTURING MACHINERY, TEXTILE MANUFACTURING MACHINERY, PROCESS PLANT MACHINERY, ELECTRICAL AND POWER MACHINERY, LIGHT ENGINEERING GOODS
OCCUPATION: MACHINING
REF ID: CSC/Q0120, V1.0
NSQF LEVEL: 4

Skill India
कौशल भारत-कुशल भारत

CGSC
CAPITAL GOODS SKILL COUNCIL

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CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

CAPITAL GOODS SKILL COUNCIL

for the

MODEL CURRICULAM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: **'CNC Setter cum Operator - Turning'** QP No. **'CSC/ Q0120 NSQF Level 4'**

Date of Issuance: July 12th, 2016
Valid up to : Aug 30th, 2016
*Valid up to the next review date of the Qualification Pack or the 'Valid up to' date mentioned above (whichever is earlier)

Authorised Signatory
(Capital Goods Skills Council)

TABLE OF CONTENTS

CNC Setter cum Operator-Turning

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "CNC Setter cum Operator-Turning", in the "Capital Goods" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**CNC Setter cum Operator-Turning**		
Qualification Pack Name & Reference ID. ID	CSC/Q0120, v1.0		
Version No.	1.0	**Version Update Date**	
Pre-requisites to Training	10th Standard passed, preferably		
Training Outcomes	**After completing this programme, participants will be able to:** • **Work safely:** State the importance of safe working practices at the workplace, and comply with health and safety legislation, regulations and other guidelines. • **Set computer numerically controlled (CNC) machines for turning operations of metal components:** Gather information from data sheets, understand job requirement and sequence, set critical parameters and ready the machine for turning operation. • **Prepare for performing turning operation on CNC machine:** Identification of parts of a CNC, select the correct cutting tool, prepare the surface for operation, secure the work piece in the work holding device, set the work piece in the correct position and identify the types of turning operation. • **Carry out turning operation using CNC machine:** Gather operation requirement from instruction sheets, carryout sequence of operation as per the instruction on various materials and forms and check for accuracy of the work using standard measuring devices. • **Basic health and safety practices at the workplace:** Identify risks and hazards at workplace, use of PPE, and apply good housekeeping practices, etc., • **Work effectively with others:** effectively communicate with others and demonstrate good ethical practices and discipline.		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of "CNC Setter cum Operator-Turning" Qualification Pack issued by "Capital Goods Skill Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction** **Theory Duration** (hh:mm) 03:00 **Practical Duration** (hh:mm) 00:00 **Corresponding NOS Code** CSC/N0120	• State the various opportunities available in fabrication industry • Describe the role and responsibilities for a CNC setter cum operator • Explain the importance of using CNC machines over conventional machines	Training Kit (Trainer Guide, PowerPoint presentation) Sample drawing, vernier calliper, micrometer screw gauge, depth gauge,CNC machine with all accessories, facing tool, turning tool, grooving tool, parting off tool, threading tool, reamers, twist drills
2	**Units, measurement and Engineering drawing** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) 03:00 **Corresponding NOS Code** CSC/N0120	• Identify system of measurement and convert units from system of measurement to another • Explain First angle and third angle projections – orthographic, isometric, sectional, exploded views • Identify dimensioning method and read manufacturing notes as per the standards specified • Define Limits, Fits and Tolerances • Use precision measuring instruments – Vernier calliper, micrometer screw gauge, depth gauge etc., • Perform numerical calculation	Training Kit (Trainer Guide, PowerPoint presentation)
3	**Material properties** **Theory Duration** (hh:mm) 03:00 **Practical Duration** (hh:mm) 00:00 **Corresponding NOS Code** CSC/N0120	• Classify materials and state their properties and composition – ferrous metals, stainless steel, cast iron, non ferrous metals – aluminium, aluminium alloys, copper and copper alloys, non metals- plastic	Training Kit (Trainer Guide, PowerPoint presentations)
4	**Introduction to CNC** **Theory Duration** (hh:mm) 14:00 **Practical Duration**	• Explain terminologies used in CNC turning- apron, bed, bore, centre, centres, cross slide, dead center,facing, feed rate, foot stock, gantry, machinability, spindle, spindle speed, swing, taper, ways • Identify the parts of a CNC machine – headstock, bed, chuck, tailstock, tailstock	Training Kit (Trainer Guide, PowerPoint presentations)

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 12:00 **Corresponding NOS Code** CSC/N0120	quill, foot switches or pedal, CNC control panel and tool turret • Explain various turning operations that can be performed on a CNC machine – turning, facing, face grooving, thread cutting, drilling, boring, reaming and tapping • Identify raw material forms – square/rectangular, circular/cylindrical, irregular shapes/profiles • Explain various types of cutting tool materials and their properties – HSS (High Speed Steel),Tungsten carbide, ceramic and diamond indexible tips • Classify tools as turning tool, grooving tool, parting tool, threading tool, forming tool, centre drills, twist/insert drills and reamers • Identify work holding devices –chucks with hard jaws, chucks with soft jaws, fixtures, drive centres, collet chucks, face plates, magnetic / pneumatic devices • Identify tool posts, magazines and carousels • Method to position and identify tools in relationship to the operating program	
5	**Work Safely** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) 05:00 **Corresponding NOS Code** CSC/N0120	• Explain the importance of safe working practices at the work place • Apply electrical safety practices at the work place • Explain and comply with health and safety legislation, regulations and other guidelines • Follow general safety practices at the workplace • Identify hazards at the workplace and take corrective actions to avoid such hazards • Follow the stated procedure for material handling • List the personal protective equipment (PPE) required for CNC operation • Wear suggested personal protective equipment correctly • Follow the safety recommendations while handling CNC machine • Check that all safety mechanisms are in place and the equipment is set correctly for the required operation • State the importance of '5S'	Training Kit (Trainer Guide, PowerPoint presentations),overalls, safety glasses, safety shoes, face mask, work holding devices,CNC machine with all accessories
6	**Prepare for setting CNC turning machine for**	• Collect job specifications from valid sources- job instruction sheet, job card,	Training Kit (Trainer Guide, PowerPoint

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	production **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 50:00 **Corresponding NOS Code** CSC/N0120	work drawings and instructions, planning documentation, quality control documents, operation sheets • Establish job requirements from the document accurately – dimensions, limits, tolerances, work holding devices, cycle time • Perform primary checks on the machine and ensure cleanliness of the machine, coolant level, lubrication level, and fill the check sheet before starting the shift • Collect suitable cutting tool based on the operation to be preformed – turning tool, grooving tool, threading tool, form tool, threading tool, centre drills, twist/insert drills and reamers • Collect calibrated measuring tools from the concerned authority – steel rule, micrometers, vernier calliper, gauges, dial test indicator, surface finish equipment and height master • Identify suitable work holding or fixture as per the work requirement • Check tools , fixtures for any damage, breakage and calibration • Ensure that the correct program is being used and the tool is set properly • Pre set the tooling appropriately using setting jigs / fixtures	presentations),overalls, safety glasses, safety shoes, face mask, work holding devices,CNC machine with all accessories ,Engineering drawings, sample instruction sheets, sample daily check sheet, turning tool, threading tool, centre drills, threading tools, reamers, vernier calliper, micrometer screw gauge, depth gauge, work holding devices
7	**Carryout setting for CNC turning operation using CNC machine** **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 100:00 **Corresponding NOS Code** CSC/N0120	• use appropriate method to mount tool in the correct tool post, turret, magazines, or carousel • identify tool number in relation to the operating program • produce components of various features such as diameter, faces, undercuts, profiles, holes, parting off, threads, radii, chamfers and grooves • Feed the relevant tool data to the program – tool type, tool length, tool offset, radius compensation etc., • Set tool datum, position, length , offset and radius compensation • Position the work holding device in relationship to the machine datum and reference points • Adjust machine tool operating parameters – hydraulic pressure, clamp as per the component requirement • Carryout a trial run using single block run ,dry run and feed and speed overdrive controls	Training Kit (Trainer Guide, PowerPoint presentations),overalls, safety glasses, safety shoes, face mask, work holding devices,CNC machine with all accessories ,Engineering drawings, sample instruction sheets, sample daily check sheet, turning tool, threading tool, centre drills, threading tools, reamers, vernier calliper, micrometer screw gauge, depth gauge, work holding devices

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Verify critical parameters – linear dimensions, slots, flatness, squareness, parallelism, angles, recesses, thread fit, runout, concentricity, and contour • Perform necessary checks before proceeding for the full mode operation • Method to document during and post operation as per the organizational policy • Method to hand over the machine to the operator with relevant documents • Procedure to return cutting tools and other tools to the concerned authority	
8	**Prepare for performing turning operation using CNC machines** **Theory Duration** (hh:mm) 25:00 **Practical Duration** (hh:mm) 70:00 **Corresponding NOS Code** CSC/N0115	• Collect job specifications from valid sources- job instruction sheet, job card, work drawings and instructions, planning documentation, quality control documents, operation sheets • Establish job requirements from the document accurately • Perform primary checks on the machine and ensure cleanliness of the machine, coolant level, lubrication level, and fill the check sheet before starting the shift, setting as per requirement has been done • Collect work piece from the concerned authority • Collect suitable cutting tool based on the operation to be preformed – turning tool, grooving tool, threading tool, form tool, threading tool, centre drills, twist/insert drills and reamers • Collect calibrated measuring tools from the concerned authority – steel rule, micrometers, vernier calliper, gauges, dial test indicator, surface finish equipment and height master • Secure the work piece in the work holding device and position correctly as per the operation • Ensure that the correct program is being used and the tool is set properly • Perform daily maintenance activities	Training Kit (Trainer Guide, PowerPoint presentations),overalls, safety glasses, safety shoes, face mask, work holding devices,CNC machine with all accessories ,Engineering drawings, sample instruction sheets, sample daily check sheet, turning tool, threading tool, centre drills, threading tools, reamers, vernier calliper, micrometer screw gauge, depth gauge, work holding devices
9	**Carryout turning operation using CNC machine** **Theory Duration** (hh:mm) 25:00	• Gather relevant information drawing regarding ,dimensions, tolerances, surface finish, machining requirement, thread size, feeds, speeds etc., • Explain various displays shown on the CNC panel • Secure the work piece in suitable work holding device	Training Kit (Trainer Guide, PowerPoint presentations),overalls, safety glasses, safety shoes, face mask, work holding devices,CNC machine with all accessories

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 80:00 **Corresponding NOS Code** CSC/N0115	• Check correctness of the program through dry run and single block check • Carryout the first cutting by setting tool offsets to get an oversized part • Measure critical parameters without removing the work piece from the machine – linear dimension, position, depth and width of slots, flatness, surface finish, squareness, parallelism, hole size/fit angles, recess, thread fit, run out and roundness • Ensure that the machine settings are adjusted as and when required either by self or by a setter • Follow machining sequence while producing components • Carryout turning operation - Turning (OD/ID), drilling, boring, facing, grooving, face grooving, thread cutting etc., • Produce features like diameters (parallel, stepped, tapered),faces, undercuts, profiles, holes, parting off and threading • Follow inspection plan to inspect produced components • Inspect tools and specific intervals and decide on the tool change • Check the dimensional tolerances, the tolerances should be within +-0.02 mm, surface finish within 1.6 micrometer, holes within H8,threads 6G/6H, angles/tapers with +/-15 sec, flatness / squareness within 0.025 mm • Perform documentation during post operations as per the procedure • Store the finished products as per the • norms • Shut down the machine safely - correctly isolated, operating program closed or removed, clean the machine, follow proper waste disposal method • State legislation, standards and policies • Own job role and responsibilities • Know reporting structure and various department functions • Acquaint with people and their responsibilities • Understand escalation matrix and reporting structure • Perform documentation • State the importance of documentation • Read and interpret information • Fill up appropriate form	,Engineering drawings, sample instruction sheets, sample daily check sheet, turning tool, threading tool, centre drills, threading tools, reamers, vernier calliper, micrometer screw gauge, depth gauge, work holding devices

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Convey and share information • Undertake basic numerical operations and calculations • Maintain current knowledge of application standards, legislation ,codes of practice and product/process developments • Develop problem solving and decision making skills • Plan and organize the work • Apply analytical thinking in the operation	
10	**Health and Safety** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 08:00 **Corresponding NOS Code** CSC/N1335	• Explain the importance of personal protective equipment (PPE) required for CNC operation • State the causes for accidents • Identify job site hazardous work and state possible causes of risk or accident at the workplace • Explain the importance of '5S' at the workplace	Training kit (Trainer guide, PowerPoint) Leather gloves, leather apron, welding screen – helmet types, hand screen welding and safety shoes and other required Personal Protective Equipment
11	**Fire Safety** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) 30:00 **Corresponding NOS Code** CSC/N1335	• Explain types of fires - Class A, B, C and D • Select appropriate fire extinguisher to control fire • Use PASS method to operate a fire extinguisher • Follow fire safety signs and safe evacuation method in case of a fire • Identify the location of assembly point, fire exit, fire alarm • Follow reporting procedure in case of a fire	Training kit (Trainer guide, PowerPoint) Class A, B, C, D and K fire extinguishers
12	**Emergency, rescue and first aid procedure** **Theory Duration** (hh:mm) 09:00 **Practical Duration** (hh:mm) 18:00 **Corresponding NOS Code** CSC/N1335	• Follow electrical safety procedures • Use approved method to rescue a person from electrocution • State the importance of first aid • Identify the contents of a first aid kit and their application • Administer first aid in case of bleeding, burns, choking, electrical shock, poisoning, etc. • Use of CPR process • Bandage wounds • Explain stages of crisis and crisis management • Prepare an incident report	Training kit (Trainer guide, PowerPoint) First aid kit with all contents

Sr. No.	Module	Key Learning Outcomes	Equipment Required
13	**Work effectively with others** **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 60:00 **Corresponding NOS Code** CSC/N1336	• Explain the importance of team work and team dynamics • State 4Cs of working in a team • Explain types of communication • Apply effective communication technique • Overcome barriers to effective communication • Demonstrate active listening skills • Demonstrate good customer service skills • Explain the importance of ethical behaviour in your day-to-day work • State the importance of discipline in life and apply the same at workplace	Training kit (Trainer guide, PowerPoint)
14	**Final Assessment** **Theory Duration** (hh:mm) 04:00 **Practical Duration** (hh:mm) 06:00 **Corresponding NOS Code**	• Test Knowledge and skills	
	Total Duration **Theory Duration** **168:00** **Practical Duration** **442:00**	**Unique Equipment Required:** overalls, safety glasses, safety shoes, face mask; fire extinguishers - dry powder fire extinguisher; fire bucket with sand, first aid kit; , work holding devices,CNC machine with all accessories; turning tool, threading tool, centre drills, threading tools, reamers, surface plate - standard size; scriber - 15 cm; dividers 20 cm; calliper outside 15 cm; prick punch; chisel cold flat - 19 mm; centre punch – 9 mm x 127 mm; rule 60 cm; two fold; brass toped to read inches and mm; hammer scaling 0.25 kg with handle; steel rule - 30 cm to read inch and millimetre; Vernier calliper (digital) - 0-150 mm; ball peen hammer with handle - 0.25 kg; cross peen hammer with handle - 0.25 kg; holding tongs - 30 cm; wire brush – 15 cm x 3.7 cm and double ended spanner, depth gauge etc.,	

Grand Total Course Duration: **610 Hours, 0 Minutes**

*(This syllabus/ curriculum has been approved by **Capital Goods Skill Council)***

Trainer Prerequisites for Job role: "CNC Setter cum Operator-Turning" mapped to Qualification Pack: "CSC/Q0120 v1.0"

Sr. No.	Area	Details
1	**Description**	It involves setting up the CNC turning machine, its work holding devices, tooling, loading the machine operating programmes, conducting trial runs and correcting faults, in order to ensure that the work output is produced as per specification
2	**Personal Attributes**	Basic communication, numerical and computational abilities. Openness to learning, ability to plan and organize own work and identify and solve problems in the course of working. Understanding the need to take initiative and manage self and work to improve efficiency and effectiveness.
3	**Minimum Educational Qualifications**	Diploma /Degree in Mechanical Engineering
4a	**Domain Certification**	Certified for Job Role: "CNC Setter cum Operator-Turning" mapped to QP: "CSC/Q0120, v1.0". Minimum accepted score is 80%
4b	**Platform Certification**	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "SSC/Q1402". Minimum accepted 70 % as per respective SSC guidelines is 70%.
5	**Experience**	• 3-4 years of industry experience in the relevant field • 3-4 years of teaching experience

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	CNC Setter cum Operator –Turning
Qualification Pack	CSC/Q0120, v1.0
Sector Skill Council	Capital Goods Skill Council

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre(as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training canter based on this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 60% in aggregate and 40% in each NOS
6	The marks are allocated PC wise; however, every NOS will carry a weight age in the total marks allocated to the specific QP

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
1.CSC/ N 0120 Set computer numerically controlled (CNC) machines for turning operations on metal components	PC1. work safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines	**100**	2	1	1
	PC2. check that all safety mechanisms are in place and that the equipment is set correctly for the required operations		2	0	2
	PC3. adhere to procedures or systems in place for health and safety, personal protective equipment and other relevant safety regulations and procedures to realize a safe system of work		3	1	2
	PC4. keep the work area clean and tidy		1	0	1
	PC5. ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition		1	0	1
	PC6. ensure that the components used are free from foreign objects, dirt or other contamination		1	0	1
	PC7. obtain job specification from a valid and approved source		1	0	1
	PC8. read and establish job requirements from the job specification document accurately		2	1	1
	PC11. follow job instructions, assembly drawings and laid down procedures at all times		2	1	1
	PC12. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures		2	0	2
	PC13. prepare the work area for the turning operations as per procedure or operational specification		2	1	1
	PC14. conduct a preliminary check of the readiness of the CNC turning machine		1	0	1
	PC15. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements		2	1	1
	PC16. ensure that all measuring equipment is calibrated and approved for usage		1	0	1
	PC17. determine what operational objectives and targets need to be achieved and how best the machine will be set to achieve this		2	1	1
	PC18. extract and use information from engineering drawings and relate specifications in relation to work undertaken		3	1	2

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC19. identify tool requirements from tooling layout and assess their suitability		3	1	2
	PC20. identify suitable work-holding or fixturing device as per the job requirement		2	1	1
	PC21. ensure that the tools and fixtures are in usable condition (free from breakage, damage, calibration, etc.)		1	0	1
	PC22. ensure the correct and latest part- program is uploaded onto the CNC system		3	1	2
	PC23. pre-set the tooling appropriately using setting jigs/fixtures		3	1	2
	PC24. seek any necessary instruction/training on the operation of the machine where required		1	0	1
	PC25. mount tools in the correct position in the tool posts, turrets, magazine or carousel		3	1	2
	PC26. check that the tools have a specific tool number in relation to the operating program		2	0	2
	PC27. produce machined components that combine different turning operations and have a range of features		5	2	3
	PC28. enter all relevant tool data to the operating program		3	1	2
	PC29. set tool datums, positions, lengths, offsets and radius compensation		3	1	2
	PC30. mount the work-holding device/fixture onto the machine		3	1	2
	PC31. set the work-holding device/fixture in relationship to the machine datum's and reference points		3	1	2
	PC32. set the machine tool operating parameters (eg. hydraulic pressure, clamping) as per the component requirements		3	1	2
	PC33. place the machine into the correct operating mode, and access the program edit facility in order to enter tooling data,		3	1	2
	PC34. conduct trial runs using single block run, dry run and feed and speed override controls		2	1	1
	PC35. measure the critical parameters of the machined component on the machine		3	0	3
	PC36. prove the program tool by tool in single block mode		5	2	3

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC37. perform the necessary checks before allowing the machine to operate in full program run mode		3	1	2
	PC38. hand-over the machine after set-up to the machine operator along with relevant instructions and documentation		4	2	2
	PC39. complete relevant documentation as per organizational procedure		2	1	1
	PC40. handle the typical problems that can occur with the setting up of the tooling, work- holding devices and proving the program		2	1	1
	PC41. switch the CNC turning/lathe machine on and off in normal and emergency situations		1	0	1
	PC42. return the old cutting tools, work holding device/fixtures/intruments/drawings back to store and verified tapes and programs, safely and correctly		1	0	1
	PC43. ensure that there is no damage to the tool/fixture while doing the prove-out		1	0	1
	PC44. complete documentation during and post operations as per organizational procedures		2	1	1
	PC45. deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve		2	0	2
	PC46. shut down the equipment to a safe condition on conclusion of the activities		1	0	1
	PC47. leave the work area in a safe and tidy condition on completion of the fitting activities		1	0	1
	PC48. return all tools and equipment to the correct location on completion of the turning activities		1	0	1
	Total		**100**	**30**	**70**
2.CSC/ N 0115 Perform turning operations on metal components using Computer Numerically Controlled (CNC) Machines	PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work	**100**	2	1	1
	PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing CNC turning operations		3	1	2
	PC3. read and understand safety instructions, warning signs on the machine		2	0	2
	PC4. work following laid down procedures and instructions		2	1	1

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC5. ensure work area is clean and safe from hazards		1	0	1
	PC6. ensure that all tools and equipment are in a safe and usable condition		1	0	1
	PC7. obtain job specification from a valid and approved source		1	0	1
	PC8. read and establish job requirements from the job specification document accurately		2	1	1
	PC9. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures		3	1	2
	PC10. prepare the work area for the turning operations as per procedure or operational specification		2	1	1
	PC11. perform daily maintenance of machine according to defined checklist, at the beginning of day's shifts.		3	1	2
	PC12. ensure that the components used are free from foreign objects, dirt or other contamination		1	0	1
	PC13. conduct a preliminary check of the readiness of the CNC turning machine		2	0	2
	PC14. obtain correct work-pieces/raw materials and consumables as per job requirements		2	1	1
	PC15. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements		2	1	1
	PC16. ensure that all measuring equipment is calibrated and approved for usage		2	0	2
	PC17. set work pieces as per job requirements using appropriate positioning and/or holding devices and support mechanisms		3	1	2
	PC18. seek necessary instruction/training on the operation of the machine where required from appropriate sources		2	0	2
	PC19. check that the operating program is at the correct start point and the tool is at a safe position clear of the part		2	0	2
	PC20. perform basic daily maintenance activities as per the checklist given		2	1	1
	PC21. obtain the component drawings, specifications and/or job instructions required for the components to be machined		1	0	1
	PC22. use and extract information from engineering drawings, dimensioning and labeling data		2	0	2

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC23. use and extract information from reference charts, tables, graphs and standards		2	0	2
	PC24. interpret the visual display and the various messages displayed correctly		2	0	2
	PC25. find the correct restart point in the program when the machine has been stopped before completion of the program		2	0	2
	PC26. load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions		3	1	2
	PC27. check correctness of program through dry run and single block check		2	0	2
	PC28. do first part cutting trial by setting tool offsets to get oversize part		3	0	3
	PC29. measure the critical parameters of the machined component on the machine (without removing from the machine), after the trial run		3	0	3
	PC30. correct the offsets based on the measurements by accessing program edit facility in order to enter tooling data		3	0	3
	PC31. measure the component after unloading to check for accuracy in the critical parameters as per job specifications		4	1	3
	PC32. produce machined components that combine different turning operations and have a range of features		4	1	3
	PC33. follow the specified machining sequence and procedure as per job specifications		2	1	1
	PC34. interpret in-built machine alarms and respond to the same as per operating manual/organizational guidelines		2	1	1
	PC35. inspect as per frequency of inspection mentioned in the inspection plan (part of the job specifications)		2	1	1
	PC36. record the measured values as per organizational procedure		1	0	1
	PC37. observe for inconsistency in dimensions due to tool wear and correct the offsets accordingly		3	1	2
	PC38. ensure that machine settings are adjusted as and when required, either by self or the setter, to maintain the required accuracy		2	0	2
	PC39. identify when tools need replacing		2	0	2

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC40. replace worn tool with new tool		1	0	1
	PC41. cut a trial part and adjust tool offsets after each tool change		1	0	1
	PC42. store finished components as well as raw material as per organizational procedure		2	1	1
	PC43. produce components as per standards applicable to the process		3	1	2
	PC44. report problems and seek appropriate assistance in a timely manner		2	0	2
	PC45. deal with finished components as per organizational guidelines		2	1	1
	PC46. complete documentation during and post operations as per organizational procedures		2	1	1
	PC47. return the machine and all tools and equipment to the correct location on completion of activities		1	0	1
	PC48. leave the work area in a safe and tidy condition on completion of job activities		1	0	1
	Total		**100**	**22**	**78**
3.CSC/ N 1335 Use basic health and safety practices at the workplace	PC1. use protective clothing/equipment for specific tasks and work conditions	**100**	5	2	3
	PC2. state the name and location of people responsible for health and safety in the workplace		3	1	2
	PC3. state the names and location of documents that refer to health and safety in the workplace		3	1	2
	PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace		5	2	3
	PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role		4	2	2
	PC6. state location of general health and safety equipment in the workplace		3	2	1
	PC7. inspect for faults, set up and safely use steps and ladders in general use		5	2	3
	PC8. work safely in and around trenches, elevated places and confined areas		5	2	3
	PC9. lift heavy objects safely using correct procedures		5	2	3
	PC10. apply good housekeeping practices at all times		4	2	2

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC11. identify common hazard signs displayed in various areas		5	2	3
	PC12. retrieve and/or point out documents that refer to health and safety in the workplace		3	1	2
	PC13. use the various appropriate fire extinguishers on different types of fires correctly		4	1	3
	PC14. demonstrate rescue techniques applied during fire hazard		4	1	3
	PC15. demonstrate good housekeeping in order to prevent fire hazards		3	1	2
	PC16. demonstrate the correct use of a fire extinguisher		4	1	3
	PC17. demonstrate how to free a person from electrocution		4	1	3
	PC18. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.		4	1	3
	PC19. demonstrate basic techniques of bandaging		3	1	2
	PC20. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		4	1	3
	PC21. perform and organize loss minimization or rescue activity during an accident in real or simulated environments		3	1	2
	PC22. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases		3	1	2
	PC23. demonstrate the artificial respiration and the CPR Process		3	1	2
	PC24. participate in emergency procedures		3	2	1
	PC25. complete a written accident/incident report or dictate a report to another person, and send report to person responsible		4	1	3
	PC26. demonstrate correct method to move injured people and others during an emergency		4	1	3
	Total		**100**	**36**	**64**
4.CSC/ N 1336 Work effectively with others	PC1.accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	**100**	10	3	7
	PC2.accurately pass on information to authorized		10	3	7

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	persons who require it and within agreed timescale and confirm its receipt				
	PC3. give information to others clearly, at a pace and in a manner that helps them to understand		10	3	7
	PC4.display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible		10	3	7
	PC5.consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	3	7
	PC6.display appropriate communication etiquette while working		10	3	7
	PC7.display active listening skills while interacting with others at work		10	3	7
	PC8.use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	3	7
	PC9.demonstrate responsible and disciplined behaviors at the workplace		10	3	7
	PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict		10	3	7
	Total		**100**	**30**	**70**
	Grand Total	**400**	**400**	**148**	**252**
	Percentage Weightage:			**37**	**63**
	Minimum Pass% to qualify (aggregate):			**60**	