Sample Test Project

District / Zonal Skill Competitions

Skill- CNC Milling

Category: Manufacturing & Engineering Technology

Section - A

A. Preface

Skill Explained:

CNC-milling machines are machine tools which are used for the shaping of metal and other solid materials. CNC refers to a computer ("control") that reads and stores instructions which is used to control and drives a machine tool, a powered mechanical device ("machining centre"). A machining center is used to fabricate components using cutting tools for removal of material.

To form the finished part, the cutting process can be started from a solid block, pre machined part, casting, or forgings.

The skill requires the CNC-milling machinist to read and interpret complex technical drawings and work to a high degree of precision.

A Programme is required to operate the machine tool, can be generated manually or using Computer Aided Design, CAD/CAM Software.

Large enterprises such as automobile plants, medium sized enterprises such as mould making and small enterprises in the maintenance field are few examples of where the CNC milling machinist professional plays a key, integral role to the success of the metalwork industries.

Eligibility Criteria (for India Skills Kerala 2018 and Worlds Skills 2019):

Competitors born on or after 01 Jan 1997 are only eligible to attend the Competition.

Total Duration: 4 to 5 Hrs

Section - B

B. Test Project

The test project will cover –

Do the machining operation by manual operated conventional machine in LEVEL_1 of the competition

Planning the operations and sequences

Selection of proper clamping methods to clamp the part correctly & safely

Selection of proper cutting tools & tool parameters

Setting offset values for the cutting tools

Executing the machining process to get the final part as per blue print.

Perform the following machining operations:

Level 1 (*Conventional Machining Process***)**

1. Facing
2. Roughing and finishing
3. External contours
4. Island milling
5. Pocket (rectangular)
6. Drilling

Section – C

C. Marking Scheme

Marking Scheme:

The Assessment is done by awarding points by adopting two methods - Measurement and Judgments

Measurement –

It is used to assess the aspect which is measurable. It is used to assess the accuracy & precision of the dimensions of the Test Project

Judgment –

It is used to assess other performance which can be measured in a robust way. It is used where there should be no ambiguity.

Judgments are made based on Industry expectations. It is used to assess the quality of performance, for which there may be small differences of view when applying the external benchmarks.

Aspects are criteria's which are judged for assessment

ASSESSMENT AND MARKING USING JUDGEMENT

Judgment uses a scale of 0-3. The 0-3 scale to indicate:

0: performance below industry standard

1: performance meets industry standard

2: performance meets and, in specific respects, exceeds industry standard

3: performance wholly exceeds industry standard and is judged as excellent

Marking Summary Form

Main Criteria	Judgment	Measurement	Total
Main Dimensions		30	30
Secondary Dimensions		20	20
Conformity to Drawing	10		10
Surface Finish		10	10
Use of Material		5	5
Part Program& Simulation(In Simulation Software)	10		10
Part Program& Simulation in Machine	5		5
Setting the Machine	10		10
Grand Total	35	65	100

MARKING SHEET for Zonal Competitions

Measurement Marking Form

Skill No.: Skill Name: CNC Milling

Competitor No.: Competitor Name:

Sub Criterion : Main Dimension

Aspect ID	Max. Mark	Aspect of Criterion-Description	Requirement or Nominal Size	Result or Actual Value	Marks Awarded
1	3.00	Overall Length	144.0 (-0.06/+0.06)		
2	3.00	Profile width	100.0 (-0.06/+0.06)		
3	3.00	Pocket to pocket	48.0 (-0.06/+0.06)		
4	3.00	Profile	22.0 (-0.06/+0.06)		
5	3.00	Pocket to side	10.0 (-0.06/+0.06)		
6	3.00	Overall width	94.0 (-0.06/+0.06)		
7	3.00	Edge to profile	90.0 (-0.06/+0.06)		
8	3.00	Pocket to profile	55.0 (-0.06/+0.06)		
9	3.00	Flat to radius	37.0 (-0.06/+0.06)		
10	3.00	Angular	26.84 (-0.06/+0.06)		
	30.00	Max. Mark for Sub criterion		Total Marks Awarded	

Signatures Conforming the Accuracy of this printed Result

Measurement Marking Form

Skill No.: Skill Name: CNC Milling

Competitor No.: Competitor Name:

Sub Criterion : Secondary Dimension

Aspect ID	Max. Mark	Aspect of Criterion-Description	Requirement or Nominal Size	Result or Actual Value	Marks Awarded
1	2.00	Pocket	40.0 (-0.06/+0.06)		
2	2.00	Radius to Radius	9.0 (-0.06/+0.06)		
3	2.00	Arc	64.0 (-0.06/+0.06)		
4	2.00	Pocket	38.0 (-0.06/+0.06)		
5	2.00	Pocket	38.0 (-0.06/+0.06)		
6	2.00	Profile(H)	18.0 (-0.06/+0.06)		
7	2.00	Profile(V)	8.0 (-0.06/+0.06)		
8	2.00	Hole	10.0 (-0.06/+0.06)		
9	2.00	Hole to Edge	9.0 (-0.06/+0.06)		
10	2.00	Edge Step	4.0 (-0.06/+0.06)		
	20.00	Max. Mark for Sub criterion		Total Marks Awarded	

Signatures Conforming the Accuracy of this printed Result

Judgment Marking Form

Skill No.: Skill Name: CNC Milling

Competitor No.: Competitor Name:

Sub Criterion : Surface Quality

Aspect ID	Max. Mark	Aspect of Criterion-Description Will be decided by the Jury	Experts Score (0-3)			Marks Awarded
			Exp01	Exp02	Exp03	
1						
2						
3						
4						
5						
	10.00	Max. Mark for Sub criterion		Total Marks Awarded		

Signatures Conforming the Accuracy of this printed Result

Judgment Marking Form

Skill No.: Skill Name: CNC Milling

Competitor No.: Competitor Name:

Sub Criterion : Conformity With Drawing

Aspect ID	Max. Mark	Aspect of Criterion-Description Will be decided by the Jury	Experts Score (0-3)			Marks Awarded
			Exp01	Exp02	Exp03	
1	3.00	Tangential Arc				
2	4.00	Pockets				
3	3.00	Hole				
4						
5						
	10.00	Max. Mark for Sub criterion		Total Marks Awarded		

Signatures Conforming the Accuracy of this printed Result

Judgment Marking Form

Skill No.: Skill Name: CNC Milling

Competitor No.: Competitor Name:

Sub Criterion : Part Program& Simulation in Software

Aspect ID	Max. Mark	Aspect of Criterion-Description Will be decided by the Jury	Experts Score (0-3)			Marks Awarded
			Exp01	Exp02	Exp03	
1	4.00	Prepare Part Program				
2	3.00	Use of Simulation Software				
3	3.00	Simulation& Overall				
4						
5						
	10.00	Max. Mark for Sub criterion		Total Marks Awarded		

Signatures Conforming the Accuracy of this printed Result

Judgment Marking Form

Skill No.: Skill Name: CNC Milling

Competitor No.: Competitor Name:

Sub Criterion : Part Program& Simulation in Machine

Aspect ID	Max. Mark	Aspect of Criterion-Description Will be decided by the Jury	Experts Score (0-3)			Marks Awarded
			Exp01	Exp02	Exp03	
1	3.00	Entering Part Program in Machine				
2	2.00	Simulation& Overall				
3						
4						
5						
	5.00	Max. Mark for Sub criterion		Total Marks Awarded		

Signatures Conforming the Accuracy of this printed Result

Judgment Marking Form

Skill No.: Skill Name: CNC Milling

Competitor No.: Competitor Name:

Sub Criterion : Setting the Machine for Operation

Aspect ID	Max. Mark	Aspect of Criterion-Description Will be decided by the Jury	Experts Score (0-3)			Marks Awarded
			Exp01	Exp02	Exp03	
1	2.00	Fixing the Work				
2	3.00	Work offset				
3	2.00	Fixing Tools				
4	3.00	Tool Off Set				
5						
	10.00	Max. Mark for Sub criterion			Total Marks Awarded	

Signatures Conforming the Accuracy of this printed Result

Mark Summary Form

Skill No.: Skill Name: CNC MILLING

Competitor No: Competitor Name:

Criterion ID.	Criterion- Description	Maximum Marks	Actual Marks
1	Main Dimension	30.00	
2	Secondary Dimention	20.00	
3	Surface Quality	10.00	
4	Conformity With Drawing	10.00	
5	Use of Materials	5.00	
6	Part Program& Simulation in Software	10.00	
7	Part Program& Simulation in Machine	5.00	
8	Setting the Machine for Operation	10.00	
	Grand Total	100.00	

Result Confirmed By;	Signature with Date
INDEPENDENT EXPERT01	
INDEPENDENT EXPERT02	
INDEPENDENT EXPERT03	
CHIEF EXPERT	