JOB SPECIFICATON

JOB TITLE	:	MILLING MACHINE SETTER OPERATION, L- 2
SECTOR	:	MECHANICAL ENGINEERING
SUB-SECTOR	:	METAL MACHINIG

1992 (2049-3-31)

The National Skill Standards and test was developed by

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Approved by the tripartite National Skill Testing Board,1992

JOB SPECIFICATION	
1	**JOB TITLE :** Milling Machine Setter Operator **LEVEL** : 2
2	**JOB DESCRIPTION** A milling Machine Setter Operate Set and operates milling machine to produce flat surface, different profiles, slots and keyways, spur gears and precision holes.
3	**LIST OF TASKS:** 1 Milling flat surfaces. 2 Milling of profiles. 3 Milling slots and keyways. 4 Milling spur gears (using simple indexing). 5 Boring precision holes.
4	**QUALIFYING NOTES (entry requirement etc.)** Physical requirements: - Normal health, no special physical requirement demanded by this job. Educational requirements: - Able to understand verbal instructions and read workshop manual and/or manufacturer's specification.

TASK SPECIFICATION	
5	**TASK NO: 1** Milling flat surfaces **JOB TITTLE::** Milling Machine Setter Operator, L-2
6	**TASK ELEMENTS:** 1.1 Ascertains job requirements from drawing/instructions or other specifications and selects appropriate materials. 1.2 Determines sequences and methods as per specifications. 1.3 Selects and fixes appropriate tools. 1.4 Positions and secures work piece on machine and sets machine components. 1.5 Sets machine controls as required (speed, feed and depth of cut) 1.6 Ensures coolant supply. 1.7 Operates automation or manual control to feed the work piece. 1.8 Checks accuracy of machine using measuring instruments and work piece. 1.9 Grinds milling cutter as required for producing flat surface. 1.10 Repositions work piece, changes tools and resets machine as necessary.

	TASK SPECIFICATION
7	**TASK PERFORMANCE REQUIREMENTS** Universal milling machine, Vernier calliper , Try square, Hight gauge, Dial gauge, Surface plate, Micrometer (outside and inside), Depth gauge, Mallet, Straight edge. Cutters:- Milling cutter Slab Cutter Face Mill Side and Face Cutter End Mill Shell and mill Fly Cutter Work & Tools Holding Devices:- Milling Arbours Screw mandrel Clamping plates Angle Plate Parallels Collect Chuck Materials Plain and Alloy steels Cast Iron Aluminium Cupper & Its Allows Plastics
8	**TASK PERFORMANCE STANDARDS** Materials selected as specified, Appropriate tools selected and clamped securely, work piece securely clamped and aligned to allow flat milling operation , Appropriate speed, feed and depth of cut selected and set, coolant supplied adequately to prevent overheating of work piece and cutting tools, controls operated automatically or manually without causing rough surface, Tool breakage of damage to work piece, Tolerance within specified limit, work piece repositioned, Tools changed and machine reset as required. General tolerance +-0.05mm surface finish 1.6 Microns.

9	10	**TASK TRAINING DATA**			
TASK NO:	**T. E. No.**	**TECHNICAL KNOWLEDGE**	**APPLIED CALCULATION**	**GRAPHIC INFORMATION**	**SAFETY & HYGENE**
1	1	Knowledge of flat milling methods.	Interprets the table provided to calculate the required cutter R.P.M. Interpretation and computations of numerical units for linear and angular measurements.	Interpretation of technical drawing including conventional sketch for milling surfaces, surface finish and tolerance.	Importance of using electrical lockouts to stop machine, use of eye protector in high speed milling. Hazards due to unsecurely clamped milling cutters. Hazards due to insecurely clamped work piece. Results of improper manipulation & situation like flying broken cutter teeth and excessive chip formation Importance of eye protection. From flying swarts. Importance of wearing goggles during grinding.
	2	Knowledge of sequential operation involved in producing work piece.			
	3	Knowledge of milling cutters methods of mounting and positioning.			
	4	Procedure for securely clamping work piece in a swivel vice or on to the machine table.			
	5	Factors affecting speed, feed and depth of cut and selection of cutter R.P.M.			
	6	Types and properties of coolants.			
	7	Knowledge of manual and automatic controls.			
	8	Use and care of measuring instruments such as Vernier Calliper, depth gauge, Micrometer, Dial gauge.			
	9	Knowledge of milling cutter grinding, different cutting angles of a milling cutter.			

	TASK PERFORMANCE TEST (SKILL ASSESSMENT)		
11	**TASK TITLE : MILLING FLAT SURFACES.** **TASK NO : 1**		**LOCATION OF TEST :** **CANDIDATE'S NAME :** **EVALUATORS NAMES:**
12	**TEST FACTORS AND ITEMS**	**STANDARD MET**	**STANDARD NOT MET (Comments)**
	DID THE CANDIDATE ? 1.1 Select the specified material. 1.2 Select, align and clamp the appropriate cutter securely. 1.3 Tighten and align the work piece to allow flat milling operation. 1.4 Select and set the appropriate speed, feed, depth of cut and machine components. 1.5 Supply adequate appropriate coolants. 1.6 Select and manipulate appropriate controls. 1.7 Reposition the work piece, change milling cutters as required for flat milling. 1.8 Produce the work piece within specified tolerance and surface finish. 1.9 Produce the work piece within specified time.		

TASK SPECIFICATION

5	**TASK NO:21** Milling of profiles. **JOB TITTLE::Milling Machine Setter Operation, L-2**
6	**TASK ELEMENTS:** 2.1 Ascertains job requirements from drawing/instructions or other specifications and selects appropriate materials. 2.2 Determines sequences and methods by specifications. 2.3 Selects and fixes appropriate cutting tools. 2.4 Positions and secures work piece on machine and sets machine components to the requirement. 2.5 Sets machine controls as required (speed, feed and depth of cut). 2.6 Ensures coolant supply. 2.7 Operates automatic or manual control to feed the work piece. 2.8 Checks accuracy of machine using measuring instruments. 2.9 Grinds milling cutter as required for producing different profiles. 2.10 Repositions work piece, changes tools and resets machine as necessary.

	TASK SPECIFICATION
7	**TASK PERFORMANCE REQUIREMENTS** Universal milling machine, Vernier calliper , Try square, Bevel protector, Combination set, Height gauge, Dial gauge, Wallet, Straight edge. Mallet, Straight edge. Cutters:- Milling cutter, Dovetail Milling Cutter, Angle Milling Cutter, Single edge milling cutter, Form relieve Cutter Work & Tools Holding Devices:- Swivel Vice, Clamping plates, Angle Plat, Parallel, Milling collect, Milling Arbours Materials: Plain and alloy steels, Cast Iron, Aluminium, Cupper & Its Allows, Plastics
8	**TASK PERFORMANCE STANDARDS** Materials selected as specified, Appropriate tools selected and clamped securely, work piece securely clamped and aligned to allow for milling operation , Appropriate speed, feed and depth of cut selected and set, coolant supplied adequately to prevent overheating of work piece and cutting tools, controls operated automatically or manually without causing rough surface, Tool breakage or damage to work piece, Tolerance within specified limit, work piece repositioned, Tools changed and machine set as required. General tolerance +-0.05mm Surface finish 1.6 Microns.

9	10	**TASK TRAINING DATA**			
TASK NO:	**T. E. No.**	**TECHNICAL KNOWLEDGE**	**APPLIED CALCULATION**	**GRAPHIC INFORMATION**	**SAFETY & HYGENE**
2	1	Knowledge of form milling.		Interpretation of technical drawing including conventional sketch for milling surfaces, surface finish and tolerance	Importance of using electrical lockouts to stop machine, use of eye protector in high speed milling.
	2	Knowledge of sequential operation involved in producing work piece.			
	3	Knowledge of milling cutters regarding methods of mounting and positioning.	Interprets the table to calculate the required cutter R.P.M.		Hazards due to unsecurely clamped milling cutters.
	4	Procedure for securely clamping work piece in a vice or on to the machine table using fixtures.	Interpretation and computations of numerical units for linear and angular measurements.		Hazards due to unsecurely clamped work piece.
	5	Factors affecting speed, feed and depth of cut and selection of cutter R.P.M.			Results of improper manipulation & situation like flying broken cutter teeth and excessive chip formation
	6	Types of properties of coolants and applicable situations.			
	7	Must be able to operate machine manual or automatic as required.			
	8	Use and care of measuring instruments such as Vernier Calliper, Depth gauge, Bevel protractor, Micrometer, Dial gauge.			Importance of eye protection. Flying swarfs.
	9	Knowledge of Milling cutter grinding, different cutting angles of a milling cutter.			Importance of wearing goggles during grinding.

	TASK PERFORMANCE TEST (SKILL ASSESSMENT)		
11	**TASK TITLE : MILLING OF PROFILES** **TASK NO : 2**		**LOCATION OF TEST :** **CANDIDATE'S NAME :** **EVALUATORS NAMES:**
12	**TEST FACTORS AND ITEMS**	**STANDARD MET**	**STANDARD NOT MET (Comments)**
	DID THE CANDIDATE ? 2.1 Select the specified material. 2.2 Select, align and clamp the appropriate milling cutter securely. 2.3 Tighten and align the work piece to allow milling of profiles (form milling). 2.4 Select and set the appropriate speed, feed depth of cut and machine component. 2.5 Supply adequate appropriate coolants. 2.6 Select and manipulate appropriate controls. 2.7 Reposition the work piece, change cutter as require for form milling. 2.8 Produce the work piece within specified tolerance and surface finish. 2.9 Produce the work piece within specified time.		

TASK SPECIFICATION

5	**TASK NO: 3** Milling slot keyways. **JOB TITTLE: Milling Machine Setter Operator, L-2**
6	TASK ELEMENTS: 3.1 Ascertains job requirements from drawing/instructions or other specifications and selects appropriate materials. 3.2 Determines sequence and methods as required by specifications. 3.3 Selects and fixes appropriate cutting tools. 3.4 Positions and secures work piece on machine and sets machine components to the requirement. 3.5 Sets machine controls as required (speed, feed and depth of cut). 3.6 Ensures coolant supply. 3.7 Operates automatic or manual control to feed the work piece. 3.8 Checks accuracy of machine using measuring instruments. 3.9 Grinds milling cutter as required for producing slots and keyways. 3.10 Repositions work piece, changes tools and resets machine as necessary.

	TASK SPECIFICATION
7	**TASK PERFORMANCE REQUIREMENTS** Universal milling machine, Vernier calliper , Try square, Centering gauge, Depth gauge, Micrometer (Outside, inside and depth) Wallet, Straight edge, indexing head, slotting, attachment. Cutters:- Milling cutter Slotting Cutters Side Milling Cutters Staggered tooth Cutters Straddle Milling Cutters T-slot cutters Slotting drills Circular saws. Work & Tools Holding Devices:- Swivel Vice **,** milling arbors Clamping plates, milling collects Mandrels, rotary tables Jigs and fixtures Angle plates Parrallels Materials Plain and alloy steels Cast Iron Aluminium Cupper & Its Allows Plastics
8	**TASK PERFORMANCE STANDARDS** Materials selected as specified, Appropriate tools selected and clamped securely, work piece securely clamped and aligned to allow mill slots and keyways, Appropriate speed, feed and depth of cut selected and set, coolant supplied adequately to prevent overheating of work piece and cutting tools, controls operated automatically or manually without causing rough surface, Tool breakage or damage to work piece, Tolerance within specified limit, work piece repositioned, Tools changed and machine set as required. General tolerance +-0.05mm Surface finish 1.6 Microns

9	10	TASK TRAINING DATA			
TASK NO:	**T. E. No.**	**TECHNICAL KNOWLEDGE**	**APPLIED CALCULATION**	**GRAPHIC INFORMATION**	**SAFETY & HYGENE**
3	1	Knowledge of milling slots and keyways.		Interpretation of technical drawing including conventional sketch for milling surfaces, surface finish and tolerance.	Importance of using electrical lockouts to stop machine, use of eye protector in high speed milling.
	2	Knowledge of sequential operation involved in producing work piece.			
	3	Knowledge of milling cutters regarding methods of mounting and positioning as required.	Interprets the table to calculate the required cutter r.p.m.		Hazards due to unsecurely clamped milling cutters.
	4	Procedure for securely clamping work piece in a swivel vice on to the machine table, rotary table, indexing head.	Interpretation and computations of numerical units for linear and angular measurements.		Hazards due to unsecurely clamped work piece.
	5	Factors affecting speed, feed and depth of cut and selection of cutter R.P.M.			Results of improper manipulation & situation like flying broken cutter teeth and excessive chip formation
	6	Types of properties of coolants and applicable situations.			
	7	Knowledge of manual and automatic controls.			
	8	Knowledge of setting the slotting attachment on to the machine and set the stroke- length.			
	9	Use and care of measuring instruments such as Vernier Calliper, depth gauge, Micrometer, Dial gauge.			Importance of eye protection from flying swarfs.
	10	Knowledge of milling cutter grinding, different cutting angles of milling cutters.			Importance of wearing goggles during grinding.

	TASK PERFORMANCE TEST (SKILL ASSESSMENT)		
11	**TASK TITLE : MILLING SLOTS AND KEYWAYS.** **TASK NO : 3**		**LOCATION OF TEST :** **CANDIDATE'S NAME :** **EVALUATORS NAMES:**
12	**TEST FACTORS AND ITEMS**	**STANDARD MET**	**STANDARD NOT MET (Comments)**
	DID THE CANDIDATE ? 3.1 Select the specified material. 3.2 Select, align and clamp the appropriate milling cutter securely. 3.3 Tighten and align the work piece to allow mill slots and keyways. 3.4 Select and set the appropriate speed, feed depth of cut and machine component. 3.5 Supply adequate appropriate coolants. 3.6 Select and manipulate appropriate controls. 3.7 Reposition the work piece, change the milling cutter as required to perform. 3.8 Produce the work piece within specified tolerance and surface finish. 3.9 Produce the work piece within specified time.		

TASK SPECIFICATION	
5	**TASK NO: 4** Milling spur gears (Using simple indexing). **JOB TITTLE:: Milling Machine Setter Operation, L-2**
6	**TASK ELEMENTS:** 4.1 Ascertains job requirements from drawing/instructions or other specifications and selects appropriate materials 4.2 Determines sequences and methods as required by specifications. 4.3 Selects and fixes appropriate cutting tools. 4.4 Positions and secures work piece on machine and sets machine components to the requirement. 4.5 Sets machine controls as required (speed, feed and depth of cut). 4.6 Ensures coolant supply. 4.7 Operates automatic or manual control to feed the work piece. 4.8 Checks accuracy of machine using measuring instruments. 4.9 Repositions work piece, changes tools and resets machine as necessary.

	TASK SPECIFICATION
7	**TASK PERFORMANCE REQUIREMENTS** Universal milling machine, Indexing head, Vernier calliper , Micrometer, Gear tooth micrometer, Height gauge, Dial gauge, Mallet, Straight edge, supporting tail stock, screw jack. Cutters:- Milling cutters; Gear cutter of different Modules Work & Tools Holding Devices:- Plain mandrel; Screw mandrel Materials: Plain and Alloy Steels; Cast Iron; Aluminium; Cupper and its Alloys; Plastics
8	**TASK PERFORMANCE STANDARDS** Materials selected as specified, Appropriate tools/cutter selected and clamped securely, work piece securely clamped and aligned to allow mill spur gear, slots and keyways, Appropriate speed, feed and depth of cut selected and set, coolant supplied adequately to prevent overheating of work piece and milling cutter, controls operated automatically or manually without causing rough surface, Tool breakage or damage to work piece, Tolerance within specified limit, work piece repositioned, Tools/cutter changed and machine reset as required. General tolerance +-0.05mm Surface finish 1.6 Microns

9	10	TASK TRAINING DATA			
TASK NO:	**T. E. No.**	**TECHNICAL KNOWLEDGE**	**APPLIED CALCULATION**	**GRAPHIC INFORMATION**	**SAFETY & HYGENE**
4	1	Knowledge of milling spur gears.		Interpretation of technical drawing including conventional sketch for milling surfaces, surface finish and tolerance.	Importance of using electrical lockouts to stop machine, use of eye protector in high speed milling. Hazards due to unsecurely clamped milling cutters. Hazards due to unsecurely clamped work piece. Results of improper manipulation & situation like flying broken cutter teeth and excessive chip formation Importance of eye protection from flying swarfs. Importance of wearing goggles during grinding.
	2	Knowledge of sequential operation involved in producing work piece.	Calculations related to simple, compound and differential indexing, gear cutting calculations (spur gear). Interprets the table to calculate the required cutter R.P.M. Interpretation and computations of numerical units for linear and angular measurements.		
	3	Knowledge of gear cutters regarding methods of mounting and positioning.			
	4	Procedure for securely clamping work piece in the indexing head of appropriate mandrel.			
	5	Must be able to set and reset index plate and sector arm as required.			
	6	Factors affecting speed, feed and depth of cut and selection of cutter R.P.M.			
	7	Controls automatic and manual feed as required.			
	8	Use and care of measuring instruments such as micrometer, Dial gauge, Gear tooth micrometer.			
	9	Knowledge of milling cutter grinding, different cutting angles of milling cutters.			

	TASK PERFORMANCE TEST (SKILL ASSESSMENT)		
11	**TASK TITLE : MILLING SPUR GEARS (USING SIMPLE INDESING).** **TASK NO : 4**		**LOCATION OF TEST :** **CANDIDATE'S NAME :** **EVALUATORS NAMES:**
12	**TEST FACTORS AND ITEMS**	**STANDARD MET**	**STANDARD NOT MET (Comments)**
	DID THE CANDIDATE ? 4.1 Select the specified material. 4.2 Select, align and clamp the appropriate gear cutter securely. 4.3 Tighten and align the work piece to mill spur gears.. 4.4 Select and set the appropriate speed, feed depth of cut and machine component. 4.5 Supply adequate coolants. 4.6 Select and manipulate appropriate controls. 4.7 Reposition the work piece, change the cutter and position as required. 4.8 Produce the work piece within specified tolerance and surface finish. 4.9 Produce the work piece within specified time.		

TASK SPECIFICATION	
5	**TASK NO: 5** Boring precision holes **JOB TITTLE:: Milling Machine Setter Operator, L-2**
6	**TASK ELEMENTS:** 5.1 Ascertains job requirements from drawing/instructions or other specifications and selects appropriate materials. 5.2 Determines sequences and methods as required by specifications. 5.3 Selects and fixes appropriate cutting tools. 5.4 Positions and secures work piece on machine and sets machine components to the requirement. 5.5 Sets machine controls as required (speed, feed and depth of cut). 5.6 Ensures coolant supply. 5.7 Operates automatic or manual control to feed the work piece. 5.8 Checks accuracy of machine using measuring instruments. 5.9 Grinds milling cutter as required for producing precision holes. 5.10 Repositions work piece, changes tools and resets machine as necessary.

	TASK SPECIFICATION
7	**TASK PERFORMANCE REQUIREMENTS** Universal milling machine, Vernier calliper, Micrometer (inside and outside), Depth gauge, Dial gauge, Telescopic gauge, Centering gauge. Cutters:- / Work & Tools Holding Devices:- / Materials Milling cutters/tools / Swivel vice / Plain and Alloy Steels Boring head / Clamp plate / Cast Iron Boring head tool / Angle plate / Aluminium Jigs and fixtures / Cupper & Its Allows Parallels / Plastics
8	**TASK PERFORMANCE STANDARDS** Materials selected as specified, Appropriate tools selected and clamped securely, work piece securely clamped and aligned to perform boring operation, Appropriate speed, feed and depth of cut selected and set, coolant supplied adequately to prevent overheating of work piece and cutting tools, controls automatically or manually without causing rough surface, Tool breakage or damage to work piece, Tolerance within specified limit, work piece repositioned, Tools changed and machine set as required. General tolerance +-0.05mm Surface finish 1.6 Microns

9	10	TASK TRAINING DATA			
TASK NO:	**T. E. No.**	**TECHNICAL KNOWLEDGE**	**APPLIED CALCULATION**	**GRAPHIC INFORMATION**	**SAFETY & HYGENE**
5	1	Knowledge of performing Boring job.		Interpretation of technical drawing including conventional sketch for performing boring operation in milling machine, surface finish and tolerance	Importance of using electrical lockouts to stop machine, use of eye protector in high speed machining. Hazards due to unsecurely clamped milling cutters. Hazards due to insecurely clamped work piece. Results of improper manipulation & situation like flying broken cutter teeth and excessive chip formation Importance of eye protection during machining. Importance of wearing goggles during grinding.
	2	Knowledge of sequential operation involved in Boring work piece.			
	3	Knowledge of Boring head and its tool regarding methods of mounting and positioning.	Interprets the table provided to calculate the required cutter R.P.M. Interpretation of numerical units for linear and angular measurements and calculations related to them.		
	4	Procedure for securely clamping work piece on the swivel vice on rotary table or machine table.			
	5	Factors affecting speed, feed and depth of cut and selection of cutter R.P.M.			
	6	Types and properties of coolant and applicable situation.			
	7	Knowledge of manual and automatic controls.			
	8	Use and care of measuring instruments such as Vernier calliper, Dial gauge, Telescopic gauge, micrometer, Dial gauge.			
	9	Knowledge of milling cutter grinding, different cutting angles of milling cutters.			

	TASK PERFORMANCE TEST (SKILL ASSESSMENT)		
11	**TASK TITLE : BORING PRECISION HOLES.** **TASK NO : 5**		**LOCATION OF TEST :** **CANDIDATE'S NAME :** **EVALUATORS NAMES:**
12	**TEST FACTORS AND ITEMS**	**STANDARD MET**	**STANDARD NOT MET (Comments)**
	DID THE CANDIDATE ? 5.1 Dress in safety clothing. 5.2 Clamp, set & adjust Boring head properly. 5.3 Clamp, align and set the work piece in appropriate work holding device. 5.4 Select and set the appropriate speed, feed depth of cut and machine component. 5.5 Select appropriate controls and manipulate accordingly. 5.6 Use appropriate measuring instruments. 5.7 Produce the work piece within specified tolerance and surface finish. 5.8 Produce the work piece within specified time.		