

Model Curriculum

Plastics Product and Mould Designer

SECTOR: RUBBER
SUB-SECTOR: PLASTICS PROCESSING
OCCUPATION: DESIGN
REF ID: RSC/Q4402 (CPC/Q3104), V 1.0
NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

RUBBER SKILL DEVELOPMENT COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**Plastics Product and Mould Designer**'
QP No. '**RSC/Q4402(CPC/Q3104), V1.0, NSQF Level 4**'

Date of Issuance: **December 26th, 2016**

Valid up to: **December 25th, 2021**

* Valid up to the next review date of the Qualification Pack



Authorised Signatory
(Rubber Skill Development Council)

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Plastics Product and Mould Designer

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Plastics Product and Mould Designer”, in the “Rubber Skill Development Council” Sector/Industry and aims at building the following key competencies amongst the learners.

Program Name	Plastics Product and Mould Designer		
Qualification Pack Name & Reference ID	RSC/Q4402 (CPC/Q3104), V 1.0		
Version No.	1.0	Version Update Date	29/05/2019
Pre-requisites to Training	10 th Standard		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Evaluate the basic concepts of plastics • Explain the process requirements for plastics • Demonstrate the layout of impression and planning of the process for all assembly parts and dyes • Prepare the list of parts and drawing of products, moulds and fixtures • Prepare drawings by using CAD/CAE/CAM software and release it as per the documentation procedure • Perform processes in terms of temperature required for the mould and plastics materials • List the raw materials required to prepare the item • Prepare the lab model of the mould or product • Demonstrate the process followed for the designing of mould • Demonstrate the inspection of finished goods • Perform repair of parts produced so that the damaged/ defective pieces can be corrected • Practice communication skill and personality development • Maintain basic health and safety practices at the workplace. 		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of “Plastics Product and Mould Designer” Qualification Pack issued by “Rubber Skill Development Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1.	Introduction to the job role Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 10:00 Corresponding NOS Code Bridge Module	<ul style="list-style-type: none"> Evaluate the developmental history of plastic Describe current industrial scenario of plastics and prospects Identify types of plastic List major industrial associations related to plastics mould designer Identify equipment used for plastics mould designer Identify the roles and responsibilities of a mould designer. 	Class Room equipment: LCD projector/screen, computer, charts, black / white board and duster. Auto CAD/CAM, CAE software, cre-o software, solid works software and NX software, computers / laptops.
2.	Collection of data/information Theory Duration (hh:mm) 30:00 Practical Duration (hh:mm) 70:00 Corresponding NOS Code RSC/N4405 (CPC/N3113)	<ul style="list-style-type: none"> Maintain the work order (work output) required from the process post discussion with the supervisor Analyse all sketches/ work orders/ process related documents to understand dimensions and properties of the work output Evaluate the process requirements in terms of temperature for the mould, plastics material required and its quantity with its market rate, hydraulic pressure/ air pressure/ vacuum pressure in the machine, weight of the product, injection time, refilling time etc. Comply with the does and don'ts in the working area as defined in OPs/ work Instructions Demonstrate the moulding procedure and process to be adopted for completing the work order from the supervisor Assemble the raw material like plastics granules, bonding additives etc. required for executing the activity Assemble the outline dimensions and other details for selected machine to be used such as injection moulding, extruder, etc. 	Class Room equipment: LCD projector/screen, computer, charts, black / white board and duster. Measuring equipment: Steel ruler, micrometer, vernier caliper, radius gauge, feeler gauge, height gauge, thread gauge, steel measuring tape, weighing balance (1 No.) Hand Tools: Hammer, screw driver set with multiple heads, allen key hexagonal ,twist drills bit, file triangular, hacksaw adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives Personal Protective equipment: Safety goggles, rubber gloves, asbestos gloves, fire

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		for preparation of drawing <ul style="list-style-type: none"> Identify the sequence of operations required for the moulding process Design the mechanism of working for the mould/dye. Finalize the rough dimensions for the mould based on the process requirement, space constraints, aux. main equipment selected for the process by the process engineer and the above product drawing. Prepare the drawings for the required mould/dyes using CAD/CAE software Practise to share the drawings for the new mould/dyes to the in – house tool room or third party agency whichever applicable for preview. 	extinguisher, apron, helmet, first aid box with medicines Raw material: Mild steel, stainless steel, aluminium, brass, wood cnc lathe machine lathe machine cnc simulator 3-jaw and 4-jaw chuck, cutting tools (single point) both HSS and carbide inserts types CAM software, CNC controller, CNC simulator, milling machine, CNC milling machine CAM software, CNC controller, different type CNC controller like HASS, FANUC, heidenhain, CNC HASS simulators
3.	Drawing, designing and layout mechanism. Theory Duration (hh:mm) 25:00 Practical Duration (hh:mm) 70:00 Corresponding NOS Code RSC/N4405 (CPC/N3113)	<ul style="list-style-type: none"> Identify the type of moulds and dyes Analyse the mechanisms of the moulding process Perform online gauges if required for fixtures and associated parts Perform robot mechanism (if required) for facilitating the process of manufacturing Practise special processes- polymer parts, welding, surface/ heat treatment Measure the required dimension for new required product in plastics as per the application Assemble accurate plastic material of the product as per its application Prepare the drawings for the required plastics product using CAD/CAE software. Plan to share the drawings for the product to the in – house tool room or third party agency. 	Class Room equipment: LCD projector/screen, computer, charts, black / white board and duster. Measuring equipment: Steel ruler, micrometer, vernier caliper, radius gauge, feeler gauge, height gauge, thread gauge, steel measuring tape, weighing balance (1 no.) Personal Protective equipment: Safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box with medicines
4.	Layout detailing and assembling	<ul style="list-style-type: none"> Discuss the points of layout with tool room engineer. Comply with the feedback 	Measuring equipment: Steel ruler, micrometer, vernier caliper, radius

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Theory Duration (hh:mm) 25:00</p> <p>Practical Duration (hh:mm) 70:00</p> <p>Corresponding NOS Code RSC/N4405 (CPC/N3113)</p>	<p>received from process engineer, tool room engineer, etc.</p> <ul style="list-style-type: none"> Evaluate the final dimension of the mould Apply the simulation software for understanding the mould /dye operation Review the drawings post simulation Analyse the working of mould/dye by CAE software to check end result Assemble, in case of robotics/ automation application required for mould functioning, finalize the operation sequence in consultation with the process engineer Practise consultation with process designer/ manager about required working system for the mould/dye like guiding system, feed system, ejection system etc. Ensure that all the technical dimension of sub parts of the mould/dyes are as per requirement Apply typical allowances, fits and tolerance required for matching parts for process trimming, and war-page etc Check and inform the in-house tool room or third party agency for reviewing the complete mould profile Practise updating the drawings, if required Ensure that all on-line gauges designed as part of this exercise meets GD and T requirements. 	<p>gauge, feeler gauge, height gauge, thread gauge, steel measuring tape, weighing balance (1 no.)</p> <p>Hand Tools: Hammer, screw driver set with multiple heads, allen key hexagonal ,twist drills bit, file triangular, hacksaw adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives</p> <p>Raw material: Mild steel, stainless steel, aluminium, brass, wood CNC lathe machine lathe machine CNC simulator 3-jaw and 4-jaw chuck, cutting tools (single point) both HSS and carbide inserts types CAM software, CNC controller, CNC simulator, milling machine, CNC milling machine CAM software, CNC controller, different type CNC controller like HASS, FANUC, Heidenhain, CNC HASS simulators</p>
5.	<p>Release the tool drawings</p> <p>Theory Duration (hh:mm) 30:00</p>	<ul style="list-style-type: none"> Design the parts- list and drawings / specifications for all the plates/items required for the mould/dyes List the raw materials with its required size as per the finished plates/items Setup the drawings of the mould/dye to production department/ In – house / user 	<p>Class Room equipment: LCD Projector/Screen, Computer, charts, Black / White board and Duster.</p> <p>Measuring equipment: Steel Ruler, micrometer, vernier caliper, radius gauge, feeler gauge, height gauge, thread</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Practical Duration (hh:mm) 70:00</p> <p>Corresponding NOS Code RSC/N4406 (CPC/N3115)</p>	<ul style="list-style-type: none"> Assemble the model of the core and cavity as per drawing Check the development as per machining process in tool room for any revisions Analyse the problem encountered while development of the mould usage Analyse the reasons and if required, modify/re-design in coordination with in – house tool room or third party agency, based on the severity of problem Comply with the drawings during assembly of mould parts Apply new sub drawing to overcome the problem Perform a trial of the mould and, release new drawing of the part post consulting the process engineer. 	<p>gauge, steel measuring tape, weighing balance (1 no.)</p> <p>Raw material: mild steel, stainless steel, aluminium, brass, wood CNC lathe machine lathe machine CNC simulator 3-jaw and 4-jaw chuck, cutting tools (single point) both HSS and carbide inserts types CAM software, CNC controller, CNC simulator, milling machine, CNC milling machine CAM software, CNC controller, different type CNC controller like HASS, FANUC, Heidenhain, CNC HASS simulators</p>
6.	<p>Preparation and documentation of changes</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 70:00</p> <p>Corresponding NOS Code RSC/N4406 (CPC/N3115)</p>	<ul style="list-style-type: none"> Check if any engineering change is required in the design or process Evaluate the impact of design change on fixture parts / mechanism Design the action of rework / re make based on cost and time available / production requirement schedules by the moulds Ensure that the size, stock and raw material is available with the company or in the market Assist the process engineer, tool room engineer or analyser in using the material available in the company by changing the shape /dimension Approve and make the changes in drawing / part-list and order the new parts/ rework with help of validation/ process engineer Design final changes in documentation after trials Demonstrate how to release the changed documents after 	<p>Hand Tools: Hammer, screw driver set with multiple heads, allen key hexagonal ,twist drills bit, file triangular, hacksaw adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives</p> <p>Raw material: Mild steel, stainless steel, aluminium, brass, wood CNC lathe machine lathe machine CNC simulator 3-jaw and 4-jaw chuck, cutting tools (single point) both HSS and carbide inserts types CAM software, CNC controller, CNC simulator, milling machine, CNC</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		successful trial <ul style="list-style-type: none"> Maintain the performance data of the mould and keep it in safe custody 	milling machine CAM software, CNC controller, different type CNC controller like HASS, FANUC, Heidenhain, CNC HASS simulators
7.	Verify the process followed for mould designing Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 65:00 Corresponding NOS Code RSC/N4407 (CPC/N3116)	<ul style="list-style-type: none"> Measure the specifications of the finished product using devices like micrometers, vernier calipers, gauges, rulers, weighing scales and other inspection equipment Differentiate the various parameters given in the work order Compare texture, surface properties, hardness and strength with the given product specifications Analyse the observations of the basic inspection process Identify pieces which are correct the ones not meeting the specified standards 	Raw material: Mild steel, stainless steel, aluminium, brass, wood CNC lathe machine lathe machine CNC simulator 3-jaw and 4-jaw chuck, cutting tools (single point) both HSS and carbide inserts types CAM software, CNC controller, CNC simulator, milling machine, CNC milling machine CAM software, CNC controller, different type CNC controller like HASS, FANUC, Heidenhain, CNC HASS simulators
8.	Record log of defective products and discard defective pieces Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 75:00 Corresponding NOS Code RSC/N4407 (CPC/N3116)	<ul style="list-style-type: none"> Maintain records of each category of work outputs as per the batch/ cavity etc. so that correction can be organized Categorize the defective pieces into pieces which can be repaired/ modified and pieces which are beyond repair Assemble to scrap the pieces which are beyond repair and repair the ones which need minor modifications/ rework Design linkage between rejection of output and the causes for the same (process/ material etc.); Rectify minor defects like shape deformation, grooves, holes etc. by cutting, finishing etc Escalate all issues related to change in surface properties, hardness etc. so that the manufacturing equipment can be reset to achieve the output Perform quality check on first and last moulding from each batch 	Measuring equipment: Steel ruler, micrometer, vernier caliper, radius gauge, feeler gauge, height gauge, thread gauge, steel measuring tape, weighing balance (1 no.) Personal Protective equipment: Safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box with medicines Raw material: Mild steel, stainless steel, aluminium, brass, wood CNC lathe machine lathe machine CNC simulator 3-jaw and 4-jaw chuck, cutting tools (single point) both HSS and carbide

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Maintain clearance for the entire batch from the lab. 	inserts types CAM software, CNC controller, CNC simulator, milling machine, CNC milling machine CAM software, CNC controller, different type CNC controller Like HASS, FANUC, Heidenhain, CNC HASS simulators
9.	Communication skill and personality development Theory Duration (hh:mm) 40:00 Practical Duration (hh:mm) 60:00 Corresponding NOS Code RSC/N4401 (CPC/N3104)	<ul style="list-style-type: none"> Communicate clearly with colleagues Practise working with colleagues amicably Deliver information to colleagues in line with organizational requirements Demonstrate respect for colleagues Keep the commitments made to colleagues Inform colleagues if commitments are not fulfilled with reasons. Identify problems in working with colleagues and take the initiative to solve them Manage resources with other members as per priority of tasks Analyse the observations of the inspection process Analyse all issues related to change in surface properties, hardness etc. to reset the manufacturing equipment 	Class Room equipment: LCD projector/screen, computer, charts, black / white board and duster. Auto CAD/CAM, CAE software, cre-o software, solid works software and NX software, computers / laptops
10.	Maintain basic health and safety practices at the workplace Theory Duration (hh:mm) 40:00 Practical Duration (hh:mm) 60:00	<ul style="list-style-type: none"> Comply with environmental and safety policies of organisation Identify personal safety, job safety and machine safety procedures Coordinate with other resources at the workplace to achieve healthy, safe and secure environment Identify hazards like accidents, fire or natural calamity and take appropriate action Demonstrate safe working practices while dealing with 	Class Room equipment: LCD projector/screen, computer, charts, black / white board and duster. Personal Protective equipment: Safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box with medicines

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code RSC/N4101 (CPC/N0411)	hazards <ul style="list-style-type: none"> • Practise good housekeeping standards at all times • Demonstrate proper rescue techniques applied during fire hazard • Demonstrate the correct use of a fire extinguisher. • Identify potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals, loud noise • Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine • Share awareness amongst others on the identified risks • Check that the tools, fixtures and jigs that are lying on workstations are the ones in use and unnecessary items are not cluttering the workbenches. 	
11.	Demonstrate 5S principles at the workplace Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 40:00 Corresponding NOS Code RSC/N4101 (CPC/N0411)	<ul style="list-style-type: none"> • Categorize the types of wastes • Demonstrate the technique of waste disposal and waste storage in proper bins • Segregate the items labelled as red tag for the process area and keep them in the correct places • Categorize the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers • Practise proper stacking of various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also for easy sorting when required • Identify the floor markings/ area markings used for demarcating the various sections in the plant • Check for labelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the 	Class Room equipment: LCD projector/screen, computer, charts, black / white board and duster. Personal Protective equipment: Safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box with medicines

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		same <ul style="list-style-type: none"> Organize all material and tools in the designated places as indicated in the 5S instructions 	
	Total Duration Theory Duration 300:00 Practical Duration 660:00	Unique Equipment Required: <ol style="list-style-type: none"> Class Room equipment: LCD projector/screen, computer, charts, black / white board and duster, auto CAD/CAM, CAE software, cre-o software, solid works software and NX software, computers / laptops Measuring equipment: Steel ruler, micrometer, vernier caliper, radius gauge, feeler gauge, height gauge, thread gauge, steel measuring tape, weighing balance (1 no.) Personal Protective equipment: Safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box with medicines. Raw material: Mild steel, stainless steel, aluminium, brass, wood, CNC lathe machine, lathe machine, CNC simulator, 3-jaw and 4-jaw chuck, cutting tools (single point) both HSS and carbide inserts types, CAM software, CNC controller, CNC simulator, milling machine, CNC milling machine, CAM software, CNC controller, different type CNC controller like HASS, FANUC, Heidenhain, CNC HASS simulators Hand Tools: Hammer, screw driver set with multiple heads, allen key hexagonal ,twist drills bit, file triangular, hacksaw adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives. 	

Grand Total Course Duration: **960 Hours 0 Minutes**

(This syllabus/ curriculum has been approved by [Rubber Skill Development Council](#))

Trainer Prerequisites for Job role: “Plastics Product and Mould Designer” mapped to Qualification Pack: “RSC/Q4402 (CPC/Q3104)” Version 1.0

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ <u>RSC/Q4402 (CPC/Q3104), V 1.0</u> ”.
2	Personal Attributes	A Trainer should be free from socio-economic preferences and prejudice. He/ she should be safety conscious and proficient in handling and use security/ safety equipment. Besides being knowledgeable, he/ she should be energetic, motivating, innovative and good at communication. The trainer should be able to establish rapport with the trainees and employ innovative methods to impart instructions.
3	Minimum Educational Qualification	10 th Standard General Information about drawing and design
4a	Domain Certification	Certified for Job Role “ <u>Plastics Product and Mould Designer</u> ” mapped to the Qualification Pack “ <u>RSC/Q4402 (CPC/Q3104), V 1.0</u> ” issued by RSDC. Minimum accepted score as per SSC guideline is 80%.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “ <u>Trainer</u> ”, mapped to the Qualification Pack: “ <u>MEP/Q2601</u> ” with scoring of minimum 80%.
5	Experience	As per the standards set by relevant SSC to practice in different industry sectors.

Annexure: Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role: Plastics Product and Mould Designer
Qualification Pack Code: RSC/Q4402 (CPC/Q3104), V 1.0
Sector Skill Council: Rubber Skill Development Council

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 laydown 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 centre based on these criteria.
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS.
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
RSC/N4401 (CPC/N3104) Communication Skill and Personality development.	PC1. Maintain clear communication with colleagues	2	0.5	1.5
	PC2. Work with colleagues	2	0.5	1.5
	PC3. Pass on information to colleagues in line with organizational requirements	2	0.5	1.5
	PC4. Work in ways that show respect for colleagues	2	0.5	1.5
	PC5. Carry out commitments made to colleagues	2	0.5	1.5
	PC6. Let colleagues know in good time if cannot carry out commitments, explaining the reasons	2	0.5	1.5
	PC7. Identify problems in working with colleagues and take the initiative to solve these problems	2	0.5	1.5
	PC8. Follow the organization's policies and procedures for working with colleagues	2	0.5	1.5
	PC9. Ability to share resources with other members as per priority of tasks	2	0.5	1.5
	PC10. Note down the observations of the basic inspection process and identify pieces which are OK and also not meeting the specified standards	2	0.5	1.5
	PC11. Separate the defective pieces into two categories – pieces which can be repaired/ modified and pieces which are beyond repair,	2	0.5	1.5
	PC12. Discard the pieces which are beyond repair and repair the ones which need minor modifications/ rework	2	0.5	1.5
	PC13. Maintain records of each category of work outputs as per the batch/ cavity etc. so that correction can be organized.	2	0.5	1.5
	PC14. Establish linkage between rejection of output and the pertinent causes for the same (process/ material etc.); Recommend the means for rejection control.	1	0.5	0.5
	PC15. Rectify minor defects like shape deformation, grooves, holes etc. by cutting, finishing etc.	1	0.5	0.5
	PC16. Escalate all issues related to change in surface properties, hardness etc.	1	0.5	0.5

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	so that the manufacturing equipment can be reset to achieve the specified output			
	PC17. Provide first and last moulding from each batch to the lab for quality check on its composition, properties etc.	1	0.5	0.5
	PC18. Obtain clearance for the entire batch from the lab	1	0.5	0.5
	Sub total	31	9	22
RSC/N4101 (CPC/N0411) Maintain basic health and safety practices at the workplace, 5S	PC1. Wear protective clothing/equipment for specific tasks and work conditions	2.5	0.5	2
	PC2. Carry out safe working practices while dealing with hazards to ensure the safety of self and others.	2.5	0.5	2
	PC3. Apply good housekeeping practices at all times	2.5	0.5	2
	PC4. Use the various appropriate fire extinguishers on different types of fires correctly	2.5	0.5	2
	PC5. Demonstrate rescue techniques applied during fire hazard, demonstrate good housekeeping in order to prevent fire hazards, demonstrate the correct use of a fire extinguisher.	2.5	0.5	2
	PC6. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals, loud noise, and Identify areas in the plant which are potentially hazardous/unhygienic in nature. Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine.	2.5	0.5	2
	PC7. Inform the concerned authorities on the potential risks identified in the processes, workplace area/ layout, materials used etc, Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations.	2.5	0.5	2
	PC8. Create awareness amongst other by sharing information on the identified	2.5	0.5	2

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	risks.			
	PC9. Follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and un-necessary items are not cluttering the workbenches or work surfaces.	2.5	0.5	2
	PC10. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work instructions	2.5	0.5	2
	PC11. Follow the technique of waste disposal and waste storage in the proper bins as per SOP	1.5	0.5	1
	PC12. Segregate the items which are labeled as red tag items for the process area and keep them in the correct places	1.5	0.5	1
	PC13. Sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/ work instructions	1.5	0.5	1
	PC14. Ensure that areas of material storage areas are not overflowing PC15. Properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required	1.5	0.5	1
	PC16. Return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area	1.5	0.5	1
	PC17. Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards.	1.5	0.5	1
	PC18. Follow the proper labelling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists	1.5	0.5	1
	PC19. Check that the items in the respective areas have been identified as broken	1.5	0.5	1

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	or damaged			
	PC20. Follow the given instructions and check for levelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same To avoid spillage, leakage, fire etc.	1.5	0.5	1
	PC21. Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions.	1.5	0.5	1
	Sub total	40	10	30
RSC/N4405 (CPC/N3113) Collection of data/information with the concept , layout of impression and Planning of the process for all assembly parts and dies and coordinating with others	PC1. Understand the work order (work output) required from the process and discuss the same with the supervisor	13	3	10
	PC2. Refer all sketches/ work orders/ process related documents to understand dimensions and properties of the required work output	13	3	10
	PC3. Understand the process requirements in terms of Temperature required for the Mould and Plastics material required and its quantity with its market rate, hydraulic pressure/ air pressure/ vacuum pressure in the machine, weight of the product. injection time, refilling time etc. as mentioned in the Work Instruction/ SOP/ Control Diagrams	13	3	10
	PC4. Clearly understanding the does and don'ts in the working area as defined in OPs/ Work Instructions or defined by supervisors	13	3	10
	PC5. Understand the moulding procedure and process to be adopted for completing the work order from the supervisor by referring the Work Instruction document/ SOP manual.	13	3	10
	PC6. Understand the raw material like plastics granules, bonding additives etc. required for executing the activity	13	3	10
	PC7. Analyse the requirement a new tool such as: <ul style="list-style-type: none"> • Type of Moulds & Dies • Mechanisms within as per the moulding process 	13	3	10

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	<ul style="list-style-type: none"> Online gauges if require Fixtures & associated parts Robot mechanism required (if require) <p>For facilitating the process of manufacturing for broad classification of process types such as:</p> <ul style="list-style-type: none"> Assembly Process Special processes- Polymer parts, welding, Surface/ Heat treatment. 			
	PC8. Finalize the required dimension for new required product in plastics as per the application	13	3	10
	PC9. Decide accurate plastic material of the product as per its application	13	3	10
	PC10. Prepare the drawings for the required plastics product using /CAE software.	13	3	10
	PC11. Share the drawings for the Product to the in – house tool room or third party agency (if require) whichever applicable for preview & later for fabrication. Sometimes if require take approval from third party agency/supplier.	13	3	10
	PC12. On the base of work order and the discussion had with process engineer ,get the outline dimensions and other details for selected Machine to be used such as Injection Moulding, Extruder, etc. for preparation of drawing	13	3	10
	PC13. Based on the sequence of operations required for the Moulding process and required moulding machine, devise the mechanism of working for the Mould/die. Sometimes if require prototype mould may also be prepared for checking its working by using wax	13	3	10
	PC14. Finalize the rough dimensions for the mould based on the process requirement, space constraints, aux. main equipment selected for the process by the Process Engineer and	13	3	10

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	the above Product drawing.			
	PC15. Prepare the drawings for the required Mould/Dies using CAD/CAE software	13	3	10
	PC16. Share the drawings for the new mould/Dies to the in – house tool room or third party agency whichever applicable for preview. If require discuss the point with Tool Room engineer.	13	3	10
	PC17. On the base of feedback received from process engineer, Tool Room engineer, etc. final dimension of the mould decide.	13	3	10
	PC18. If required, use simulation software for understanding the Mould /Die operation and review the drawings.	13	3	10
	PC19. During design stage , Analyse the working of mould/die by CAE software to check end result	13	3	10
	PC20. In case of robotics/ automation application require for mould functioning, finalize the operation sequence program in consultation with the process engineer.	13	3	10
	PC21. Decide In consultation with Process Designer/ Manager required working system for the mould/die like Guiding system, Feed system, Ejection system etc. in injection mould. Type of die, size of mandrel required in extrusion die and shape of bottle and its size in blow moulding.	13	3	10
	PC22. Decide In consultation with Process Designer/ Manager, all the technical dimension of sub parts of the mould/dies as per requirement of sample and process.	13	3	10
	PC23. Decide typical allowances, Fits and tolerance required on matching parts for process trimming, and warpage etc. are considered based on requirement & past experience of the machining process.	13	3	10
	PC24. Once finalized , then inform the in – house tool room or third party agency for reviewing the complete Mould	13	3	10

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	profile , dimensions and accordingly if required update the drawings			
	PC25.For any on-line gauges designed as part of this exercise ensure GD & T requirements are adhered to.	13	3	10
	Sub total	325	75	250
RSC/N4406 (CPC/N3115) Preparation of drawings by using CAD/CAE/CAM software and release it as per the documentation procedure	PC1. Complete the parts- list and drawings / specifications for all the plates/items required for the Mould/Dies	14	4	10
	PC2. Prepare require raw material list with it's require size as per the finished plates/items.	14	4	10
	PC3. Release the drawings of the Mould/Die to Production department/ In – House / user	14	4	10
	PC4. If require, release the model of the core & cavity along with drawing	14	4	10
	PC5.Monitor its development as per machining process in Tool Room for any revisions, clarity required etc.	14	4	10
	PC6.In case of any problem encountered while development of the Mould , usage by Production during process , probe the reasons and if required , modify/re-design in coordination with in – house tool room or third party agency, based on the severity of problem.	14	4	10
	PC7. During assembly of parts of the mould, if further any modification require ,release new sub drawing to overcome the problem	14	4	10
	PC8.After trial of the mould, if any parts of the mould is required to modify, release new drawing of the part with consultant to process engineer	14	4	10
	PC9. In case of any Engineering Change require in the design OR a process or any part dimension change , review the impact on fixture parts / mechanism and decide the action of Rework / re make based on cost and time available / production requirement schedules by the moulds. Check the size, stock and raw material available with the	14	4	10

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	company			
	PC10.To save the time, the discussion may be done with process engineer, Tool Room engineer Analyser to use the material available in the company by changing the shape /dimension. Re-draw the parts and release the issue-ll drawing.	14	4	10
	PC11. Based on the above make the changes in drawing / part-list and order the new parts/ rework with help of Validation/ Process engineer.	14	4	10
	PC12. Make final changes in documentation after trials by declaring successful design by the user and release the change documents as per SOP.	14	4	10
	PC13. In consultation with the process engineer / Tool room /Mould Designer, maintain the performance data of the mould and keep in safe custody for next project	12	2	10
	Sub total	180	50	130
RSC/N4407 (CPC/N3116) Prepare lab model of the mould to verify the process followed for the designing of mould.	PC1. Measure the specifications of the finished product using devices like Micrometers, Vernier Calipers, Gauges, rulers, weighing scales and any other inspection equipment and compare with the parameters given in the work order	3	1	2
	PC2. Compare texture, surface properties, hardness and strength with the given product specifications	2.5	0.5	2
	PC3. Note down the observations of the basic inspection process and identify pieces which are OK and also not meeting the specified standards	2.5	0.5	2
	PC4. Separate the defective pieces into two categories – pieces which can be repaired/ modified and pieces which are beyond repair,	2.5	0.5	2
	PC5. Discard the pieces which are beyond repair and repair the ones which need minor modifications/ rework	2.5	0.5	2
	PC6. Maintain records of each category of work outputs as per the batch/ cavity	2.5	0.5	2

Assessable Outcome		Marks Allocation		
NOS	Performance Criteria	Total	Theory	Practical
	etc. so that correction can be organized.			
	PC7. Establish linkage between rejection of output and the pertinent causes for the same (process/ material etc.); Recommend the means for rejection control.	2.5	0.5	2
	PC8. Rectify minor defects like shape deformation, grooves, holes etc. by cutting, finishing etc.	1.5	0.5	1
	PC9. Escalate all issues related to change in surface properties, hardness etc. so that the manufacturing equipment can be reset to achieve the output	1.5	0.5	1
	PC10. Provide first and last moulding from each batch to the lab for quality check on its composition, properties etc.	1.5	0.5	1
	PC11. Obtain clearance for the entire batch from the lab	1.5	0.5	1
	Sub total	24	6	18
	Grand total	600	150	450