3rd course. Unit OPERATIONS. Injection molding. SURNAME NAME GROUP

Task 1. Fill in the gaps with the most appropriate word in the box.

INJECTION MOULDING PROCESS STEP BY STEP

left melted released taking harden produce

put into fed injected opened up

The whole plastic injection moulding process begins with _____ the raw plastic material in the form of granules or tiny pellets. This is then _____ through a hopper and _____ at high heat. When the plastic is soft enough, it is then _____ under pressure into a single or multi-cavity mould to _____ the desired shape or shapes. Then, the plastic parts are _____ to cool down enough to _____ and solidify. At that stage, the injection mould is _____ and the new plastic component is _____ by means of moving rods, plates or an air blast, ready to be _____ its intended use.

Task 2. Put the stages of the plastic injection molding process in the correct order.

_____As the plastic material is injected into the mold cavity, it undergoes a process of cooling and solidification to form the desired shape of the final plastic component.

_____During the clamping stage, the mold halves are securely closed by the clamping unit to prepare for the injection of heated plastic material.

_____Once the mold is opened after cooling, the finished part is extracted, completing the injection molding cycle with a successfully produced plastic component.

_____The injection process involves feeding raw plastic material into the machine, where it is conveyed towards the mold and heated up through temperature and compression.

Task 3. Match the halves of the sentences.

1. The plastic material is injected into the mold cavity	a) due to temperature and compression within the machine barrel.
2. The mold halves were securely closed by the clamping unit	b) the final part after injection into the mold.
3. As the screw conveys the plastic pellets, they heat up	c) throughout the process to achieve the desired results.
4. The injection time is determined by factors such as	d) once the mold is securely clamped.
5. The melted plastic becomes an exact portion that will form	e) before the injection process began.
6. Temperature and pressure are carefully controlled	f) fills the entire mold cavity.
7. Pressure is applied to ensure the plastic	g) shot volume, injection pressure, and part geometry.

Task 4. Read the text and decide if the statements below are TRUE or FALSE.

The injection molding process cycle is quite short, usually lasting between six seconds and two minutes. The process consists of the following stages:

Clamping: Before the injection of the heated plastic material into the mold, the two halves of the mold must first be securely closed by the clamping unit. The tremendous force of the clamping unit pushes the mold halves together and keeps the mold securely closed while the material is injected. The time required to close and clamp the mold is dependent upon the machine – larger machines with larger openings require more time.

Injection: Raw plastic material, usually in the form of tiny pellets, is fed into the injection molding machine and conveyed towards the mold by the injection unit. The plastic material heats up by temperature and compression as the screw conveys the

plastic pellets through heated zones of the machine barrel. The amount of melted plastic that is conveyed to the front of the screw is an exact portion that will become the final part after injection. The amount of material that is injected is referred to as the shot, and once fully clamped, the machine injects the material into the mold. Injection time can be estimated by the shot volume, injection pressure, and part geometry.

1. Clamping is a step that occurs after the injection of heated plastic material into the mold.
2. Larger injection molding machines with larger openings require less time for mold clamping.
3. Injection molding machines convey raw plastic material towards the mold using the injection unit.
4. The plastic material heats up through temperature and compression as it is conveyed through the machine barrel.
5. The shot volume, injection pressure, and part geometry do not affect the estimation of injection time.

Task 5. Match the terms with their definitions.

	Injected	**Cavity**	**Push**	
Fed		**Conveyed**	**Heat up**	
Inject	**Melt**		**Harden**	**Mold**

□ _____To exert force on an object to move or press it in a particular direction.

□ _____ To change from a solid to a liquid state as a result of heating.

□ _____Transported or transmitted something from one place to another, often using a medium such as a conveyor belt or mechanism.

□ _____ To become firm or solid, typically as a result of cooling, drying, or the application of pressure.

□ _____ Introduced into a confined space or medium, especially forcefully or rapidly.

□ _____ Transferred or conveyed something, typically a substance or material, into a particular location or system.

□ _____ To increase in temperature, causing a rise in thermal energy within an object or substance.

□ _____ To introduce a substance or material into a confined space or medium, typically with force or pressure.

□ _____ A void or space within the mold where the molten plastic is injected

□ _____ A hollow form or matrix into which a material, such as plastic, is poured or injected to give it a particular shape

Task 6. Choose the correct option.

1. The plastic material currently **is / is being** heated to its optimal temperature in the injection molding machine.
2. It is then **forced / conveyed** into a closed mold that defines the shape of the article **to produce / to be produced.**
3. There the material is **cooled / heated** until it reverts to a **solid / liquid.**
4. Then the mold **is opened / openes** and the finished part is **cooled / extracted.**