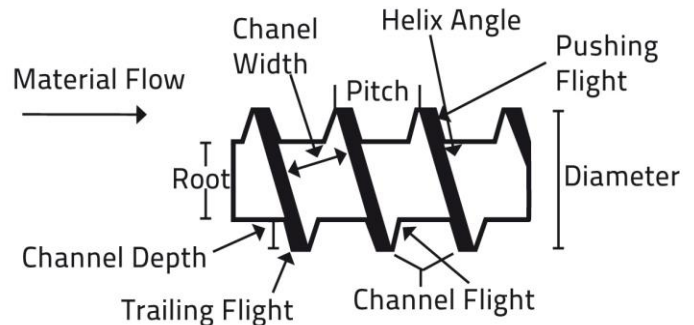


Q1. A. Based on Availability- Natural and Synthetic: Synthesis- Bulk, Solution, Suspension and Emulsion: Temperature- Thermoplastic, Thermosetting: Crystallinity – Crystalline, Amorphous [5 Marks]

B. Hint: Proper explanation of the sections in diagram below fetches [5 Marks]



C. Hint Words: Explaining the extrusion process and its parts and blown film die construction (Blown-film Unit) [3 Marks] Diagram with detailed description [2 Marks]

D. Hint: Explaining the vacuum metallization process variations (Thermal Deposition, Electroplating or other relevant method) carries [3 Marks] and schematic diagram [2 Marks]

Q2. A. Hint words: Categorizing dies based on the type of product, openings, location, stationary/rotating viz. [5 Marks] and explaining factors considered like L/D, Compression ratio, Type of screw (inter-meshing/non-intermeshing) [5 Marks]

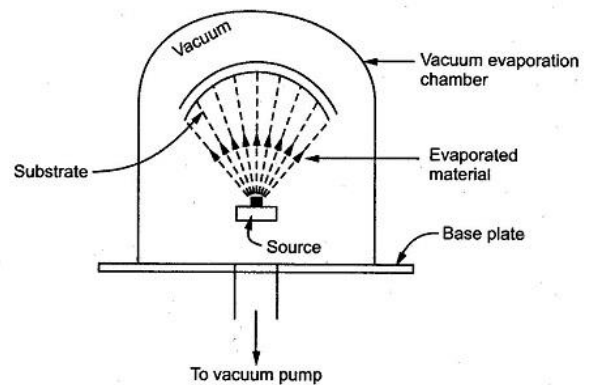


Fig. 1.16 Metallization process

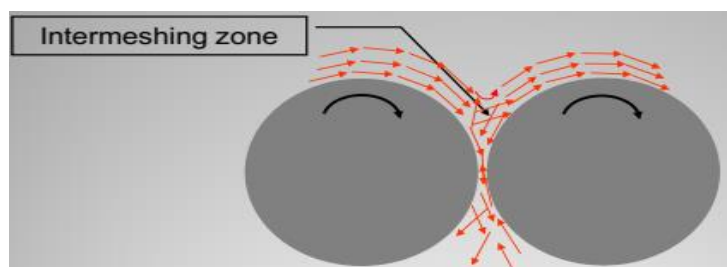
B. Advantages of single screw extruder. Designed by advanced technology, it has good plasticizing function

to ensure stable and high speed extrusion.

The entire process is involved with involute gear transmission so it causes low noise and can bear large capacity.

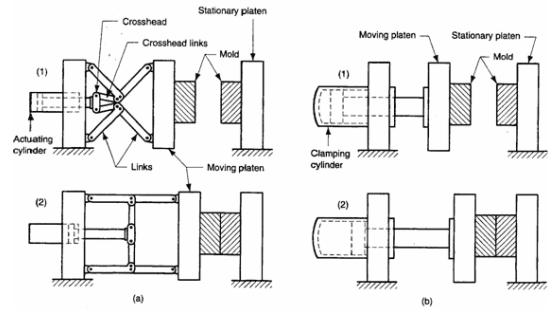
Disadvantages of single screw extruder are the transmission of materials in single screw extruder is mainly by friction, so

that the feeding performance is limited. Powder, paste materials, glass fiber and inorganic filler is more difficult to join which is not suitable for some processes. [5 Marks]



The advantages of Twin Screw Extruders are Precise control of product characteristics, Extrusion of heat sensitive products, Reduced volatilization of flavors, Extrusion of ingredients which require additional moisture, Better mixing characteristics.

Twin-screw extruders can be further subdivided into several classifications as Co-rotating intermeshing, Co-rotating non-intermeshing, Counter rotating intermeshing, Counter rotating non-intermeshing, Conical intermeshing [5 Marks]



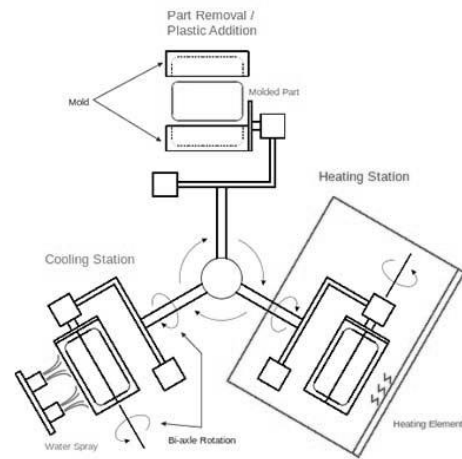
Q3. A. Hint words: Mold Cooling like Baffled cooling, Sprinkler system, C-Type Channel, U-Type Cooling channels and explaining similar types [5 Marks] Diagram with theory [5 Marks].

B. Hint: Explaining the Hydraulic and Toggle type clamping type [5 Marks] and Explaining the Toggle type with diagram [5 Marks]

Q4. A. Hint: Explaining the rotational molding process and its variants viz. Carousel, rock-n-roll, clam-shell type [5 Marks] explaining carousel type with diagram [5 Marks]

B. Explaining the advantages of Rotational molding compared to other molding techniques [5 Marks] and explanation with suitable example considering product properties [5 Marks]

Q5. A. Hint Words: Enlisting the types of thermoforming like vacuum, pressure, plug assist type [5 Marks] and explaining the vacuum type with diagram [5 Marks]



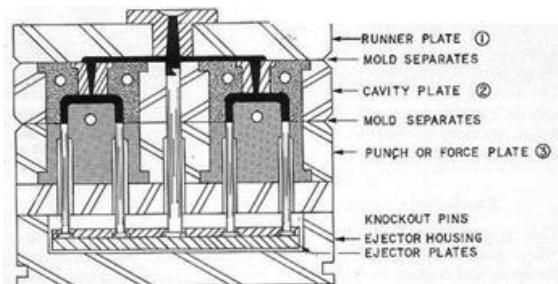
B. Hint: Enlist various types of thermoforming like positive, semi-positive, flush type [5 Marks] and explaining the Transfer molding process with diagram [5 Marks]

Q6. A. Hint: Anti-oxidants, Flame retardants, fillers, master-batches and similar additives and explaining their functionality [5 Marks]

B. Silver Streaks, Pin holes, Marks on surface, Burn marks, Miss-alignment of die and explaining the causes and remedy to the mentioned [5 Marks]

C. Hint: Blister, Orange peel, Flow marks, voids, Short-shot and explaining the causes and remedy to the mentioned [5 Marks]

D. Hint: The clamping unit must be able to keep the mold halves closed during the pressurized injection of plastic and not allow flashing. Common clamping mechanisms are direct hydraulic clamping and mechanical toggle clamps, actuated by hydraulic cylinders. Explanation of the above with a schematic diagram [5 Marks]



E. Hint: I-Type, Inverted L-Type, L-type, F-Type and Z type calendaring rolls and its explanation with schematic diagram [5 Marks]