

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2024****Subject Code:3152307****Date:18-05-2024****Subject Name:Plastics Extrusion Technology****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Explain the fundamental principle of how a single-screw extruder works and its key components.	03
	(b) Describe melting mechanism in extrusion.	04
	(c) Explain in detail the criteria for selecting raw materials for the extrusion process.	07
Q.2	(a) Discuss manufacture of braided hoses	03
	(b) Define : Helix angle, flight depth, pitch and L/D ratio	04
	(c) Compare and contrast the advantages and disadvantages of twin-screw and single-screw extruders.	07
	OR	
	(c) Illustrate the production process of multilayer films using a clear line diagram.	07
Q.3	(a) Discuss the advantages and applications of grooved barrel technology in extrusion.	03
	(b) Explain the function of the barrel and feed throat in an extruder and how they contribute to the extrusion process.	04
	(c) Provide five common troubleshooting issues related to pipe manufacturing.	07
	OR	
Q.3	(a) How do heating and cooling systems impact the performance of an extruder, and why are they essential?	03
	(b) What are the key differences between intermeshing (co-rotating and counter-rotating) and non-intermeshing twin-screw extruders, and when are they each used?	04
	(c) Provide a comprehensive discussion on various screw designs used in extrusion, including their applications, advantages, and disadvantages.	07
Q.4	(a) Explain the significance of the thrust bearing assembly in a screw extruder.	03
	(b) Estimate the B-10 life of a thrust bearing given that: $P = 40 \text{ MPa}$ $N = 120 \text{ rpm}$ $K = 10/3$ $B-10 \text{ std} = 1,00,000 \text{ hrs}$	04

	(c)	Illustrate the manufacturing process of wires and cables using a clear line diagram.	07
	OR		
Q.4	(a)	Describe the components of a die assembly, including the breaker plate, screen, and screen changers.	03
	(b)	Elaborate on: Drag flow and Pressure flow.	04
	(c)	Illustrate the production process of PP monofilaments using a clear line diagram.	07
Q.5	(a)	How does devolatilization take place in a screw extruder, and why is it important in certain applications?	03
	(b)	Discuss the comparison between AC and DC drives in extruder machines.	04
	(c)	Illustrate the production process of PVC Pipes using a clear line diagram.	07
	OR		
Q.5	(a)	What are the key differences between tubular and flat sheet and film extrusion processes, and in what applications is each method typically used?	03
	(b)	Provide a comprehensive explanation of nitriding.	04
	(c)	Illustrate the manufacturing process of sheets through extrusion with a clear line diagram and accompanying explanation.	07
