Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code: 2163602 **Date:13/05/2016**

Subject Name: Compounding & Processing of Plastics & Rubbers-I

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Match the listed below: (1.5x4=6) **07**

(i)

Processing Technique	**Product**
P. Blow molding	1. Switch board
Q. Compression molding	2. Blister packaging
R. Injection molding	3. Shampoo bottles
S. Thermoforming	4. Car bumper
T. Calendering	--

(ii)

Processing Technique	**Product**
P. Calendering	1. mobile case
Q. Extrusion	2. parison
R. Injection Molding	3. Sheets
S. Thermoforming	4. 2000 Lit tank
T. Rotational	

(iii)

Additive	**Function**
P. dilaurylthiodipropionate	1. solid layer lubricant
Q. graphite	2. flame retardant
R. antimony trioxide	3. reinforcement
S. carbon fibre	4. antioxidant

(iv)

Ingredients	Parts by wt.
P. PVC	1. 0.5
Q. Plasticizer	2. 40
R. Stabilizer	3. 3
S. Calcium stearate	4. 100

(v) A polymer (density =1.1 g/cm^3) having sharp shear thinning behaviour is to be processed in an extruder with an output rate of 0.1 m^3/hr, calculate D_b (1)

(b) Explain the extrusion process with well-labeled diagram. **07**
Also explain the extrusion process for films

Q.2 **(a)** Compounding of polymer is carried out in a polymer industry using: **07**
(a) Two-roll mill (b) Twin screw extruder and (c) Single screw extruder
Make comparative statements on extent of mixing, performance and process control in each case

(b) Suggest raw materials for the preparation 2 liter of water bottles. Name the technique and describe it with proper diagram **07**

OR

(b) What do you mean by compounding? Explain in detail **07**

Q.3 **(a)** In rotational molding process, answer the following: **07**

(i) Draw and discuss the molding cycle

(ii) How it is unique from other moldings process?

(iii) Characteristics of raw materials

Draw schematic, label and explain the whole process

(b) Explain which process (describe it with proper diagram) will be used and suggest raw materials for the preparation of disposable cups **07**

OR

Q.3 **(a)** Explain (describe with proper diagram**)** which technique/process provide best mixing of additive for polymer? **07**

(b) What are functions (point wise) of extruder screw, breaker plate and additive **07**

Q.4 **(a)** What do you mean by calendaring? Explain in detail any two types of calendaring process with proper diagram. **07**

(b) Comment (point wise) on Dispersive mixing vs Distributive mixing, TSE vs SSE, channel depth decreases from feed end to die end with pressure profile **07**

OR

Q.4 **(a)** Why modification is an important for polymers and rubbers? How can you improve toughness, modulus and both of any polymer. Explain with example **07**

(b) Explain in brief the process and raw materials required for manufacturing of the pipes (with proper diagram) **07**

Q.5 **(a)** Write a short note on any three (with proper diagram) **07**

Cold and hot runners, Flashless mould, Reaction Injection moulding, Gas/Water assisted Injection moulding, Compression Moulding, 4-cavity mould indicating sprue, runner and gate positions

(b) Explain which process (describe it with proper diagram) will be used and suggest raw materials for the preparation of plastics gear. **07**

OR

Q.5 **(a)** Write a short note on any three (with function, application etc.) **07**

Fillers, Carbon black, Accelerators, Antioxidants, Coupling agent, Flame retardants

(b) Write in detailed about Pultrusion with proper and well labeled diagram **07**

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