

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
DEPARTMENT OF POLYMER AND TEXTILE ENGINEERING

2014/2015 HARMATTAN SEMESTER EXAMINATION

PTE 413: PVC TECHNOLOGY

TIME: 2½ HRS

DATE: May 02, 2015.

INSTRUCTIONS: ANSWER FIVE QUESTIONS

- 1(a) Briefly discuss the four types of flow
- (b) The following parameters were measured during the flow analysis of blow moulding extrusion; screw speed 10.4 r.p.s., channel depth 12.4mm, flight angle 62° , screw diameter 99mm, length of screw 302mm, melt viscosity $5.2 \times 10^5 \text{ N/m}^2\text{s}$, pressure 120 N/m^2 ($\pi = 3.142$). Use the above information to determine the total flow.
- 2(a) With the aid of diagrams, differentiate thermoforming from compression moulding
- (b) Determine the tensile strain of an extrudate with a total length of 15.5cm, axial length of 8.42cm and density of melt 5.43 g/cm^3 (take $g = 10 \text{ m/s}^2$)
- 3(a) Enumerate some of the problems of injection moulding (Plunger type) process.
- (b) A parison that weighs 10N has the following dimensions, outside diameter 30cm and length 8.6cm. if the density is 0.75 g/cm^3 . Calculate the thickness of the parison ($\pi = 3.142$).
- 4(a) Explain slush moulding process and give examples of articles that can be processed by slush moulding process.
- (b) Cross-section of a parison emerging from a tubular die with the dimensions; diameter of die 14mm, diameter of parison 26mm, thickness of parison 11mm, and thickness of die 8mm. find the ratio of swelling of wall thickness to that of width of the parison.
- 5(a) Describe the process of thermal degradation of PVC polymers
- (b) Name any 4 classification of heat stabilizers used in PVC compounding, and give a named example in each case.
- 6(a) Describe the mode action of any two heat stabilizers mentioned above.
- (b) Using a named example, state how the chemical composition of PVC resins affects its choice in PVC compounding.