3 Computer Graphics and Image Processing (PR)

(a) Explain the difference between an explicit formula, a closed form and a parametric form for a curve in two dimensions. Give examples to illustrate your answer. [3 marks]

(b) Explain the term mathematical continuity \( (C_n) \) when joining two curves. [2 marks]

(c) Give the formulation of a cubic Bézier curve in two dimensions, explaining the rôle of the parameter and control points. [4 marks]

(d) Consider the joint between two cubic Bézier curves. State and prove constraints on their control points to ensure:

\( (i) \) \( C_0 \) continuity at the joint; [2 marks]

\( (ii) \) \( C_1 \) continuity at the joint; [4 marks]

\( (iii) \) \( C_2 \) continuity at the joint. [3 marks]

(e) Discuss the implications of requiring \( C_3 \) continuity at the joint between two cubic Bézier curves. [2 marks]