

3. (a) How is symmetry used to scan convert circles? [3]
- (b) Show with a diagram the setup of the Midpoint method for curves. [4]
- (c) Show that the increment in the decision parameter for Bresenham's mid-point circle drawing method is

$$P_{k+1} = P_k + 2(x_k + 1) + (y_{k+1}^2 - y_k^2) - (y_{k+1} - y_k) + 1$$

and hence state the appropriate increments of P_k for the two cases: $P_k \leq 0$
and $P_k > 0$. [10]

- (d) Derive a value for P_0 . [4]
- (e) Give two simple ways of filling the circle. [4]