10. A sequence of numbers $u_1, u_2, u_3, \ldots$ is defined by

$$u_1 = 8 \qquad u_2 = 10$$

$$u_{n+2} = u_{n+1} + 2u_n \quad n \in \mathbb{Z}^+$$

Prove by induction that, for $n \in \mathbb{Z}^+$

$$u_n = 3 \times 2^n - 2 \times (-1)^n$$

(6)

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Question 10 continued

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(Total for Question 10 is 6 marks)

TOTAL FOR PAPER IS 75 MARKS

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