The Open University of Sri Lanka

B.Sc. Degree Programme : Level 05

Department of Mathematics & Computer Science

No Book Test -02 (NBT-02) -2016/17

Computer Science

CPU3140-Mathematics for Computing

Duration : One hour only (1Hour)

Date: 27th May 2017	**Time: 10.30am – 11.30am**

Answer All Questions

01.(a) A propositional function P(n) is given. To prove P(n) is true for any natural number n, what are the main steps that you will follow?

(b) Prove using Mathematical Induction for all n≥ 1,

$1+4+7+\ldots+(3n-2) = n\frac{(3n-1)}{2}$

(c) Use Principal of Mathematical Induction to verify that for all n$\in\aleph$,that $(6^n - 1)$ is divisible by 5.

02. (a) Give the definition of a Recurrence Relation.

(b) Clarify the following recurrence relations given below.

(i) $a_n = a_{n-1} + 2a_{n-2} + 3a_{n-3}$
(ii) $P_n = (1.11)P_{n-1}$
(iii) $a_n = a_{n-1} + a_{n-2}^2$
(iv) $f_n = f_{n-1} + f_{n-2}$ - a
(v) $B_n = n\, B_{n-1}$

(c) Solve the recurrence relation given below.

$a_n = a_{n-1} + 2a_{n-2}$ with $a_0 = 2$ and $a_1 = 7$