

APRIL/MAY 2018

MMA11 — ALGEBRA -I

Time : Three hours

Maximum : 75 marks

SECTION A — ( $5 \times 6 = 30$  marks)

Answer ALL questions.

1. (a) Prove that  $N(a)$  is a subgroup of  $G$ .

Or

- (b) Show that the conjugacy is an equivalence relation on  $G$

2. (a) If  $G$  and  $G'$  are isomorphic abelian groups, prove that for every integer  $S$ ,  $G(s)$  and  $G'(s)$  are isomorphic.

Or

- (b) Prove that any finite abelian group is the direct product of cyclic groups.

3. (a) If  $u \in V_1$  is such that  $uT^{n_1-k} = 0$ , where  $0 < k \leq n$ , prove that  $u = u_0T^k$  for some  $u_0 \in V_1$ .

Or

- (b) Prove that the relation of similarity is an equivalence relation in  $A(V)$ .