Some classes of finite 2-groups and their endomorphism semigroups

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It is proved, that all groups of order 32 presentable as semidirect product of C_2 and normal subgroup $C_4 \times C_4$ or $C_8 \times C_2$ are determined by their endomorphism semigroups in the class of all groups. All non-isomorphic groups of order 2^{2n+1}, presentable as semidirect product of C_2 and normal subgroup $C_{2^n} \times C_{2^n}$ $(n \geq 3)$, are described by generators and defining relations. It turns out that there exist 17 different types of these groups. For one type of these groups, it is given for groups of this type their characterizations by endomorphism semigroups and shown that these groups are determined by their endomorphism semigroups in the class of all groups. The groups presentable as semidirect product of C_4 and normal subgroup $C_{2^n} \times C_{2^n}$ $(n \geq 3)$ are described by their generators and defining relations. These groups are divided into disjoint classes, where two groups of the same class are isomorphic. Unfortunately, the isomorphism problem for groups of different classes is still open. The groups presentable as semidirect product of C_2 and normal subgroup $C_{2^{n+m}} \times C_{2^n}$ $(n \geq 3,\ m \geq 1)$ are described by their generators and defining relations. Isomorphism problem for groups presentable in given form is not still solved.