(a) $G = Z_2 \times Z_4 \times Z_9$
Take $H = \{e\} \times Z_4 \times Z_9$, $K = Z_2 \times \{e\} \times \{e\}$
Then we have to check G is the inner direct product of H, K.
First,it is clearly that $H \triangle G$, $K \triangle G$.
Second, $\forall (a, b, c) \in G$
$\exists (a, b, c) \in H$ and $(a, 0, 0) \in K$ such that $(a, b, c) = (0, b, c) \cdot (a, 0, 0)$
$\Rightarrow G \subset H \times K$.
Third, $H \cap K = \{e\}$.
Therefore, $G = H \times K$.
(b)
Take $H = \{0\} \times Z_4 \times Z_9$,and $K = \{0\} \times Z_2 \times \{0\}$.
Then there exists $(0, 2, 0) \in H \cap K$.
Hence, $G \neq H \times K$.
(c)
Take $H = Z_2 \times \langle 2 \rangle \times Z_9$.
Suppose $\exists\ K < G$ s.t $G = H \times K$ where $|G| = 72$ and $|H| = 36$.
Then $|K| = 2$.
Let $h = \langle (0, 1, 0) \rangle < G$.
Then $|h| = 4$.
But $H \times K$ no subgroup of order 4.
So for any subgroup K of G, $G \neq H \times K$.
(d)
(e)
First, since $\mid G \mid < \infty$, G satisfies ACCN, DCCN.
So, G is the direct product of finite indecomposable normal subgroups.
Second, By Krull-schmit Theorem, $G = G_1 \times G_2 \times \cdots G_k$, where G_i is indecomposable.
Moreover, by (d), G_i is cyclic.
So, $G_i \cong Z_m$ for some m.
By the way, if $m = lk$ for $(l, k) = 1$, then $Z_m \cong Z_l \times Z_k$ is decomposable.
Hence, $m = p_i^{s_i}$.
Thus $G = G_1 \times G_2 \times \cdots \times G_k$(inner product) $\cong G_1 \times G_2 \times \cdots \times G_k$ (direct product) $\cong Z_{p^{s_1}} \times Z_{p^{s_2}} \times \cdots Z_{p^{s_k}}$
(f)
False.
Take $G = G_1 \times G_2 = H_1 \times H_2$, where $G_1 \cong G_2 \cong Z_4$, $H_1 \cong Z_2$, $H_2 \cong Z_8$.
The reason is that $Z_4 \times Z_4 \neq Z_2 \times Z_8$.
Since $\forall x \in Z_4 \times Z_4$, the order of x is at most 4.

But when we take $(0, 1) \in Z_2 \times Z_8$, the order of (0,1) is 8.
Thus, $Z_2 \times Z_4 \neq Z_2 \times Z_8$.
(g)
For $1400 = 2^3 \times 5^2 \times 7$, we have $3 \times 2 \times 1 = 6$ non-isomorphic abelian groups of order 1400.