1.

(a) $Ae^{-3t} + t(Bt^2 + Ct + D)e^{4t} + e^{3t}[(Et + F)\cos 4t + (Gt + H)\sin 4t]$.

Here and below, it does not matter in which order the terms in a sum or product appear, or which coefficients are given which names (as long as they are all given different names), or whether the distributive law is applied. E.g., another correct answer to (a) would be

$$(At + B)e^{3t}\sin 4t + e^{3t}(Ct + D)\cos 4t + e^{4t}(Et^3 + Ft^2 + Gt) + He^{-3t}.$$

Coefficient-names can also be distinguished using subscripts instead of different letters (e.g. $A_1, A_2, A_3, \ldots$ instead of $A, B, C, \ldots$), or by using combinations of subscripts and different letters (e.g. E_1, F_1, E_2, F_2 instead of E, F, G, H).

(b) $(At^2 + Bt + C)e^{2t} + te^{3t}(D\cos 2t + E\sin 2t) + (Ft + G)e^{3t}$.

(c) $(At + B)\cos t + (Ct + D)\sin t + t(Et^2 + Ft + G)e^{2t} + He^{2016t}$.

(d) $Ax^2e^{3x} + e^{3x}(B\cos 2x + C\sin 2x) + (Dx^2 + Ex + F)e^x$.

(e) $e^{4x}(A\cos x + B\sin x) + e^x(C\cos 4x + D\sin 4x) + x^2(Ex + F)e^{4x} + G$.

(f) $A\cos 3t + B\sin 3t + te^{2t}[(Ct + D)\cos 3t + (Et + F)\sin 3t] + Gt^2 + Ht + I + Je^{2t}$.

2.

(a) Yes.
(b) No.
(c) No.
(d) Yes.
(e) No.