(a) Solution:

1: D　　2: A　　3: C　　4: B　　5: E

(b) Proof:

$f = e^{jwu}$

$h(v) = f(u) * g(v) = \sum_u e^{j(v-u)w} g(u) = e^{jvu} \sum_u e^{-jwu} g(u)$

$= e^{jvw} \sum_u e^{-jwu} g(u) = e^{jwv} \left(\sum_u \cos(wu) g(u) + j \sum_u \sin(wu) g(u) \right)$

$= f(v) \cdot (a + bj)$

QED.

(c) $F[u,v] = \sum_{m=-\infty}^{\infty} \sum_{n=-\infty}^{\infty} f(m,n) \cdot e^{-j(mu+nv)}$

$= \sum_{m=-\infty}^{\infty} \sum_{n=-\infty}^{\infty} \left(\sum_{x=-\infty}^{\infty} \sum_{y=-\infty}^{\infty} g(m-x, n-y) \cdot h(x,y) \right) e^{-j(mu+nv)}$

$= \sum_{x=-\infty}^{\infty} \sum_{y=-\infty}^{\infty} h(x,y) \left(\sum_{m=-\infty}^{\infty} \sum_{n=-\infty}^{\infty} g(m-x, n-y)\, e^{-j(mu+nv)} \right)$

Let $m-x = p$　$n-y = q$ $\rightarrow$ $m = x+p$, $n = y+q$

$= \sum_{x=-\infty}^{\infty} \sum_{y=-\infty}^{\infty} h(x,y)\, e^{-j(xu+yv)} \cdot \sum_{p=-\infty}^{\infty} \sum_{q=-\infty}^{\infty} g(p,q) \cdot e^{-j(pu+qv)}$

$= H[u,v] \cdot G[u,v]$

(e) If Gaussian has large variance σ, its fourier transform will have low variance and vice versa.

2.2 (b)

The higher level of pyramids and reconstruction correspond to better blending resnlt.