(A) $\Sigma = LL^T = \begin{pmatrix} l_{11} & l_{12} \\ l_{21} & l_{22} \end{pmatrix} \begin{pmatrix} l_{11}^T & l_{21}^T \\ l_{12}^T & l_{22}^T \end{pmatrix}$ ($k\times k$, $k\times(p-k)$)

$= \begin{pmatrix} l_{11}l_{11}^T + l_{12}l_{12}^T & l_{11}l_{21}^T + l_{12}l_{22}^T \\ l_{21}l_{11}^T + l_{22}l_{12}^T & l_{21}l_{21}^T + l_{22}l_{22}^T \end{pmatrix} = \begin{pmatrix} \Sigma_{11} & \Sigma_{12} \\ \Sigma_{21} & \Sigma_{22} \end{pmatrix}$

$X = LZ + \mu$

$\begin{pmatrix} X_1 \\ X_2 \end{pmatrix} = \begin{pmatrix} l_{11} & l_{12} \\ l_{21} & l_{22} \end{pmatrix} \begin{pmatrix} Z_1 \\ Z_2 \end{pmatrix} + \begin{pmatrix} \mu_1 \\ \mu_2 \end{pmatrix} = \begin{pmatrix} l_{11}Z_1 + l_{12}Z_2 + \mu_1 \\ l_{21}Z_1 + l_{22}Z_2 + \mu_2 \end{pmatrix}$

So $X_1 = l_{11}Z_1 + l_{12}Z_2 + \mu_1$

$M_{X_1}(t) = E\left[\exp\left(t^T(l_{11}Z_1 + l_{12}Z_2 + \mu_1)\right)\right]$

$= e^{t^T\mu_1} E\left(e^{t^T l_{11}Z_1}\right) E\left(e^{t^T l_{12}Z_2}\right)$

$= \exp\left[t^T\mu_1 + \frac{1}{2}t^T l_{11}l_{11}^T t + \frac{1}{2}t^T l_{12}l_{12}^T t\right]$

$= \exp\left[t^T\mu_1 + \frac{1}{2}t^T(l_{11}l_{11}^T + l_{12}l_{12}^T)t\right]$

$= \exp\left(t^T\mu_1 + \frac{1}{2}t^T\Sigma_{11}t\right)$

So $X_1 \sim N(\mu_1, \Sigma_{11})$