TIME: 90min **KING SAUD UNIVERSITY** **FULL MARKS: 40**

M - 107 **DEPARTMENT OF MATHEMATICS**

(SEMESTER II, 1422-1423) FIRST MID-TERM

NOTE: Attempt all Questions.

Question: 1 (a) **Use Gaussian - elimination method to solve**

$$\begin{aligned} 2x + 2y + 2z &= 0 \\ -2x + 5y + 2z &= 1 \\ 8x + y + 4z &= -1. \end{aligned}$$ **[7]**

(b) Let A = $\begin{bmatrix} 1 & 2 \\ 3 & 8 \end{bmatrix}$, $f(x) = x^2 - 4x + 6$, Find $f(\mathrm{A})$. **[6]**

Question: 2(a) . If A = $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{bmatrix}$**, find the inverse of A by using Elementary matrix method.**

[8]

(b) Find condition on a, b, and c for which the following system is consistent,

$$\begin{aligned} x - 2y + 5z &= a \\ 4x - 5y + 8z &= b \\ -3x + 3y - 3z &= c \end{aligned}$$ **[6]**

Question :3(a) . Let A = $\begin{bmatrix} 0 & 4 & 1 \\ 2 & 3 & 4 \\ -2 & 3 & 1 \end{bmatrix}$ **,**

(i)find adj(A),

(ii) find det(A) by using the cofactor expansion. **[8]**

(b) By using elementary row operations, evaluate **[5]**

$$\begin{vmatrix} 2 & 0 & 12 & -1 \\ 4 & 0 & 0 & -2 \\ 0 & -1 & 4 & -1 \\ 0 & -2 & 8 & 0 \end{vmatrix}$$