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Here,

$a = 1$

$b = 1$

$c = 5$

$d = 1$

Ans to the Que No: 1

① Dataset:

X	1	5	5	1
Y	4	1	6	1

② Calculate the ~~features~~ Mean of features:

$$\bar{X} = \frac{1}{4}(1+5+5+1) = 3$$

$$\bar{Y} = \frac{1}{4}(4+1+6+1) = 3$$

(iv) Covariance Matrix :

$$C = \begin{bmatrix} cov(x,x) & cov(x,y) \\ cov(y,x) & cov(y,x) \end{bmatrix}$$

$$cov(x,x) = \frac{1}{N-1} \sum_{K=1}^{N} (x_{1K} - \bar{x})^2$$

$$= \frac{1}{3} \{ (1-3)^2 + (3-3)^2 + (5-3)^2 + (1-3)^2 \}$$

$$= \frac{1}{3} (4 + 4 + 4 + 4)$$

$$= \frac{1}{3} \times 16$$

$$= 5.33$$

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$$\mathrm{cov}(x,y) = \frac{1}{N-1}\sum_{k=1}^{N}(x_k-\bar{x})(y_k-\bar{y})$$

$$= \frac{1}{4-1}\{(1-3)(4-3)+(5-3)(1-3)+(5-3)(6-3)$$

$$+(1-3)(1-3)\}$$

$$= \frac{1}{3}\{(-2)+(-4)+6+4\}$$

$$= 1.33$$

$$\mathrm{cov}(y,x) = \frac{1}{N-1}\sum_{k=1}^{N}(y_k-\bar{y})(x_k-\bar{x})$$

$$= 1.33$$

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$$\text{Cov}(Y,Y) = \frac{1}{N-1}\sum_{K=1}^{N}(Y_K - \bar{Y})$$

$$= \frac{1}{3}\left\{(4-3)+(1-3)+(6-3)+(1-3)\right\}$$

$$= \frac{1}{3} \times 18$$

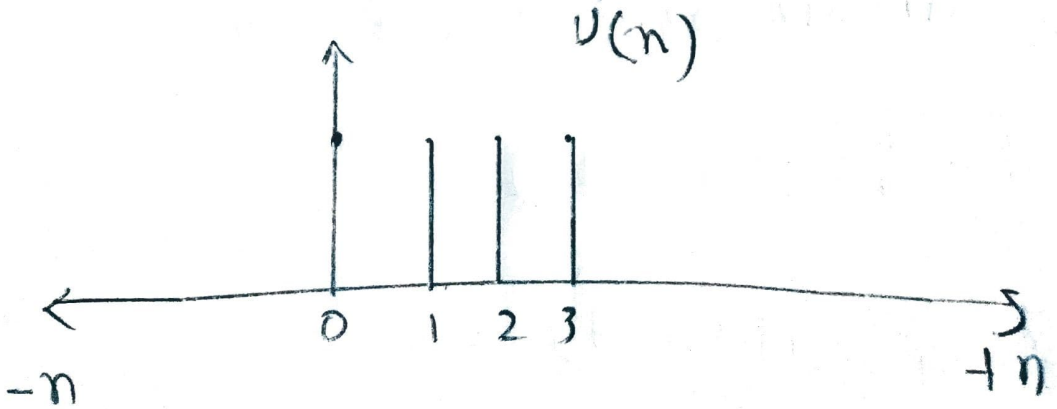
$$= 6$$

Que. No: 2

(1)

Unit Step Signal : $U(n)$

$$u(n) = \begin{cases} 1, & n \geq 0 \\ 0, & n < 0 \end{cases}$$



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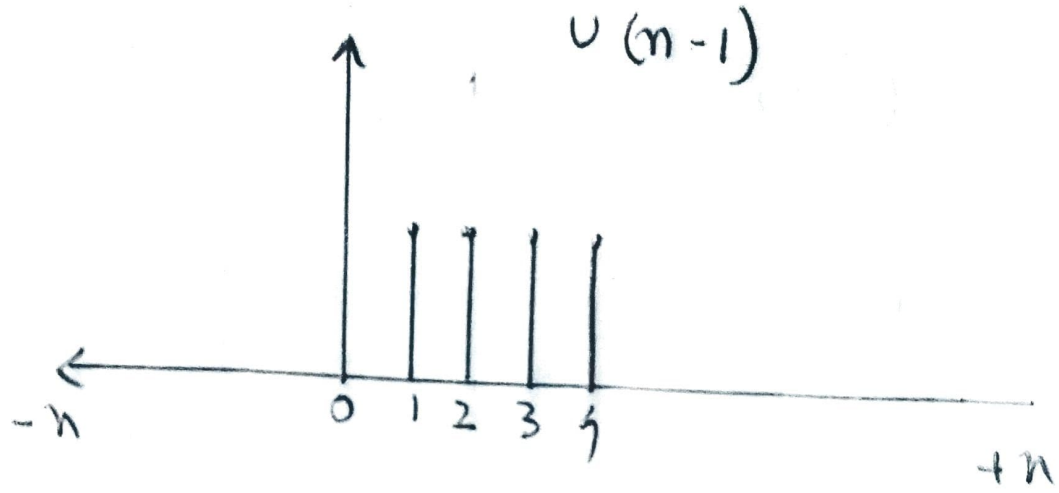

(12) $r(n+c)$

$= r(n+5)$

$$r(n) = \begin{cases} n, & n \geq 0 \\ 0, & n < 0 \end{cases}$$