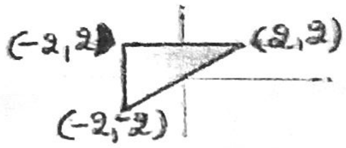
Vivekananda College of Engineering & Technology, Puttur [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®] Affiliated to VTU, Belagavi & Approved by AICTE New Delhi			
CRM08	Rev 1.11	BS	28/07/22

CONTINUOUS INTERNAL EVALUATION - 2

Dept:BS (MAT)	Sem / Div: IV / A	Sub : Engineering statistics & Linear algebra	S Code: 18EC44
Date:04-08-2022	Time: 3:00 PM-4:30 PM	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN		Questions	Marks	RBT	CO's
		PART A			
1	a.	A bivariate PDF for the discrete random variable X and Y is $0.2\,\delta(x)\,\delta(y)+0.3\,\delta(x-1)\,\delta(y)+0.2\,\delta(x)\,\delta(y-1)+c\,\delta(x-1)\delta(y-1)$ **(i)**What is the value of c **(ii)**What are the PDF's of X and Y **(iii)**What are the marginal CDF's of X and Y	8	L2	CO2
	b.	Define correlation coefficient of random variables X and Y. Show that it is bounded by limits ± 1.	8	L2	CO2
	c.	The joint PDF of $f_{XY}(x,y)=c$ a constant when $0<x<3$ and $0<y<4$ and is 0 otherwise. **(i)**What is the value of c **(ii)**What are the PDF's for X and Y **(iii)**What are $f_{XY}(x,\infty)$ and $f_{XY}(\infty,y)$ **(iv)**Are X and Y independent.	9	L2	CO2
		OR			
2	a.	If X and Y are bi-variate independent random variables show that X and Y are uncorrelated.	8	L2	C02
	b.	Suppose the joint p.m.f of a bivariate random variable (X, Y) is given by $P_{XY}(x,y)=\frac{1}{3}\,for\,(0,1),(1,0),(2,1)$ and is 0 *otherwise*. Find (a) Are X and Y uncorrelated	8	L2	CO2

		(b)Are X and Y independent.			
	c.	Shown in Fig. is a region in the x, y plane where the bivariate pdf $f_{XY}(x,y)=c$ elsewhere, the pdf is 0. (i) What value must c have? (ii) Evaluate F_{XY} (1,1). (iii) Find the pdfs of X and Y. 	9	L2	CO2

PART B

3	a	Define inner product space and orthonormal set of vectors. Find the matrix of projection on the line through a=(1,3,2).	8	L3	CO4
	b	1) Reduce the matrix A to U and find det(A) using pivots of A (i) $A=\begin{bmatrix}1&2&3\\2&2&3\\3&3&3\end{bmatrix}$ (ii) $B=\begin{bmatrix}2&5&3\\1&2&4\\-1&3&6\end{bmatrix}$	8	L1	CO4
	c	Apply Gram-Schmidt process to , $A=\begin{bmatrix}1\\0\\1\end{bmatrix}$, $B=\begin{bmatrix}1\\0\\0\end{bmatrix}$ & $C=\begin{bmatrix}2\\1\\0\end{bmatrix}$ find orthonormal basis & write the result in the form A=QR.	9	L3	CO4

OR

4	a	Find the projection of b onto the column space of A also find a least square solution of the system Ax=b for A and b given below $A=\begin{bmatrix}1&2\\1&3\\0&0\end{bmatrix}$; $b=\begin{bmatrix}4\\5\\6\end{bmatrix}$	8	L3	CO4
	b	By applying row operations produce an upper triangular matrix U and find out det(A) $A=\begin{bmatrix}3&1&4&2\\1&5&2&6\\2&3&7&1\\4&1&2&3\end{bmatrix}$	8	L1	CO4
	c	If u=(1,2,2), v=(2,-2,1), w=(2,1,-2), then show that u,v,w are pairwise orthogonal vectors. Find lengths of u,v,w and find orthonormal vectors u_1,v_1,w_1 from u,v,w.	9	L3	CO4

Prepared by: Prof. Shreesharanya U R HOD: Prof. M Pa[illegible]anandaKamath