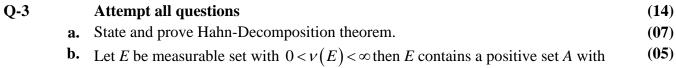
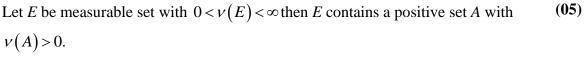
	Envolln	ant No.		Evam Soot No.			
	Emonnent		No: Exam Seat No:				
	C.U.SHAH UNIVERSITY Summer Examination-2020 Subject Name: Advanced Real Analysis						
	Subject Code: 5SC03ARA1		5SC03ARA1	Branch: M.Sc. (Mathematics)			
	Semeste	er: 3	Date: 25/02/2020	Time: 02:30 To 05:30	Marks: 70		
	Instruct	tions:					
	(1) Use of Programmable calculator and any other electronic instrument is prohibited.(2) Instructions written on main answer book are strictly to be obeyed.						
			eat diagrams and figures (if ne				
	(4)	Assume	suitable data if needed.				
			SEC	TION – I			
Q-1		Attemp	ot the Following questions		(07)		
	a.		σ - finite measure		(01)		
	b.		s the mean of Signed measure	space?	(02)		
	с.		Complete measure		(02)		
	d.	Define:	Mutually singular measure		(02)		
Q-2	ı	Attemp	ot all questions		(14)		
	a.	Suppos	$e v_1$ and v_2 are two finite signe	ed measure on (X, A) then show t	that (06)		
		$\alpha v_1 + \mu$	$3v_2$ is also signed measure, fo	r any $\alpha, \beta \in R$. Further prove the	following:		
		i) $ \alpha v_1 $	$= \alpha \nu_1 $ and ii) $ \nu_1 + \nu_2 \le \nu_1 $	$+ \upsilon_2 $.			
	b.	State ar	nd prove Beppo-levi's theorer	n.	(04)		
	c.	If E_1, E_2	$\mu_2 \in \mathcal{A}$ then show that $\mu(E_1 \Delta E_2)$	$\mu(E_1) = 0 \Rightarrow \mu(E_1) = \mu(E_2)$. Moreov	ver if μ is (04)		
		comple	te and $E_1 \in \mathcal{A}$ with $\mu(E_1 \Delta E_2)$	$=0$ then $E_2 \in \mathcal{A}$			
				OR			
Q-2	,	Attemp	ot all questions		(14)		
	a.		nd prove Lusin's theorem.		(08)		
	b.	State an	nd prove Lebesgue Dominated	d Convergence theorem.	(06)		







	c.	Define: Absolutely continuous measure	(02)			
		OR				
Q-3		Attempt all questions				
	a.	State and prove Jordan Decomposition theorem.	(08)			
	b.	Define: Positive set and prove that countable union of positive set is positive set.	(04)			
	c.	Let (X, \mathcal{A}) be a measurable space if $\lambda \& \mu$ are two measure on (X, \mathcal{A}) with	(02)			
		$\lambda \perp \mu$ and $\lambda \ll \mu$ then $\lambda = 0$.				
		SECTION – II				
Q-4		Attempt the Following questions				
	a.	Define: Product measure space	(01)			
	b.	State Tonelli's theorem.	(02)			
	c.	What is the mean of conjugate pair of real numbers?	(02)			
	d.	Suppose $f \in L^p(\mu)$ and $f = g$ a.e. and μ be a complete measure then $g \in L^p(\mu)$.	(02)			
Q-5		Attempt all questions (
	a.	State and prove Radon-Nikodym theorem.	(10)			
	b.	Show that Holder's inequality is an equality if $\alpha f ^p = \beta g ^q$ a.e. on X, for	(04)			
		some $\alpha, \beta \in R - \{0\}$.				
		OR				
Q-5		Attempt all questions	(14)			
	a.	State and prove Riesz-Ficher's theorem.	(08)			
	b.	Prove that <i>X</i> is Banach space if and only if every absolutely summable series is summable.	(06)			
Q-6		Attempt all questions	(14)			
	a.	Prove that L^p spaces are complete spaces.	(08)			
	b.	Prove the set of all simple measurable function f vanishing outside a set of finite	(06)			
		measure is dense in $L^p(\mu)$, where $1 \le p < \infty$.				
		OR				
Q-6		Attempt all Questions	(14)			
	a.	State and prove Caratheodory theorem.	(09)			
	b.	What is the Riesz representation theorem? Explain it with proof.	(05)			

