CODE : 4313 B.Sc.EXAMINATION,March/ April

SEMESTER –V

PAPER NO:M-502 MATHEMATICAL ANALYSIS-I March-2015

TIME:2:30 HOURS TOTAL MARKS:70

INSTRUCTIONS: (1) All questions are compulsory.
(2) Each question carries equal marks.

Q.1	A	If $f \in R[a,b]$ and $g \in R[a,b]$,then prove that $f+g \in R[a,b]$.	07
	B	Every monotonic function is R-integrable over [a,b]	07
		OR	
Q.1	A	Prove that $\frac{\pi^3}{51} \le \int_0^{\pi} \frac{x^2}{10+7\cos x} dx \le \frac{\pi^3}{9}$	07
	B	Find L(P , f) and U(P, f) for function $f(x) = \frac{10}{x}$, $x \in [2,20]$ with partition P = {2,4,5,20}	07
Q.2	A	State and prove condition of R- integrability.	07
	B	State and prove second mean value theorem.	07
		OR	
Q.2	A	Prove that neighbourhood of a point in a Matric space is a open set.	07
	B	$f:[0,1] \to R$, $f(x) = x^2$, then prove that $f \in R[0,1]$ and find $\int_0^1 x^2 dx$	07
Q.3	A	If (X , d) is a discrete matric space , then prove that $0 < \delta \le 1 \Rightarrow N(a,\delta) = \{a\}$ and $\delta > 1 \Rightarrow N(a,\delta) = X$.	07
	B	State and prove Hausdroff' s property for metric space.	07
		OR	
Q.3	A	Prove that closure of any subset of metric space is closed.	07
	B	If (X , d) is matric space ,then prove that $(X , \frac{d}{1+d})$ is also matric space.	07
Q.4	A	Define pseudo matric space and give an example of matric space which is pseudo matric space but not matric space.	07
	B	Prove that sum of two metric spaces is also metric space.	07
		OR	
Q.4	A	Prove or disprove: (i) $\overline{A \cup B} = \bar{A} \cup \bar{B}$. (ii) $\overline{A \cap B} = \bar{A} \cap \bar{B}$.	07
	B	(X , d) is metric space . $E \subset X$ is open if and only if $X - E$ is closed .	07
Q.5	A	Prove that every open sphere is open set.	07
	B	Define : boundary point , isolated point , dense set , perfect set Cauchy sequence , convergent sequence , closure .	07
		OR	
Q.5	A	Prove that every convergent sequence is Cauchy , but converse is not true.	07
	B	Define : isolated point, Boundary point , Dense set and prove that set of rational number is dense in R.	07