SEMESTER	IV	QP CODE	4201

P.R. GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
SEM END EXAMINATIONS SEPTEMBER 2023
II.BSC MATHS STREAM: MATHEMATICS – PAPER 4

DATE & SESSION	05.09.2023 AN	REG NO								MAX MARKS	50

SECTION –A

Answer any THREE questions.
Each question carries 10 marks

3x10=30M

PART-A

1. State and prove Cauchy's general principal of convergence.
2. State and prove D'Alemberts ratio test.
3. Determine the constants a,b so that the function f defined by f(x)= 2x+1 if x≤1 ; f(x)= ax^2+b if 1<x<3 and f(x)= 5x+2a if x≥3 is continuous every where.

PART-B

4. State and prove Rolle's theorem.
5. Show that the necessary and sufficient condition for a bounded function f:[a,b]->R to be Riemann integrable is for each $\in > 0$ there exists a partition of [a,b] such that $0 \le U(P,f)-L(P,f) < \in$.
6. Test for the convergence of 1) $\sum_{n=1}^{\infty}(\sqrt[3]{n^3+1}-n)$ 2) $\sum(-1)^{n-1}\left[\sqrt{n+1}-\sqrt{n}\right]$

SECTION-B

Answer any FOUR questions.
Each question carries 5 marks.

4x5=20M

7. Show that $\lim_{n\to\infty}\left(\frac{1}{(n+1)^2}+\frac{1}{(n+2)^2}+\ldots\ldots+\frac{1}{(n+n)^2}\right)=0$
8. Test for the convergence of $\sum(1+\frac{1}{\sqrt{n}})^{-n^{3/2}}$
9. Show that f:R->R is defined by f(x)=x if $x \in R-Q$ and f(x)=-x if $x \in Q$ is continuous only at 0.
10. Find C of Cauchy mean value theorem for $f(x)=\sqrt{x}$ and g(x)= $\frac{1}{\sqrt{x}}$ in [a,b] where 0<a<b
11. If f(x)= $x^3+1 \forall x \in [0,1]$ *and* P= $\{0,1/3,2/3,1\}$ is a partition on [0,1] then then find W(P,f).
12. By considering the integral $\int_0^1 \frac{1}{1+x}dx$ show that $\log 2 = \lim_{n\to\infty}\left[\frac{1}{n+1}+\frac{1}{n+2}+\ldots+\frac{1}{2n}\right]$
13. Test for the converges $\Sigma \frac{1}{2^n+3^n}$