SRI A.S.N.M. GOVT.COLLEGE (A), PALAKOL,W.G.DT

(Affiliated to Adikavinannaya University, Rajamahendravaram)

II BSC Degree Examinations at the End of IVSemester (CBCS)

SUBJECT – MATHEMATICS

REAL ANALYSIS

Time: 3 Hours | Max. Marks: 75

Answer any FIVE questions each question carriers Five marks : 5X5=25 M

1. Prove that Every convergent sequence is bounded .
2. Test for the convergent of the series $\frac{1}{2}+\frac{1.3}{2.5}+\frac{1.3.5}{2.5.8}+$---------
3. Test for the convergent for $\sum_{n=1}^{\infty}\frac{1}{2^n+3^n}$
4. Examine the continuity of the function defined by $f(x) = |x| +|x-1|$ at $x=0,1$
5. Verify Rolle's theorem in the interval [a,b] for the function $(x-a)^m$ $(x-b)^n$ being +ve integers .
6. Prove that $f(x)=x\left(\frac{e^{\frac{1}{x}}-1}{e^{\frac{1}{x}}+1}\right)$ if $x\neq0$ and $f(0)=0$ is continuous at $x=0$ but not derivable at $x=0$
7. Evaluate $\int_0^{\pi/4}(sec^4x-\tan^4x)dx$
8. Prove that $1/4<\int_0^{1/4}\frac{1}{\sqrt{1-x^2}}dx<1/\sqrt{15}$

SECTION –B

Answer any FIVE questions at least Two from each part .Each questions carries Ten marks: 5X10=50M

PART-A

9.Prove that a monotonic sequence is convergent if and only if it is bounded.

10.Prove that $\lim_{n\to\infty}\left[\frac{1}{(n+1)^2}+\frac{1}{(n+2)^2}----\mp\frac{1}{(n+n)^2}\right]=0$

11.State and prove the Cauchy's n^{th} root test

12.If $S_n=\frac{1}{1.2}+\frac{1}{2.3}\pm----\frac{1}{n(n+1)}$ prove that sequence S_n is convergent

13.If f is continuous on [a,b] then prove that f is bounded and attains its infimum and suprimum.

PART-B

14.If f is continuous on [a,b] then prove that f is uniformly continuous on [a,b].

15 State and prove the Lagrange's mean value theorem.

16.Find C of Cauchy's mean value theorem for $f(x)=\sqrt{x}$ and $g(x)=\frac{1}{\sqrt{x}}$ in [a,b] where o<a<b

17.If $f:[a,b]\rightarrow R$ is continuous on [a,b] then prove that f is integrable on [a,b].

18 State and prove the Fundamental theorem of integrals calculus.