TEST SERIES -1
CLASS B.A-2/B.SC-2
(ANALYSIS)

Section-A

1(a) If f be bdd function defined on [a,b], then $\int_{-a}^{b} fdx \leq \int_{a}^{-b} fdx$. (4)

(b) Show that the function defined by f(x) = $\begin{cases} 2, x \in Q \\ 1, x \in Q' \end{cases}$ is not integrable on any interval. ($3\frac{1}{2}$)

2(a) Proceeding From the defination compute the integral $\int_{a}^{b} x^m dx$. (5)

(b) If f is a non negative cont function on [a,b] and $\int_{a}^{b} f(x)dx = 0$ prove that f(x)=0 ($2\frac{1}{2}$)

3(a) If f is R-integrable on [a,b] and F is a function defined on [a,b] s.t. $F'(x) = f(x)$ then.
$\int_{a}^{b} f(x)dx = F(b) - F(a)$ (4)

(b) If 0<a<b , show that $\left|\int_{a}^{b} \frac{\sin x}{x} dx\right| \leq \frac{2}{a}$. ($3\frac{1}{2}$)

4.If a function f defined on [a,b] is bdd and has a finite number of pts of discontinuity , then f is R.I. ($7\frac{1}{2}$)

Section-B

5(a) Prove that the seq $\left\{\left(1+\frac{3}{n}\right)^n\right\}$ is monotonically increasing and bdd.Prove that it cgt to the limit e^3 .
(4)

(b) Prove that the series $\sum_{n=2}^{\infty} a_n$ where $a_n = \frac{1}{n^p (\log n)^q}$ cgs if either p>1 or p=1and q>1.

(3)

(6) Prove that NASC for the the cgs of a seq of a real nos is that it is a cauchy seq.
(7)

(7)(a) Discuss the cgs of series $\sum_{n=1}^{\infty} \frac{1}{x^n + x^{-n}}$,x>0.

(4)

(b) Show that the seq $\{a_n\}$ where $a_n = 1 + \frac{1}{2} + \frac{1}{3} + \ldots\ldots\ldots + \frac{1}{n}$ does not cgt, by showing that it is not cauchy seq.
(3)

8(a) State and prove cauchy's Root test.
(4)

(b) Test the series $1 + \frac{\alpha\beta}{1\gamma} x + \frac{\alpha(\alpha+1)\beta(\beta+1)}{1.2\gamma(\gamma+1)} x^2 + \ldots\ldots\ldots$ for cgs

(3)

Section –c

9(a)Define Partition, refinement, lower R.I,upper R.I.

(b) Show that $\int_0^1 [5x] dx = 2$.

(c)Prove that $\int_0^1 x^2 dx \le \int_0^1 \sqrt{x} dx$.

(d)Prove that seq $\left\{ \left(1 + \frac{1}{n}\right)^n \right\}$ is bdd

(e) show that $\lim_{n \to \infty} \left[\frac{(n+1)(n+2)\ldots\ldots(n+n)}{n^n} \right]^{\frac{1}{n}} = \frac{4}{e}$.

(f) If $\sum_{1}^{\infty} a_n$ is cgt , then prove that $\underset{n\to\infty}{lt}\, a_n = 0$.

(g) Discuss the cgs $\sum (-1)^{n-1}\frac{n+1}{n}$.

(h) Define Ratio test.

(i) Define Gauss,s test (j) Define logrithem's test 10 x 1 =10