

PAPER CODE –

M. Sc. Semester-I Examination, 20XX
MATHEMATICS

Paper No. - XXX
[Real Analysis - I]

Time: Three hours

Maximum Marks: 80
 Passing Marks: 29

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Note: (1) Section -A is compulsory containing 10 objective type questions of 10 marks and 5 short answer type questions of 10 marks. (2) Section-B containing 8 descriptive type questions with 50% internal choice carrying 15marks for each

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Section - "A"

Q.1 Answer the following questions --

(1X10= 10) Marks

- i. Write the name of Mathematicians who had published the definition Riemann–Stieltjes integral.
- ii. What is the Fifth term of sequence $a^n = 2n-3$?
- iii. Write the name of theorem that helps evaluate certain Cauchy-type integrals.
- iv. Which Theorem ensures compactness of closed and bounded sets in R^n
- v. Write the Sum of first fifteen terms of series $5+10+20+\dots$
- vi. Which method is employed for testing the convergence of a series?
- vii. For any summation method L , the result that if $c = (c_n)$ is a convergent sequence, with limit C , then $L(c) = C$ based on which theorem
- viii. Osgood–Hobson theorem is concerned to which series?
- ix. In mathematics, which test is used for the convergence of an infinite series.
- x. Write the name of Author of any Reference book of REAL ANALYSIS.

Q.2 Answer the following questions --

(2X5= 10) Marks

- i. Point out the differences between Integration and differentiation.
- ii. What do you understand by Darboux sums?

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- iii. List the mathematical theorems named after Karl Weierstrass.
- iv. Briefly comment on Abel's test in Mathematics
- v. What is Contraction principle?

Section - "B"

Attempt any four questions --

4 x 15 = 60 Marks

- Q.3.** What is the Fundamental theorem of Calculus? Find out the integration of vector-valued function Rectifiable curves.
- Q.4.** Write short notes on –
 (i) Properties of integral (ii) Implicit function theorem
- Q.5.** What do you mean by Linear Transformation? Determine its derivatives in an open subset of R^n .
- Q.6.** Write a brief account of –
 (i) Differentiation of Integrals
 (ii) Weierstrass Approximation Theorem
- Q.7.** What do you mean by Uniform Convergence? Elaborate the mathematical test employed for Uniform Convergence?
- Q.8.** Write a brief account of -
 (i) Weierstrass M-test (ii) Abelian and Tauberian theorems
- Q.9.** Give critical account of Inverse function theorem and evaluate its derivatives of higher orders.
- Q.10.** Discuss the Uniqueness theorem for Power series with required components

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