QP CODE: 24800576

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Reg No : ....

Name : ....

INTEGRATED MSC DEGREE EXAMINATION, DECEMBER 2023

Sixth Semester

NTEGRATED MSC BASIC SCIENCE-STATISTICS

CORE - IST6CR01 - REAL ANALYSIS II

2020 Admission Onwards

DE8185AB

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is finite set with an example?
2. What is perfect set?
3. What is the concept of limit?
4. Define function and also write down two examples of functions.
5. State Taylor's Theorem
6. Write any few properties of Riemann integral.
7. State Lebesgue's Integrability Criterion.
8. State first form of the integral calculus.
9. How do you integrate vectors?
10. Distinquish between pointwise and uniform convergence of sequence of functions.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. State and prove uniqueness of limit.
12. State and prove additive property of limit.

13. Suppose y= f(x) is continuous on [a,b] and differentiable on the interval interior (a,b) . Then there is atleast one point c in (a,b) at which $\frac{f(b)-f(a)}{b-a} = f'(c)$. Prove it.

14. Evaluate $\lim_{x \to 0} \frac{(1-cosmx)}{(1-cosnx)}$.

15. Let f: [0,5] → R be defined by f(x) = 3 , for all x € [0,5]. Show that f is Riemann integrable.

16. If ϕ:[a,b] $\rightarrow$ R is a step function ,thenϕ € R[a,b]

17. Briefly explain sequences of functions and limit function of the sequence.

18. Let (f_n) be a sequence of real valued continuous functions on a set $A \subseteq R$ and suppose that (f_n) converges uniformly on A to a function $f : A \rightarrow R$. Then f is continuous on A

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19.
1. Explian discontinuity and different types of discontinuities.
2. Find the type of discontinuity if it exists for the following function:

$$f(x) = \frac{sin2x}{x}, x \neq 0$$
$$= 1, x = 0$$

20. State and prove Cauchy Criterion.

21. State and prove the linearity property of Riemann Integral.

22. Examine whether the series $\sum_1^{10} \frac{1}{n^3+n^4x^2}$ is differentiable term by term

(2×5=10 weightage)