2020

MATHEMATICS HONOURS

Paper: CC-3

Internal Assessment

Full Marks: 10

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Notations and symbols have their usual meaning.

Answer all questions: 2×5

1. Which of the following series is convergent

a) $\sum_{n=1}^{\infty} 2^n$ b) $\sum_{n=1}^{\infty} 2$ c) $\sum_{n=1}^{\infty} 2^{-n}$ d)None

2. The series $\sum \frac{1}{n^p}$ is convergent if

a) $p \geq 1$ b) $p>1$ c) $p<1$ d) $p \leq 1$

3. The sequence $\{1+(-1)^n\}$ has

a) no limit points b) 0 is the only one limit point

c) limit points 1, -1 d) limit points 0, 2 .

4. Find the correct one:

a) $\underline{\lim} a_n + \underline{\lim} b_n \geq \underline{\lim}(a_n + b_n)$ b) $\underline{\lim}\, a_n + \overline{\lim}\, b_n \geq \overline{\lim}(a_n + b_n)$

c) $(\underline{\lim} a_n)(\overline{\lim}\, b_n) \leq \overline{\lim}\,(a_n b_n)$ d) $(\overline{\lim}\, a_n)(\overline{\lim}\, b_n) \leq \overline{\lim}\,(a_n b_n)$

5. If $f: A \to B$ be a mapping and B is countable then which one is true

a) A is definitely countable b) if f is onto then A is countable

c) if f is one-one then A is countable d) none of these.

2020
MATHEMATICS HONOURS
Paper: CC-3
Theory Examination
Full Marks: 32

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
Notations and symbols have their usual meaning.

Answer any FOUR questions: 8×4

1. Prove that the derived set of a set is closed.
2. State and prove the necessary and sufficient condition for the convergence of monotonic sequence.
3. Test the convergence of the series $\sum_{n=2}^{\infty} \frac{1}{n^2-1}$
4. Prove that the series $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$ diverges to ∞
5. Use Comparison Test to check the convergency of the given series

$$\sum a_n = 1 + \frac{2}{1!} + \frac{2^2}{2!} + \frac{2^3}{3!} + \ldots\ldots\ldots$$