

Assignment – 5

- 1) The sequence  $\left\{ \frac{n}{n+1} \right\}$  is
- a) A Cauchy sequence
  - b) Not a Cauchy sequence
  - c) Not a convergent sequence
  - d) None of the above

Answer: a)

- 2) Which of the following statement is correct in the set of real numbers?
- a) Every Cauchy sequence is unbounded
  - b) Every Cauchy sequence is divergent
  - c) Every contractive sequence is not a Cauchy sequence
  - d) Every Cauchy sequence is bounded

Answer: d)

- 3) The sequence  $\{s_n\}$ , where  $s_n = \begin{cases} 2, & \text{when } n \text{ is even} \\ \text{lowest prime factor } (\neq 1) \text{ of } n, & \text{when } n \text{ is odd} \end{cases}$  is a
- a) Convergent sequence
  - b) Divergent sequence
  - c) Cauchy sequence
  - d) None of the above

Answer: b)

- 4) The sequence  $\left\{ \frac{3+2\sqrt{n}}{\sqrt{n}} \right\}$  is
- a) A Cauchy sequence
  - b) Not a Cauchy sequence
  - c) Not a convergent sequence
  - d) None of the above

Answer: a)

- 5) The sequence of Fibonacci fractions  $x_n = \frac{f_n}{f_{n+1}}$ , where  $f_1 = f_2 = 1$  and  $f_{n+1} = f_n + f_{n-1}$  is
- a) Not a Cauchy sequence
  - b) A divergent sequence
  - c) A contractive sequence
  - d) Not a contractive sequence

Answer: c)

- 6) The sequence  $\{\ln(n)\}$  is
- a) A Cauchy sequence
  - b) Not a Cauchy sequence
  - c) A convergent sequence
  - d) None of the above

Answer: b)

- 7) Which of the following is convergent series?

- a)  $\sum_{n=1}^{\infty} \cos \frac{1}{n}$
- b)  $\sum_{n=1}^{\infty} \cos \frac{1}{\sqrt{n}}$
- c)  $\sum_{n=1}^{\infty} \cos \frac{1}{n^2}$
- d) None of the above

Answer: d)

- 8) The series  $\sum \frac{1}{n^p}$  converges if

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

Answer: b)

- 9) If a series  $\sum u_n$  of positive monotonic decreasing terms converges then

- a)  $u_n \searrow 0$
- b)  $nu_n \rightarrow 0$
- c)  $nu_n \searrow 0$
- d) None of the above

Answer: b)

- 10) The subsequence of the sequence  $(\sin \frac{1}{n})$  is

- a)  $(\sin \frac{1}{\ln(n)})$
- b)  $(\sin \frac{1}{e^n})$
- c)  $(\sin \frac{1}{\sqrt{n}})$
- d)  $(\sin \frac{1}{n!})$

Answer: d)