Quiz 1

* Required

1. Email address *

2. Roll No. (Ex: S2019XXXXXXX) *

3. Name *

4. Interval of convergence of the power Series *

$$\sum_{n=1}^{\infty} \frac{1}{n}x^n = x + \frac{1}{2}x^2 + \frac{1}{3}x^3 + \frac{1}{4}x^4 + \dots$$

Mark only one oval.

- [ ] [-1,1]
- [x] [-1,1)
- [ ] (-1,1)
- [ ] (-1,1]

5. The numerical value of limit of the following series using Ratio test is *

$$\sum_{n=1}^{\infty} \frac{9^n}{(-2)^{n+1} n}$$

Mark only one oval.

- 2/9
- 9
- 2
- 9/2

6. The infinite series *

$$\sum_{n=1}^{\infty} \frac{9^n}{(-2)^{n+1} n}$$

Mark only one oval.

- Converges
- Diverges

7. The numerical value of the limit of the following series using root test is *

$$\sum_{n=0}^{\infty} \left(\frac{5n - 3n^3}{7n^3 + 2} \right)^n$$

Mark only one oval.

- 7/3
- 5/2
- 3/7
- 2/5

8. The infinite series *

$$\sum_{n=0}^{\infty} \left(\frac{5n - 3n^3}{7n^3 + 2} \right)^n$$

Mark only one oval.

- [x] Converges
- [ ] Diverges

Quiz 2

* Required

1. Email address *

2. Roll number *

3. Name *

4. Which of the following is not true? *

Mark only one oval.

- [ ] Non point wise convergence imply non Uniform convergence
- [x] Non Point wise convergence implies uniform convergence
- [ ] Uniform convergence implies point wise convergence
- [ ] Point wise convergence need not imply uniform convergence

5. For point wise convergence the value of N *

Mark only one oval.

- [ ] only epsilon
- [x] both epsilon and x
- [ ] only x
- [ ] none of the above

6. The value of N for uniform convergence depends on *

Mark only one oval.

- [ ] only x
- [x] only epsilon
- [ ] both epsilon and x
- [ ] neither of x and epsilon
- [ ] Option 5

7. The sequence of functions: 1/(n+x) is _____ on any interval [a,b], b>0. *

Mark only one oval.

- [x] Uniformly and point wise convergent
- [ ] only uniformly convergent
- [ ] only point wise convergent
- [ ] not convergent

8. The sequence of functions x^n is point wise convergent to zero function in the interval *

Mark only one oval.

- [ ] [0,1]
- [x] [0,1)
- [ ] (0,1)
- [ ] (0,1]

Quiz 3

* Required

1. Email address *

2. Roll No. *

3. Name *

4. The series of functions *

$\sum_{n=1}^{\infty} \frac{\cos nx}{n^2}$

Mark only one oval.

- [ ] Uniformly Convergent
- [ ] Point wise convergent
- [x] Both uniform and point wise
- [ ] Diverges

5. Every dominating series *

Mark only one oval.

- need not converge uniformly
- converges uniformly
- always diverges
- converges point wise

6. Weierstrass- M test is used to check the *

Mark only one oval.

- point wise convergence of a sequence of functions
- uniform convergence of a sequence of functions
- point wise convergence of a series of functions
- uniform convergence of a series of functions

7. sufficient condition for the following series to converge uniformly in any interval [a,b] and q>=0 *

$$\sum \frac{x}{n^p + x^2 n^q}$$

Mark only one oval.

- p+q > 1
- p > 1
- p< 1
- p+q < 1

8. The series of functions *

$$\frac{2x}{1+x^2}+\frac{4x^3}{1+x^4}+\frac{8x^7}{1+x^8}+\ldots,-\frac{1}{2}\le x\le\frac{1}{2}$$

Mark only one oval.

- [ ] Does not converge uniformly
- [x] Converges uniformly
- [ ] diverges
- [ ] converges only point wise

Class Quiz A

Completeness Axiom and infinite sequences

* Required

1. Email address *

2. Name *

3. Roll No. *

4. Supremum of the set {n / m | m,n ∈ N and m + n ≤ 10}. (just enter the number/value in the space provided. Any other answer will be invalid) * 1 point

   9

5. For a subset A of R, define −A = {−x : x ∈ A}. Suppose that S is a nonempty bounded above subset of R. Then -S is * 1 point

   Mark only one oval.

   - ( ) Bounded above
   - (✓) Bounded below
   - ( ) Both bounded above and below
   - ( ) Not bounded

6. The sequence * 1 point

$$x_n := -n + \sqrt{n^2 + 3n}.$$

Mark only one oval.

- [ ] Converges to 2/3
- [ ] diverges to infinity
- [x] converges to 3/2
- [ ] diverges to - infinity

7. Which of the following is true? * 1 point

Mark only one oval.

- [ ] Limit point of a sequence is unique
- [ ] Limit point of the sequence is also limit point of its range set
- [ ] Limit point is always limit for a given sequence
- [x] Limit is always a limit point for a given sequence

8. The sequence * 2 points

$$a_n = \frac{1}{3n^3} + \frac{2^2}{3n^3} + \frac{3^2}{3n^3} + \cdots + \frac{n^2}{3n^3}$$

Mark only one oval.

- [ ] diverges
- [x] converges to 1/9
- [ ] converges to 1/3
- [ ] converges to 2/3

9. Every absolutely convergent sequence is necessarily 1 point

Mark only one oval.

- ( ) divergent
- (✓) convergent
- ( ) Conditionally convergent
- ( ) None of the above

10. Which of the following is not true for sn=1/n * 2 points

(a) The sequence converges to 0.

(b) $\lim_{n\to\infty} \sum_{i=1}^{n} s_i = L$, for some finite L.

(c) $\limsup s_n = 0$.

(d) The series $\sum(-1)^n s_n$ converges.

(e) The series $\sum s_n^2$ converges.

Mark only one oval.

- ( ) a and d
- (✓) b
- ( ) c and d
- ( ) e

11. The sequence * 1 point

$$\left\{\frac{4-n}{2n+3}\right\}_{n=1}^{\infty}$$

Mark only one oval.

- [ ] Monotonically increasing and bounded
- [x] Monotonically decreasing and bounded
- [ ] Monotonically increasing and not bounded
- [ ] Monotonically decreasing and not bounded

Class Quiz B

Infinite series and sequences and series of functions

* Required

1. Email address *

2. Name *

3. Roll No. *

4. The series converges if * 1 point

$$\sum_{k=0}^{\infty} \frac{k^3 x^k}{3^k}.$$

Mark only one oval.

- [x] |x|<3
- [ ] |x|<=3
- [ ] |x|>3
- [ ] |x|>=3

5. The series on interval R * 1 point

$$\sum_{k=1}^{\infty}\left(\frac{\cos kx}{k^3}+3\frac{\sin kx}{k^2}\right)$$

Mark only one oval.

- ( ) Only point wise convergent
- ( ) Diverges
- ( ) Can not decide
- (✓) Uniformly converges

6. The series * 1 point

$$\sum_{n=1}^{\infty}\frac{3+\cos n}{e^n}$$

Mark only one oval.

- (✓) Converges
- ( ) Diverges

7. The series * 1 point

$$\sum_{n=1}^{\infty}\frac{\left(\ln(n)\right)^2}{n^3+n^4}$$

Mark only one oval.

- (✓) converges
- ( ) diverges

8. Th interval of convergence for the following series * 1 point

$$\sum_{n=0}^{\infty} \frac{n(x-1)^{2n}}{3^n}$$

Mark only one oval.

- [1+root 3, 1- root 3)
- (1+root 3, 1- root 3)
- (1+root 3, 1- root 3]
- [1+root 3, 1- root 3]

9. The series * 1 point

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}\left(1+\frac{1}{n^2}\right).$$

Mark only one oval.

- converges absolutely.
- converges to +∞
- converges to -∞
- converges conditionally, but not absolutely.

10. Which of the following series converges? * 2 points

(a) $\sum \frac{x^n}{n!},\ \forall x$
(b) $\sum \frac{1}{n+\sin(n)}$
(c) $\sum (-1)^n n$
(d) $\sum \sin(n)$
(e) $\sum \frac{2^n}{\sqrt{n!}}$

Mark only one oval.

- [ ] a and b
- [ ] b and d
- [x] a and e
- [ ] c and e

11. The limit value for the following series using root test * 1 point

$\sum_{n=1}^{\infty} (\frac{n}{n+1})^{n^2}$

Mark only one oval.

- [x] 1/e
- [ ] e
- [ ] 1+e
- [ ] 1-e

12. Assume summation an is a infinite series with partial sums given by following. What is a5? * 1 point

$$S_N = 4 + \frac{2}{N}.$$

Mark only one oval.

- [ ] 1/10
- [ ] 3/10
- [x] -1/10
- [ ] -3/10