Name: ______ Section # Math 102 (3&6) ID# ______ Sr. No ______

(Final Test)

Marks: $\frac{\quad}{45}$

1. The series $\sum_{n=0}^{\infty} \frac{n!}{2 \cdot 5 \cdot 8 \cdots (3n+2)}$

(a) diverges by the test for divergence

(b) diverges by comparison test

✓(c) converges

(d) $\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| = 1$

(e) $\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| > 1$

2. The error in approximating the sum of the series $\sum_{n=1}^{+\infty} \frac{(-1)^n n}{5^n}$ by the sum of the first four terms is less than or equal to

(a) $\frac{1}{5}$

✓(b) $\frac{1}{5^4}$

(c) $\frac{6}{5^6}$

(d) $\frac{1}{5^5}$

(e) $\frac{4}{\ }$

3. The series $\sum_{k=1}^{\infty} \left(1 + \frac{1}{k}\right)^{-k}$

(a) converges to e

(b) diverges

(c) converges to $\frac{1}{e}$

(d) converges to 0

(e) converges to 1

4. The series $1 + \frac{1}{2^2\sqrt{2}} + \frac{1}{3^2\sqrt{3}} + \frac{1}{4^2\sqrt{4}} + \cdots$ is

(a) a convergent p-series with $p = \frac{5}{2}$

(b) a divergent series

(c) a convergent p-series with $p = 2$

(d) a divergent series by the integral test

(e) a divergent p-series with $p = \frac{1}{2}$

5. The series $\sum_{n=1}^{\infty} \frac{\cos(\pi n)}{n!}$

(a) converges conditionally

✓(b) converges absolutely

(c) is convergent to 0

(d) is convergent to $\frac{1}{e}$

(e) is divergent

6. The value of a for which the series $\sum_{n=0}^{\infty} 4^n(3+a)^{-n}$ converges to 2 is equal to

✓(a) 5

(b) 1

(c) 3

(d) 0

(e) 6

7. The interval of convergence and radius of convergence R of $\sum_{n=1}^{\infty} (n!)(2x-1)^n$ are

(a) $[-\frac{1}{2}, \frac{1}{2}]$; $R = \infty$

(b) $[0, \frac{1}{2}]$; $R = 1$

(c) $(-\frac{1}{2}, 0]$; $R = \frac{2}{9}$

(d) $(-\frac{1}{2}, \frac{1}{2})$; $R = 7$

✓(e) $[\frac{1}{2}]$; $R = 0$

8. The value of the integral $\int_0^{1/3} \frac{x^2}{1+x^7}\,dx$ is equal to

(a) $\sum_{n=0}^{+\infty} \frac{1}{(7n+13) \cdot 3^{7n+3}}$

(b) $\sum_{n=0}^{+\infty} \frac{(-1)^n \cdot 3^{7n+3}}{7n+3}$

(c) $\sum_{n=0}^{+\infty} \frac{(-1)^n}{(7n+1) \cdot 3^{7n+1}}$

✓ (d) $\sum_{n=0}^{+\infty} \frac{(-1)^n}{(7n+3) \cdot 3^{7n+3}}$

(e) $\sum_{n=1}^{+\infty} \frac{(-1)^n (7n+3)}{3^{7n+1}}$

9. If you want to use the integral test to test the series $\sum_{n=1}^{\infty} n\, e^{-n^2}$ for convergence, then your conclusion is

(a) the integral test is not applicable in this case

✓ (b) the integral converges to $\frac{1}{2e}$

(c) the integral converges to $3e$

(d) the integral diverges

(e) the integral converges to $\frac{1}{e^2}$