

Roll Number:

Name:

Section:



Indian Institute of Information Technology, Sri City, Chittoor

Monsoon Semester Schedule Quiz 2, November-2025

UG2, First Sem

Name of the Exam: RANAC (S1)

Duration: 20 Minutes

November 04, 2025

Max. Marks: 10

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*Instructions:*

1. Calculators are allowed.
  2. All questions are mandatory and carry equal mark.
  3. Tick only the right option. If we find two ticks for one question, '0' marks will be awarded.
  4. Rough work should not be done in the question paper.
  5. Return the question paper along with the rough sheet before leaving the exam hall.
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1. For the power series  $\sum_{n=0}^{\infty} \frac{(x - \sqrt{2})^{2n+1}}{2^n}$ , the radius of convergence is

- (a) 2
- (b)  $\sqrt{2}$
- (c)  $\frac{1}{\sqrt{2}}$
- (d)  $\frac{1}{2}$

**Answer:** (b)

2. One root of the equation  $e^x - 3x^2 = 0$  lies in the interval  $(3, 4)$  the least number of iterations for the bisection method so that  $|error| \leq 10^{-3}$  are

- (a) 5
- (b) 10
- (c) 6
- (d) 8

**Answer** (b)

3. The improper integral  $\int_1^{\infty} \frac{x}{x^a \sqrt{x^2 + 1}} dx$  converges if

- (a)  $a > 1$

(P.T.O.)

- (b)  $a < 0$
- (c)  $0 < a < 1$
- (d)  $a > 0$

**Answer:** (a)

4. If  $\Gamma\left(\frac{5}{2}\right) = k$ , then  $k$  equals

- (a)  $\frac{3\sqrt{\pi}}{2}$
- (b)  $\frac{5\sqrt{\pi}}{2}$
- (c)  $\frac{3\sqrt{\pi}}{4}$
- (d)  $\frac{\sqrt{\pi}}{3}$

**Answer:** (c)

5. Let  $\{x_n\}$  be a bounded sequence of real numbers. Then

- (a) There is a subsequence of  $\{x_n\}$  which is convergent.
- (b) Every subsequence of  $\{x_n\}$  is convergent.
- (c) There is exactly one subsequence of  $\{x_n\}$  which is convergent.
- (d) None of these.

**Answer** (a)

6. Let  $f(x, y) = x^2 e^{-(x^4+y^2)}$ ,  $(x, y) \in \mathbb{R}^2$ . Find the extremum point of  $f$ :

- (a)  $(\pm 2^{-1/4}, 0)$  is a local minima point
- (b)  $(\pm 2^{-1/4}, 0)$  is global minima point
- (c)  $(\pm 2^{-1/4}, 0)$  is not local maxima point
- (d)  $(\pm 2^{-1/4}, 0)$  is global maxima point

**Answer:** (d)

7. Let  $f : \mathbb{R}^2 \rightarrow \mathbb{R}$  be defined by

$$f(x, y) = \begin{cases} \frac{|y|}{x^2} e^{-|y|/x^2}, & x \neq 0, b \\ 0, & x = 0. \end{cases}$$

The function  $f$  at  $(0, 0)$

- (a) is continuous
- (b) is differentiable
- (c) has partial derivatives
- (d) none of the above

**Answer:** (c)

8. If a function  $f : \mathbb{R}^n \rightarrow \mathbb{R}^m$  has derivatives in every direction  $v \in \mathbb{R}^n$  at the origin, then  $f$

- (a) is differentiable
- (b) is continuous but not differentiable
- (c) may not have partial derivatives
- (d) none of the above

**Answer:** (d)

9. If  $y$  is a function of  $x$  defined implicitly by  $x^y + y^x = 0$ , then  $\frac{dy}{dx} =$

- (a)  $-\frac{yx^{y-1} + y^x \ln y}{x^y \ln x + xy^{x-1}}$
- (b)  $-\frac{y^x \ln y + x^y \ln x}{x^{y-1}y + y^{x-1}x}$
- (c)  $-\frac{x^{y-1}y + x^y \ln x}{y^x \ln y + y^{x-1}x}$
- (d)  $-\frac{yx^{y-1} + xy^{x-1}}{x^y \ln x + y^x \ln y}$

**Answer:** (a)

10. The integral  $\int_0^{\pi/2} \sqrt{\tan x} dx$  can be expressed as

- (a)  $\frac{\pi}{\sqrt{3}}$
- (b)  $\frac{\pi}{\sqrt{2}}$
- (c)  $\frac{\pi}{2\sqrt{2}}$
- (d)  $\frac{\pi}{2\sqrt{3}}$

**Answer:** (b)

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