K26FY1219 Pages: 2 Reg No:.....
Name:.....

Second Semester FYUGP Degree (Reg) Examination April 2026

KU2DSCCMT101 - COMPUTATIONAL CALCULUS 2

2024 Admission onwards

Time : 2 hours Maximum Marks : 70

Section A

Answer any 6 questions. Each carry 3 marks.

1. Write formula for finding the volume of the solid obtained by rotating about the y-axis the region under the curve y = f(x) from x= a to x= b,

2. When a particle is located a distance x feet from the origin, a force of

$$x^2 + 2x$$

newtons acts on it.How much work is done in moving it from x = 1 to x = 3?

3. Give a boundary for error of A_n in right end point sum.

4. Give a boundary for error of A_n in Simpson's rule.

5. Give a boundary for error of A_n in trapezoidal rule.

6. Find the length of the arc of the curve

$$y = x^3.$$

from (0,0) to (1,1).

7. Write the arc length function formula.

8. Plot the point whose polar coordinates are

$$(1, 5\pi/4)$$

Section B

Answer any 4 questions. Each carry 6 marks.

9. Evaluate $\int_0^1 x^2 dx$ with spacing $h = 0.25$ using midpoint sum.

10. Evaluate $\int_0^1 \frac{1}{1+x} dx$ using right endpoint sum with spacing of x- coordinate $h = 0.25$.

11. Evaluate $\int_0^1 \frac{1}{1+x}$ using trapezoidal rule with spacing of x- coordinate $h = 0.25$

12. Find the exact length of the curve

$$y = \ln(\cos x) d, 0 \leq x \leq \pi/3$$

13. Sketch the region in the plane consisting of points whose polar coordinates satisfy the given conditions

$$1 < r \leq 3$$

14. Find the length of the polar curve

$$r = \theta^2, 0 \leq \theta \leq 2\pi$$

Section C

Answer any 2 questions. Each carry 14 marks.

15. The acceleration function and the initial velocity for a particle moving along a line are given by

$$a(t) = t + 4, \quad v(0) = 5, \quad 0 \leq t \leq 10$$

(a) Find the velocity at time t .
(b) the distance traveled during the given time interval.

16. a) Use the Midpoint Rule with $n = 5$ to approximate

$$\int_1^2 \frac{1}{x} dx.$$

b) Use the properties of integrals to evaluate

$$\int_0^1 (3x^2 + 4)\, dx.$$

17. Prove that (a)

$$\int (\ln x)^n dx = x(\ln x)^n - \int (\ln x)^{n-1} dx$$

(b)

$$\int x^n e^x dx = x^n e^x - n \int x^{n-1} e^x dx$$