K25FY3593 Pages: 2 Reg No:.....
Name:.....

Third Semester FYUGP Degree (Reg) Examination November 2025

KU3DSCMAT217 - MULTIPLE INTEGRALS, DIFFERENTIAL EQUATIONS AND NUMERICAL METHODS

2024 Admission onwards

Time : 2 hours Maximum Marks : 70

Section A

Answer any 6 questions. Each carry 3 marks.

1. Write the first approximation formula for the method of false position.
2. Write the general formula for Trapezoidal Rule.
3. State Fubini's first Theorem.
4. State the additive property of double integrals.
5. Find the region of integration bounded by the lines $y = x^2$ and $y = x + 2$.
6. Write equivalent polar form of $x = 2$.
7. Write equivalent cartesian form of $r\cos\theta = 4$.
8. Write equivalent cartesian form of $r^2\cos\theta sin\theta = 16$

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Section B

Answer any 4 questions. Each carry 6 marks.

9. Find the volume bounded above by the paraboloid $z = 10 + x^2 + 3y^2$ and below by the rectangle $0 \le x \le 1$, $0 \le y \le 2$.
10. Evaluate $\int\int xy\cos y\, dA$ over the rectangle $-1 \le x \le 1$, $0 \le y \le \pi$.
11. Find the volume of prism whose base is in the triangle in the xy-plane bounded by the x-axis and the lines $y = x$ and $x = 1$ and whose top lies in the plane $z = 3 - x - y$.
12. Replace the give polar equation by equivalent Cartesian equation, $r^2 = 4r\cos\theta$.
13. Evaluate $\int_0^1 \int_0^{2-x} \int_0^{2-x-y} dzdydx$.

14. Sketch the region of integration and convert polar integral to Cartesian integral (Do not evaluate the integral), $\int_0^{\frac{\pi}{2}} \int_0^1 r^3 \sin\theta \cos\theta dr d\theta$.

Section C

Answer any 2 questions. Each carry 14 marks.

15. Solve $(e^{x+y} + ye^y)dx + (xe^y - 1)dy = 0$, $y(0) = -1$.

16. Solve the initial value problem $y'' + y' - 6y = 0$, $y(0) = 10$, $y'(0) = 0$.

17. Evalute $I = \int_0^1 \frac{1}{1+x} dx$ using trapezoidal rule and Simpson's rule, given $h = 0.25$

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