

QP CODE: D2BAM2501	(Pages: 2)	Reg. No :
		Name :
SECOND SEMESTER FYUGP EXAMINATION, APRIL 2026		
(Regular/Improvement/Supplementary)		
Discipline Specific Core (DSC) Courses - Major		
AMA2CJ101 : Calculus II		
(Credits: 4)		
Time: 2 Hours	Maximum Marks: 70	
Section A		
Answer the following questions. Each carries 3 marks (Ceiling: 24 marks)		
1. Show that $\lim_{n \rightarrow \infty} (1 + \frac{1}{n})^n = e$	BL1	CO1
2. Define convergence of infinite series.	BL1	CO2
3. Show that the alternating harmonic series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n} = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \dots$ converges.	BL1	CO2
4. Define area of surface of revolution.	BL1	CO3
5. Determine whether the series $\sum_{n=1}^{\infty} \frac{1}{n(n-2)}$ converges or diverges. If it converges, find its sum.	BL2	CO2
6. Solve $e^{2x} - 5e^x + 6 = 0$	BL2	CO1
7. Determine whether the sequence $\{a_n\} = \{\frac{3}{2n+5}\}$ is monotonic. Is the sequence bounded?	BL2	CO2
8. Give an example for: i. Absolutely convergent series. ii. Conditionally convergent series.	BL2	CO2
9. Find the length of the curve $r = 5 \sin \theta$.	BL2	CO3
10. Evaluate $\int_{-1}^1 \frac{dx}{x^2}$.	BL1	CO1
Section B		
Answer the following questions. Each carries 6 marks (Ceiling: 36 Marks)		
11. If $\sinh x = \frac{4}{3}$, find the value of the other hyperbolic functions at x.	BL3	CO1
12. State "the integral test" and use it to determine whether $\sum_{n=1}^{\infty} \frac{1}{n^2+1}$ converges or diverges.	BL1	CO2
(PTO)		

13.	The Lissajous curves, also known as Bowditch curves have applications in physics, astronomy and othe sciences. They are described by the parametric equations $x = \sin(at + b\pi)$, where " a "a rational number, and $y = \sin t$. Plot the curve with $a = 0.75$ and $b = 0$ for t int the parameter interval $[0, 8\pi]$.	BL3	CO3
14.	a.Convert the polar equation $r^2 = 4r\cos\theta$ to a rectangular equation. b.Convert the rectangular equation $x^2 - y^2 = 1$ to a polar equation.	BL2	CO3
15.	Evaluate $\lim_{x \rightarrow \infty} (1 - \frac{1}{x})^x$.	BL2	CO1
16.	The concentration of a certain drug (in mg/cc) in patient's bloodstream t hour after injection is $C(t) = \frac{0.3t}{2t^2+1}$. Determine the average concentration of the drug in the patient's bloodstream over the first 5 hour after the drug is injected.	BL2	CO1
17.	Determine whether the series $\sum_{n=1}^{\infty} \frac{1}{3+4^n}$ converges or diverges.	BL2	CO2
18.	Find the radius of convergence and interval of convergence of $\sum_{n=0}^{\infty} \frac{(-1)^n x^{2n}}{2n!}$.	BL1	CO2

Section C

Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)

19.	Find the Taylor series for $f(x) = \ln x$ at 1, and determine its interval of convergence.	BL2	CO2
20.	Find the area of the surface obtained by revolving the curve $r = 2 + 2\cos\theta$ about the polar axis.	BL2	CO4

CO : Course Outcome

BL : Bloom's Taxonomy Levels (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)