D (Printe

(20321) Roll No. ....

BCA-I Sem.

18005

B.C.A. Examination, Dec.-2020

MATHEMATICS-I

(BCA-101)

Time : Three Hours] *[Maximum Marks : 75*

Note : Attempt questi ... sections as per instructions.

Section-A

Note : Attempt all the **five** questions of this section. Each question carries 3 marks. 5×3=15

1. Define rank of a Matrix with example.
2. Find third differential coefficient of $x^4.e^{2x}$.
3. What do you mean by Beta and Gamma function?

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4. Give the statement of Rolle's theorem.
5. In short, explain Dot product and Cross product.

Section-B

Note : Attempt any **two** questions out of the three questions. Each question carries 7½ marks. 2×7½=15

6. Solve the following equations by Cramer's Rule

$3x+4y=5$

$x-y=-3$

7. Use Maclaurin's theorem to prove that

$$\cos x = 1-\frac{x^2}{2!}+\frac{x^4}{4!}-.......(-1)^{n/2}\frac{x^n}{n!}+....$$

8. If $I_n=\int_0^{\pi/3}\tan^n x\,dx$ then show that $(n-1)(I_n+I_{n-2})=(\sqrt{3})^{n-1}$

Section-C

Note : Attempt any **three** questions out of the following five questions. Each question carries 15 marks. 3×15=45

9. What do you mean by L-Hospital rule? Evaluate $\lim_{x\to\frac{\pi}{2}} \frac{\log\left(x-\frac{\pi}{2}\right)}{\tan x}$ by using L-Hospital Rule.

10. Examine the function f(x) given by $f(x)= 10x^6-24x^5+15x^4-40x^3+108$ for maximum and minimum values.

11. If $\vec{F}=(x^2+y^2)\hat{i}-2xy\hat{j}$ and curve C is the rectangle in xy-plane bounded by y=0, x=a, y=b, x=0 then prove that $\int_C \vec{F}.d\vec{r} = -2ab^2$

12. If $f(x)=\frac{|x|}{x}$, for $x \neq 0$ and f(x)= 0, for x=0 then show that f(x) is not continuous at x=0.

13. Investigate for what values of λ, μ the simultaneous equations

$x+y+z=6$

$x+2y+3z=10$

$x+2y+\lambda z=\mu$

Prove (i) no solution (ii) a unique solution and (iii) infinitely many solutions.