

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. 5x3=15

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

P.T.O.

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. 2x7½=15

6. Solve the following equations by Cramer's Rule

$$3x+4y=5$$

$$x-y=-3$$

7. Use Maclaurin's theorem to prove that

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

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

$$(I_n + I_{n-2}) = (\sqrt{3})^{n-1}$$

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Section-C

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

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

$$\int_C \vec{F} \cdot d\vec{r} = -2ab^2$$

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P.T.O.

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.

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