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SUBJECT CODE NO: - BNP-2565
FACULTY OF SCIENCE AND TECHNOLOGY
BSc. F.Y.(SEM-I)(CBCGS NEP) Mathematics
Examination November / December 2024
Mathematics Calculus (DSC-1)

[Time: 1:00 Hours]**[Max. Marks:30]**

Please check whether you have got the right question paper.

N. B

i) Question no.1 is compulsory.

ii) Attempt any Four questions from question no. 2 to 7.

Q1 choose the correct alternative**10**

i) For $x \in R$, $\cosh(-x) =$ _____
 a) $\cosh(x)$ b) $-\cosh(x)$ c) $\sinh(x)$ d) $-\sinh(x)$

ii) If $y = (ax + b)^m$, then $\frac{d^n y}{dx^n} =$ _____
 a) $\frac{m!}{(m-n)!} a^n (ax + b)^{m-n}$ b) $\frac{m!}{(m+n)!} a^n (ax + b)^{m-n}$
 c) $\frac{m!}{(m-n)!} (ax + b)^{m-n}$ d) $\frac{m!}{(m-n)!} a^n (ax + b)^{m+n}$

iii) if f is continuous in $[a,b]$ and differentiable in (a,b) , then there exists at least one point 'c' in (a,b) such that $f'(c) =$ _____
 a) $\frac{f(b)+f(a)}{b+a}$ b) $\frac{f(b)-f(a)}{b-a}$ c) $\frac{f(b)-f(a)}{b-a}$ d) $\frac{f(b)+f(a)}{b-a}$

iv) $\int_0^{\pi/2} \sin^5 x \, dx =$ _____
 a) $\frac{11}{15}$ b) $\frac{15}{7}$ c) $\frac{7}{15}$ d) $\frac{8}{15}$

v) the process of determining the length of arc of plane curves is known as _____
 a) rectification b) Determination c) Quadrature d) Revolution

Q2 If $y = \frac{ax}{e} \sin(bx + c)$ then find $\frac{d^n y}{dx^n}$.

05

Q3 Find $(x^2 e^x \cos x)_n$

05

Q4 If a function f is

05(i) continuous in $[a,b]$,(ii) derivable in (a,b) and(iii) $f(a) = f(b)$, then prove that there exists at least one value $C \in (a,b)$ such that $f'(C) = 0$ 

Q5 If $u = \frac{1}{\sqrt{x^2+y^2+z^2}}$; $x^2 + y^2 + z^2 \neq 0$

05

Show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = 0$



Q6 Obtain the reduction formula for $\int \cos^n x \, dx$

05

Q7 Find the volume of the solid obtained by revolving the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about the axis of x .

05

