



TAMIL NADU OPEN UNIVERSITY

Chennai - 15

School of Science

HOME / SPOT ASSIGNMENT

Programme Code No : 132
Programme Name : B.Sc., Mathematics with Computer Applications
Course Code & Name : BMC-11, Elements of Calculus
Batch : CY 2020
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 15 (Average of Total No. of Assignment)

Assignment – I

Answer any one of the question not exceeding 1000 words

1. Derive the reduction formula for $\int \cos^n x \, dx$ and hence evaluate $\int_0^{\pi/2} \cos^n x \, dx$.
2. State and prove Raabe's Test.
3. Define Beta function and explain properties of Beta function.

Assignment – II

Answer any one of the question not exceeding 1000 words

1. Derive the reduction formula for $\int \sin^n x \, dx$ and hence evaluate $\int_0^{\pi/2} \sin^n x \, dx$.
2. State and prove D'Alembert's Ratio Test.
3. State and prove Cauchy's second theorem on limits.

Assignment – III

Answer any one of the question not exceeding 1000 words

1. Derive the formula for Radius of curvature.
2. Define Gamma function, Show that the Gamma function $\Gamma(n)$ converges for $n > 0$ and derive the recurrence formula.
3. Derive the reduction formula for $\int \cos^m x \cos nx \, dx$ and hence evaluate

$$\int_0^{\pi/2} \cos^m x \cos nx \, dx, \text{ and hence prove that } \int_0^{\pi/2} \cos^n x \cos nx \, dx = \frac{\pi}{2^{n+1}}$$

Assignment – IV

Answer any one of the question not exceeding 1000 words

1. Prove that $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2}$ can be transformed into $\frac{\partial^2 v}{\partial r^2} + \frac{1}{r^2} \frac{\partial^2 v}{\partial \theta^2} + \frac{1}{r} \frac{\partial v}{\partial r}$ using polar coordinates.
2. State and prove Leibnitz Theorem and hence find the n^{th} derivative of $e^x \log x$
3. Derive the reduction formula for $\int \sin^m x \cos^n x dx$ and hence evaluate

$$\int_0^{\pi/2} \sin^m x \cos^n x dx, \text{ where } m \text{ and } n \text{ positive integers.}$$



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Programme Code No : 132
Programme Name : B.Sc., Mathematics with Computer Applications
Course Code & Name : BMC-12, Trigonometry, Analytical Geometry
(3d) and Vector Calculus
Batch : CY 2020
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 15 (Average of Total No. of Assignment)

Assignment – I

Answer any one of the question not exceeding 1000 words

1. Curl $(u \times v) = v \nabla u - u \nabla v + u \operatorname{div} v - v \operatorname{div} u$.
2. (a) Derive the volume of a tetrahedron when the vertices are given.
(b) Find the equation of the cone whose vertex is at the point (α, β, γ) and whose generators intersect the guiding curve $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0, z = 0$.
3. Verify Gauss's divergence Theorem for $F = (x^2 \cdot yz)i + (y^2 \cdot zx)j + (z^2 \cdot xy)k$ taken over the rectangular parallelepiped $0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$.

Assignment – II

Answer any one of the question not exceeding 1000 words

1. Prove Curl curl $F = \operatorname{grad} \operatorname{div} F - \nabla^2 F$.
2. (a) Derive the condition for two general spheres to cut orthogonally.
(b) Show that the spheres $x^2 + y^2 + z^2 + 3x + 5y + z - 7 = 0$ and $x^2 + y^2 + z^2 + 2x + 7y + 3z - 6 = 0$ are orthogonal.
3. Verify Gauss's Divergence theorem for the function $F = 2xzi + yzj + z^2k$ over the upper half of the sphere $x^2 + y^2 + z^2 = a^2$.

Assignment – III

Answer any one of the question not exceeding 1000 words

1. (a) Find the equation of the cylinder whose generators intersect the curve $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0, z = 0$ and are parallel to line $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$.
- (b) Find the equation of the right circular cylinder whose generators are parallel to the line $x = -2y = 2z$ and which touch the sphere $x^2 + y^2 + z^2 - 2y - 4z - 11 = 0$.
- 2 (a). Find the Length of the Tangent from an external point to the general sphere
- (b) Find the condition that the plane $lx + my + nz = p$ may be a tangent plane to the Sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$.
3. Verify Gauss's Divergence theorem over the cube bounded by the planes $x = 0, x = 1; y = 0, y = 1; z = 0$ and $z = 1$ for $F = x^2 i + y^2 j + z^2 k$.

Assignment – IV

Answer any one of the question not exceeding 1000 words

1. (a) Find the equation of a cone with vertex at the origin.
- (b) Find the equation of the right circular cylinder of radius 2 whose axis passes through (1,2,3) and has direction cosines proportional to (2,-3,6).
- 2 (a). Find the equation of the right circular cone whose vertex is origin and guiding curve the circle $x^2 + y^2 + z^2 + 2x - y + 3z - 1 = 0, x - y + z + 4 = 0$.
- (b). Find the equation of the sphere having its centre (5,-2,3) and which touches the line $\frac{x-1}{6} = \frac{y+1}{2} = \frac{z-12}{-3}$.
3. Show that $\nabla^2 r^n = n(n+1) r^{n-2}$.



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Programme Code No : 132
Programme Name : B.Sc., Mathematics with Computer Applications
Course Code & Name : BMC-13, Computer Fundamentals and PC Software
Batch : CY 2020
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 15 (Average of Total No. of Assignment)

Assignment – I

Answer any one of the question not exceeding 1000 words

1. Write a note on Internet.
2. Write a note on working with files and folders
3. Explain the concept of Mail merge with available facilities.

Assignment – II

Answer any one of the question not exceeding 1000 words

1. Explain the Proofing tools in word processing.
2. Write a note on Multi-media.
3. Write a note on Text Formatting.