

Paper 1 : CALCULUS & GEOMETRY-2014

Note : Attempt all the five questions. All questions carry equal marks. Attempt any two parts from each question.

UNIT - 1

1. (a) Give an example of a bounded function which is not R-integrable.
- (b) If $f(x) = x + x^2$ for rational values of x and $f(x) = x^2 + x^3$ for irrational values of x in the interval $[0, 2]$, then evaluate the upper and the lower Riemann-integrals in the interval $[0, 2]$.
- (c) State and prove fundamental theorem of integral calculus for Riemann integral function.

UNIT - 2

2. (a) Discuss the maximum and minimum value of the function:
 $u = x^3 + y^2 - 3axy$
- (b) Find the maxima and minima of $u = \sin A \cdot \sin B \cdot \sin C$, if A, B and C are the angles of the ΔABC .
- (c) Find the maximum or minimum value of $x^4 + y^4 + z^4$, where $xyz = c^3$.

UNIT - 3

3. (a) Test the convergence of the Integral :

$$\int_a^\infty \frac{dx}{x^n}, \quad n > 0$$

- (b) Show that the integral $\int_0^\infty e^{-ax} \frac{\sin x}{x} dx$ is convergent when $a \geq 0$.

- (c) Prove that integral $\int_a^b \frac{dx}{(x-a)\sqrt{(b-x)}}$ is divergent.

UNIT - 4

4. (a) Find the equation of the cone whose vertex is (α, β, γ) and base $ax^2 + by^2 = 1, z = 0$
- (b) Show that the plane $ax + by + cz = 0$ cuts the cone $yz + zx + xy = 0$ in two perpendicular lines if :

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$$

- (c) Find the equation of right circular cylinder whose radius is 2 axis is the line :

$$\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{2}$$

UNIT - 5

5. (a) Prove that the polar equation to the circle described on straight line joining the points $(1, 60^\circ)$ $(2, 30^\circ)$ as diameter is : $r^2 - r [\cos(\theta - 60^\circ) + 2 \cos(\theta - 30^\circ)] + \sqrt{3} = 0$
- (b) PP' is a focal chord of a conic. Prove that the angle between the tangents at P and P' is $\tan^{-1} \left(\frac{2e \sin \alpha}{1 - e^2} \right)$ where α is the angle between the chord and the major axis.
- (c) Find the equation of normal at a point ' α ' on the conic $1/r = 1 + e \cos \theta$.

<http://www.prsunotes.com>

Whatsapp @ 9300930012

Your old paper & get 10/-

पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से