

LESSON PLAN

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| Discipline All Branches | Semester II | Name of the teacher: Riturani Dash , Lect. in Mathematics, G.P. Balangir |
| Sub: Engg. Math | No. of days per week / 05 | Semester start from - 14.03.2022 to 08.06.2022 No. of week:14 (Excluding Puja Vacation) |
| Week | Class/Day | |
| 1st | 1st | Introduction: Types of Vector (Null vector, Parallel vector, Coliner Vector) |
| | 2nd | Component form, representation vector, magnitude, direction vector) |
| | 3rd | Addition, subtraction vector, position vector, |
| | 4th | Angle between two vectors, scalar product of two vectors |
| | 5th | Geometrical meaning of dot product, scalar, vector projection |
| 2nd | 1st | Scalar vector projection, scalar triple product |
| | 2nd | Vector Triple product, Area of triangle |
| | 3rd | Area of triangle and parallelogram |
| | 4th | Geometrical meaning of vector product |
| | 5th | Problem based on cross product, dot product, angle between dot product |
| 3rd | 1st | Definition of function based on set theory, types of function |
| | 2nd | Constant function, Identity function |
| | 3rd | Absolute valued function, greatest integer function, trigonometric function |
| | 4th | Logarithmic function, Introduction of limit |
| | 5th | Existence of limit |
| 4th | 1st | Existence of limit same or different function |
| | 2nd | Evaluation of limit by standard formula $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = n \cdot a^{n-1}$ |
| | 3rd | $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \log a$, $\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$ |
| | 4th | $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$, $\lim_{x \rightarrow 0} \frac{\tan x}{x} = 1$ |
| | 5th | $\lim_{x \rightarrow 0} (1 + x)^{1/x} = e$, $\lim_{x \rightarrow 0} (1 + \frac{1}{x})^x = e$ |
| 5th | 1st | Check continuity of limit function exit |
| | 2nd | Check continuous and discontinuous function |
| | 3rd | Problem based on continuity |
| | 4th | Evaluation of limit by factorization |
| | 5th | Rationalize at infinity |
| 6th | 1st | Derivative of a function at a point |
| | 2nd | Algebra of derivative |
| | 3rd | Derivative standard formula x^n , a^x |
| | 4th | Derivative standard formula $\log x$, e^x , $\sin x$, $\cos x$ |
| | 5th | Derivative standard formula $\tan x$, $\cot x$, Inverse function ($\sin^{-1}x$, $\cos^{-1}x$, $\cot^{-1}x$, $\tan^{-1}x$, $\sec^{-1}x$, $\operatorname{cosec}^{-1}x$) |
| 7th | 1st | Derivative composite function (Chain rule) |
| | 2nd | Method of diff(Parametric funcion) |
| | 3rd | Implicit function, logarithmic function |
| | 4th | A function w.r.t. another function |
| | 5th | Application of Derivative |

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| 8th | 1st | Successive differentiation |
| | 2nd | Partial differential (function two variable) |
| | 3rd | Function variable second order derivative |
| | 4th | Equation of tangent, normal of the curve |
| | 5th | Problem based on above |
| 9th | 1st | Definition of integration as inverse of differentiation |
| | 2nd | Integral of standard function |
| | 3rd | Method of integration by substitution |
| | 4th | Method of integration (by parts method) |
| | 5th | Integration function (i) $\int \frac{dx}{x^2+a^2}$ |
| 10th | 1st | (ii) $\int \frac{dx}{x^2-a^2}$ (iii) $\int \frac{dx}{a^2-x^2}$ (iv) $\int \frac{dx}{\sqrt{x^2+a^2}}$ |
| | 2nd | (v) $\int \frac{dx}{\sqrt{x^2-a^2}}$ (vi) $\int \frac{dx}{\sqrt{a^2-x^2}}$ |
| | 3rd | (vi) $\int \frac{dx}{x\sqrt{x^2-a^2}}$ (viii) $\int \sqrt{a^2-x^2} dx$ |
| | 4th | (ix) $\int \sqrt{a^2+x^2} dx$ |
| | 5th | (v) $\int \sqrt{x^2+a^2} dx$ |
| 11th | 1st | Definite integral properties (i) $\int_0^a f(x)dx = \int_0^a (a-x)dx$ |
| | 2nd | (ii) $\int_a^b f(x)dx = -\int_b^a f(x)dx$ |
| | 3rd | (iii) $\int_a^c f(x)dx = \int_a^b f(x)dx + \int_b^c f(x)dx$ |
| | 4th | (iv) $\int_{-a}^a f(x)dx = 0, \text{ if } x \text{ is odd}$ |
| | 5th | (v) $\int_{-a}^a f(x)dx = 2 \int_0^a f(x)dx, \text{ if } x \text{ is even}$ |
| 12th | 1st | Application of Integration |
| | 2nd | (i) Area enclosed by a curve and x-axis |
| | 3rd | (ii) Area of a circle with centre of origin |
| | 4th | (iii) Area bounded by parabola, straight line |
| | 5th | (iv) Problem based on integration |
| 13th | 1st | Order, degree differential equation |
| | 2nd | Solution of differential equation |
| | 3rd | Standard first degree equation by method of separation |
| | 4th | Variable separation method |
| | 5th | Linear equation |
| 14th | 1st | Linear equation $\frac{dy}{dx} + Py = Q$, where P, Q function of x |
| | 2nd | Problem discussion with doubt clearing |
| | 3rd | Exercise problem discussion |
| | 4th | Problem Practice |
| | 5th | Problem Practice |