Identity element w.r.t operation of addition of vector $\vec{a}$ is.

A. $\vec{1}$

B. $\vec{0}$

C. $-\vec{a}$

D. $\vec{a}$

ANSWER: B

If angle between two vectors $\vec{a}$ and $\vec{b}$ is 0 then $\vec{a}.\vec{b} = ?$.

    A.   0

    B.   1

    C.   a.b

    D. -1

ANSWER: C

Projection of vector $\vec{a}$ on vector $\vec{b}$ is.

    A. $\vec{a}.\vec{b}$

    B. $\vec{a}\times\vec{b}$

    C. $\vec{a}.\dfrac{\vec{b}}{\left|\vec{b}\right|}$

    D. $\vec{b}\times\dfrac{\vec{a}}{\left|\vec{a}\right|}$

ANSWER: C

$\left|\vec{a}\times\vec{b}\right|$ represents.

    A.   Area of triangle

    B.   Area of ▢gm

    C.   Area of trapezium

    D.   Volume of ▢piped

ANSWER: B

The vector $\vec{a} \times \vec{b}$ is orthogonal to.

      A. $\vec{b}$

      B. $\vec{a}$

      C. $\vec{a}.\vec{b}$

      D.   both $\vec{a}$ and $\vec{b}$

ANSWER: D

$\vec{a}.\vec{b} \times \vec{c}$ represents.

      A.   Area of triangle

      B.   Area of ▢gm

      C.   Area of trapezium

      D.   Volume of ▢piped

ANSWER: D

If $\vec{a}$ is perpendicular to $\vec{b}$.

      A. $\vec{a}.\vec{b} = -1$

      B. $\vec{a}.\vec{b} = 1$

      C. $\vec{a} \times \vec{b} = 0$

      D. $\vec{a}.\vec{b} = 0$

ANSWER: D

If $\vec{f}(t) = \operatorname{Sin} t \underline{i} + \operatorname{Cos} t \underline{j} + 8\underline{k}$ then $\left| \vec{f}(t) \right| = ?$

      A.   2

      B.   64

      C. $\sqrt{65}$

      D.   1

ANSWER: C

Derivative of vector $\vec{a}$ of constant magnitude is.

A.   Perpendicular to $\vec{a}$

B.   Perpendicular to $\vec{b}$

C.   Parallel to $\vec{a}$

D.   Parallel to $\vec{b}$

ANSWER: A

$$\frac{d}{dt}\left(\vec{f} \times \vec{f}^{/} \times \vec{f}^{//} \right) = ?$$

A.   0

B.   1

C. $\vec{f} \times \vec{f} \times \vec{f}^{//}$

D. $\vec{f} \times \vec{f}^{/} \times \vec{f}^{///}$

ANSWER: D

If f is a scalar point function then $\vec{\nabla}(f)$ is called.

A.   divergence of f

B.   Gradient of f

C.   curl of f

D.   mod of f

ANSWER: B

If $\overline{f} = 2i + 3j + 5k$ then $\vec{\nabla}.\overline{f}$ =.

A.   1

B.   -1

C.   2

D.   0

ANSWER: D

24   If $\overline{f} = x\underline{i} + yj + z\underline{k}$ then $div(\overline{f})$ =.

A.   1

B.   2

C.   3

D. $\underline{i} + \underline{j} + \underline{k}$

ANSWER: D

Unit normal to a level surface x+y+z=1 at p(1,2,3).

A. $\dfrac{1}{\sqrt{3}}$

B. $\dfrac{\underline{i} + \underline{j} + \underline{k}}{\sqrt{3}}$

C. 2

D. 1

ANSWER: B

Which of following is not true.

A. $\vec{a}.(\vec{b}.\vec{c})$ = Scalar value

B. $\vec{a}.(\vec{b} \times \vec{c})$ = Scalar value

C. $\vec{a} \times (\vec{b}.\vec{c})$ = Scalar value

D. $\vec{a} \times (\vec{b} \times \vec{c})$ = Vector value

ANSWER: C

Divergence of curl of vector $\vec{f} = x\underline{i} + yj + z\underline{k}$.

A. 0

B. 1

C. 2

D. -1

ANSWER: A

Direction cosine of y-axis are.

A. 1,0,0

B. 0,0,1

C. 0,1,0

D. 1,0,1

ANSWER: C

Degree of differential Eq. $\dfrac{d^2 y}{dx^2} + y\left(\dfrac{dy}{dx}\right)^2$ =0 is.

A. 0
B. 1
C. 2
D. 3
ANSWER: B

The differential equation $\dfrac{dy}{dx} = \dfrac{x+y}{x}$ is.

A. Homogenous equation
B. Separable equation
C. Exact equation
D. Bernoulli equation
ANSWER: A

The differential equation $M(x, y)dx + N(x, y)dy = 0$ is exact eq. if.

    A. $M_x = N_y$

    B. $M_y = N_x$

    C. $M_x = N_x$

    D. $M_y = N_y$

ANSWER: B

The differential equation $\dfrac{dy}{dx} + P(x)y = Q(x)$ is.

    A.   Homogenous Equation

    B.   Separable Equation

    C.   Exact Equation

    D.   Linear equation

ANSWER: D

For differential equation $dx + \left(\dfrac{x}{y} - \sin y\right)dy = 0$.

    A. $I.F = x$

    B. $I.F = xy$

    C. $I.F = y$

    D. $I.F = y^2$

ANSWER: C

Differential equation of eq. $x^2 + y^2 = c^2$ is.

    A. $\dfrac{dy}{dx} = \dfrac{-x}{y}$

    B. $\dfrac{dy}{dx} = \dfrac{x}{y}$

    C. $\dfrac{dy}{dx} = \dfrac{y}{x}$

    D. $\dfrac{dy}{dx} = \dfrac{-y}{x}$

ANSWER: A

Solution of differential equation $\left(D^2 + 4D + 3\right) y = 0$ is.

A. $\quad y = c_1 e^x + c_2 e^{3x}$

B. $\quad y = c_1 e^{-x} + c_2 e^{3x}$

C. $\quad y = c_1 e^{-x} + c_2 e^{-3x}$

D. $\quad y = c_1 e^x + c_2 e^{3x}$

ANSWER:　C

For differential equation $.\left(D^3 + D\right) y = \sin x$

A. $\quad y_p = \dfrac{-x \sin x}{2}$

B. $\quad y_p = \dfrac{-\sin x}{2}$

C. $\quad y_p = \dfrac{x \sin x}{2}$

D. $\quad y_p = \dfrac{x \sin x}{3}$

ANSWER:　A

The diff. eq. $\dfrac{x^2 d^2 y}{dx^2} + \dfrac{7xdy}{dx} + 5y = x^5$ is.

A. Separable equation
B. Exact equation
C. Cauchy equation
D. Clairauts equation

ANSWER:　C

Trajectory of projectile is.

A. Parabola
B. Hyperbola
C. Ellipse
D. Circle

ANSWER:　A

Equation of Range of projectile is.

A. $\dfrac{v_0^{\,2}\sin\alpha}{g}$

B. $\dfrac{v_0^{\,2}\sin 2\alpha}{2g}$

C. $\dfrac{v_0^{\,2}\sin 2\alpha}{g}$

D. $\dfrac{v_0^{\,2}\cos 2\alpha}{g}$

ANSWER: C

Maximum value of Range is.

A. $\dfrac{V_0^{2}}{g}$

B. $\dfrac{V_0^{2}}{2g}$

C. $\dfrac{2V_0}{g}$

D. $\dfrac{V_0}{g}$

ANSWER: A

Upward range of projectile on an inclined plane is.

A. $\dfrac{v_0^{\,2}}{g\cos^2\beta}\left[\sin(2\alpha-\beta)-\sin\beta\right]$

B. $\dfrac{v_0^{\,2}}{g\sin^2\beta}\left[\sin(2\alpha-\beta)+\sin\beta\right]$

B. $\dfrac{v_0^{\,2}}{g\cos^2\beta}\left[\sin(2\alpha-\beta)+\sin\beta\right]$

B. $\dfrac{v_0^{\,2}}{g\tan^2\beta}\left[\sin(2\alpha-\beta)+\sin\beta\right]$

ANSWER: B