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Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following is correct Wallis Sine formula when n is odd and $n \geq 3$?

Answer (Please select your correct option)

- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{\pi}{2}\frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{--------}\frac{5}{6}\frac{3}{4}\frac{1}{2}$
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{\pi}{2}\frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{--------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{--------}\frac{6}{7}\frac{4}{5}\frac{2}{3}$ correct
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{--------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of a periodic function defined by $f(x) = 4\cos 3x$?

Answer (Please select your correct option)

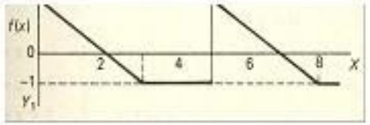
- $\frac{\pi}{4}$
- $\frac{\pi}{3}$
- $\frac{2\pi}{3}$ correct
- π

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

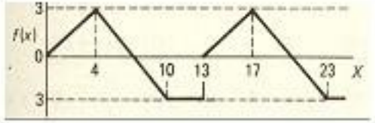
Match the following periodic function with its graph.

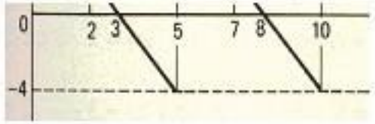
$$f(x)=\begin{cases}2-x & 0<x<3\\ -1 & 3<x<5\end{cases}$$

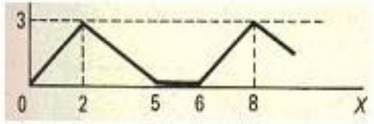
Answer (Please select your correct option)



correct

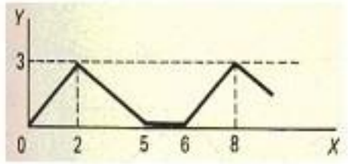






Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of periodic function whose graph is as below?



Answer (Please select your correct option)

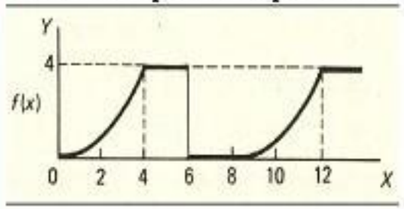
- 2
- 5
- 6

correct

- 8

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of periodic function whose graph is as below?



Answer (Please select your correct option)

- 0
- 4
- 6
- 8

correct

Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following condition must be satisfied for a vector field $\vec{F}$ to be a conservative vector field?

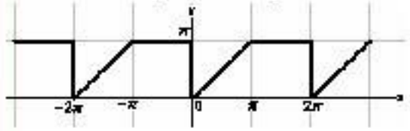
Answer (Please select your correct option)

- Line integral of $\vec{F}$ along a curve, depends only on the endpoints of that curve, not on the particular route taken.
- Divergence of $\vec{F}$ should be zero
- Gradient of $\vec{F}$ should be zero.
- $\vec{F} = 0$

correct

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of periodic function whose graph is as below?



Answer (Please select your correct option)

- π
- $-\pi$ correct
- 2π
- -2π

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

Let L denotes the Laplace Transform.
According to First Shift Theorem, if $L\{F(t)\} = f(s)$ then which of the following equation holds?
s *and* a are constants.

Answer (Please select your correct option)

- $L\{e^{-at}F(t)\} = f(s+a)$
- $L\{e^{-at}F(t)\} = f(s)$
- $L\{e^{-at}F(t)\} = f(a)$
- $L\{e^{-at}F(t)\} = f(s-a)$

Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

The function $f(x) = x^2 \cos 2x$ is ----------

Answer (Please select your correct option)

- Neither even nor odd
- Odd function
- Even function

correct

Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of an even function is symmetrical about ----------

Answer (Please select your correct option)

- x-axis
- y-axis

correct

- origin

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is Laplace inverse transform of the function $f(s)$ defined by $f(s) = \frac{3}{s-2} - \frac{2}{s}$?

Answer (Please select your correct option)

- $3te^{2t} - 2$
- $3e^{2t} - 2t$
- $3e^{2t} - 2$ correct
- None of these.

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

What is laplace transform of the function $F(t)$ if $F(t) = \sin 3t$?

Answer (Please select your correct option)

- $L\{\sin 3t\} = \frac{3}{s^2+9}$ correct
- $L\{\sin 3t\} = \frac{s}{s^2+9}$
- $L\{\sin 3t\} = \frac{1}{s-3}$
- $L\{\sin 3t\} = \frac{3!}{s^4}$

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

If L denotes laplace transform then
$L(te^{5t}) =$

Answer (Please select your correct option)

- $L(te^{5t}) = \frac{1}{s^2 - 5}$
- $L(te^{5t}) = \frac{1}{s^2 + 5}$
- $L(te^{5t}) = \frac{1}{(s+5)^2}$
- $L(te^{5t}) = \frac{1}{(s-5)^2}$ correct

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

What is $L(-6)$ if L denotes Laplace Transform?

Answer (Please select your correct option)

- $L(-6) = \frac{1}{s+6}$
- $L(-6) = \frac{-6}{s}$ correct
- $L(-6) = \frac{s}{s^2+36}$
- $L(-6) = \frac{-6}{s^2+36}$

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

A vector field is a vector each of whose components is a scalar field

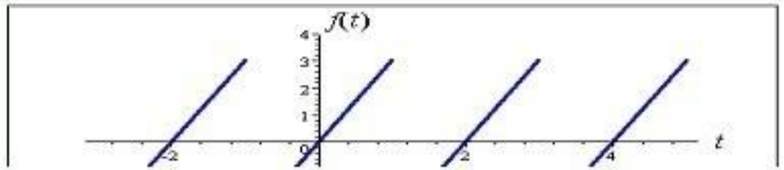
Answer (Please select your correct option)

- True

correct

- False

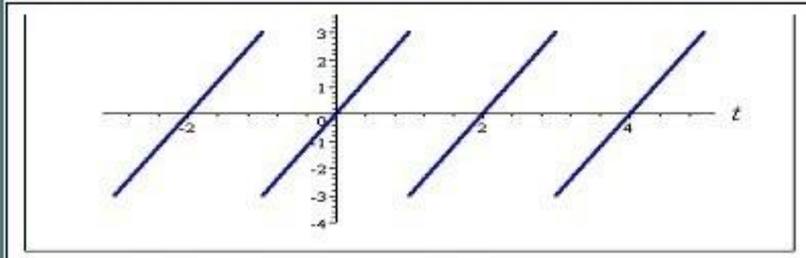
Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)



Answer (Please select your correct option)

- An odd function
- An even function
- Neither even nor odd

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)



Answer (Please select your correct option)

- An odd function
- An even function
- Neither even nor odd

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of "saw tooth wave" given above is ----------

Answer (Please select your correct option)

- An odd function
- An even function
- Neither even nor odd

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

All axes are positive in ---------- octant.

Answer (Please select your correct option)

- First

correct

- Second
- Fourth
- Eighth

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

The angles which a line makes with positive x ,y and z-axes are known as ----------

Answer (Please select your correct option)

- Direction cosines
- Direction ratios
- Direction angles

correct

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

If α, β and γ are the direction angles of a line then

$\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma =$

Answer (Please select your correct option)

- 0
- 1
- 2
- T

correct

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

Intersection of two non parallel planes is a . . . . . .

Answer (Please select your correct option)

- Plane
- Point
- Straight line

correct

- None of these.

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

$$\lim_{(x,y)\to(0,1)} \frac{xy^2}{x^2+y^2} =$$

Answer (Please select your correct option)

- ∞
- 0 correct
- 1
- 0.5

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

The function $z = \frac{1}{\sqrt{x+y}}$ is discontinuous at origin because at the point (0,0), it . . . . . .

Answer (Please select your correct option)

- has a jump
- has a hole
- approaches towards infinity
- approaches towards zero

correct

Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

Gradient of a scalar function always results in a . . . . . function.

Answer (Please select your correct option)

- Scalar
- Continuous
- Vector

correct

- Constant

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

At the critical point (x_0, y_0), if $D = f_{xx}(x_0 y_0) f_{yy}(x_0 y_0) - f_{xy}{}^2(x_0 y_0) < 0$ then f has a . . . . . .

Answer (Please select your correct option)

- Relative maximum at (x_0, y_0)
- Relative minimum at (x_0, y_0) correct
- Saddle point at (x_0, y_0)
- No conclusion can be drawn

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

The volume of parallelepiped with dimensions x, y, z is . . . . . .

Answer (Please select your correct option)

- $V = x^2y^2z^2$
- $V = x + y + z$
- $V = \sqrt{xyz}$
- $V = xyz$

correct

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x, y) : 0 \le x \le 2 \text{ and } 1 \le y \le 4\}$, then $\iint_R (6x^2 + 4xy^3)dA = \ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\int_1^4 \int_0^2 (6x^2 + 4xy^3)dydx$
- $\int_0^2 \int_1^4 (6x^2 + 4xy^3)dxdy$
- $\int_1^4 \int_0^2 (6x^2 + 4xy^3)dxdy$ correct
- $\int_2^4 \int_0^1 (6x^2 + 4xy^3)dxdy$

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

Polar co-ordinates of a point are $\left(7, \frac{-\pi}{4}\right)$. Which of the following is another possible polar co-ordinates representation of this point?

Answer (Please select your correct option)

- $\left(7, \frac{3\pi}{4}\right)$ correct
- $\left(-7, \frac{3\pi}{4}\right)$
- $\left(-7, \frac{-\pi}{4}\right)$
- $\left(7, \frac{-3\pi}{4}\right)$

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

Polar co-ordinates of a point are $\left(-2, \frac{-3\pi}{2}\right)$. Which of the following is another possible polar co-ordinates representation of this point?

Answer (Please select your correct option)

- $\left(-2, \frac{\pi}{2}\right)$ correct
- $\left(-2, \frac{\pi}{4}\right)$
- $\left(-2, \frac{3\pi}{4}\right)$
- $\left(-2, \frac{\pi}{3}\right)$

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(r, \pi - \theta)$ then the curve is said to be symmetric about . . . . . .

Answer (Please select your correct option)

- y-axis

- Pole
- Initial line
- origin

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

In polar coordinate system, x- axis is also called . . . . . .

Answer (Please select your correct option)

- Polar axis

correct

- Pole
- Imaginary axis
- None of these

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

The point $p(0,\theta)$ in polar coordinate system lies on . . . . . .

Answer (Please select your correct option)

- Polar axis
- y-axis
- Pole
- None of these

correct

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

Given the integral $\iint_R f(x,y)dxdy$, after converting to polar coordinates, it will become . . . . . where $a \leq \theta \leq b$ and c ≤ r ≤ d.

Answer (Please select your correct option)

- $\int_a^b \int_c^d f(r,\theta) r dr d\theta$
- $\int_a^b \int_c^d f(r,\theta) dr d\theta$ correct
- $\int_a^b \int_c^d f(r,\theta) r d\theta dr$
- $\int_a^b \int_c^d f(r,\theta) d\theta dr$

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The parametric equations that correspond to the vector equation $\vec{r}(t) = \sin^2 t\,\hat{i} + (1-\cos 2t)\,\hat{j}$ are . . . . . .

Answer (Please select your correct option)

- $x = \sin^2 t \quad , \quad y = 1-\cos 2t \quad , \quad z = 0$ correct
- $y = \sin^2 t \quad , \quad x = 1-\cos 2t \quad , \quad z = 0$
- $x = \sin^2 t \quad , \quad y = 1-\cos 2t \quad , \quad z = 1$
- $x = \sin^2 t \quad , \quad y = \cos 2t \quad , \quad z = 1$

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

If $\vec{R}(t)$ is the anti-derivative of a given vector valued function $\vec{r}(t)$ i.e., $\vec{R}'(t) = \vec{r}(t)$ then $\int_a^b \vec{r}(t)dt = \ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\vec{R}(a) + \vec{R}(b)$
- $\vec{R}(b) - \vec{R}(a) + c$ where c is a non-zero constant.
- $\vec{R}(a).\vec{R}(b)$
- $\vec{R}(b) - \vec{R}(a)$

Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

For the given vector valued functions $\vec{r}_1(t)$ and $\vec{r}_2(t)$, $\frac{d}{dt}[\vec{r}_1(t)\times\vec{r}_2(t)]$ = ... where "×" and "·" represent the cross and dot product respectively.

Answer (Please select your correct option)

- $\vec{r}_1 \cdot \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \cdot \vec{r}_2$
- $\vec{r}_1 \times \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$
- $\frac{d\vec{r}_2}{dt} \times \vec{r}_1 + \vec{r}_2 \times \frac{d\vec{r}_1}{dt}$
- $\frac{d\vec{r}_2}{dt} \times \vec{r}_1 + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

A vector valued function $\vec{r}(t) = x(t)\hat{i} + y(t)\hat{j} + z(t)\hat{k}$ is continuous if . . . . . .

Answer (Please select your correct option)

- Atleast one of its components is continuous.
- All of its components are necessarily differentiable.
- All of its components are continuous.
- Limit exists for all of its components.

correct

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

Given a vector valued function $\vec{r}(t) = \frac{1}{(t-3)}\hat{i} + e^t\hat{j}$ and its anti-derivative $\vec{R}(t) = \ln(t-3)\hat{i} + e^t\hat{j}$, then $\int \vec{r}(t)dt = \ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\ln(t-3)\hat{i} + e^t\hat{j} + c$
- $(t-3)\hat{i} + \frac{e^t}{2}\hat{j} + c$
- $(t-3)^{-1}\hat{i} + \frac{e^t}{2}\hat{j} + c$
- $\frac{1}{(t-3)}\hat{i} + e^t\hat{j}$

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

For any two vector valued functions $\vec{r}_1(t)$ and $\vec{r}_2(t)$, $\frac{d}{dt}[\vec{r}_1(t).\vec{r}_2(t)] = \ldots\ldots\ldots\ldots$ where "×" and "·" represent the cross and dot product respectively.

Answer (Please select your correct option)

- $\vec{r}_1 \cdot \frac{d\vec{r}_2}{dt} - \frac{d\vec{r}_1}{dt} \cdot \vec{r}_2$
- $\vec{r}_1 \cdot \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \cdot \vec{r}_2$
- $\vec{r}_1 \times \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$
- $\vec{r}_1 \cdot \frac{d\vec{r}_2}{dt} - \frac{d\vec{r}_1}{dt} \times \vec{r}_2$ correct

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

A single curve can be represented by . . . . . vector valued function(s).

Answer (Please select your correct option)

- Two
- Infinitely many
- Single

correct

- Three

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

A function is said to be smooth if it's derivative is . . . . . on any value of its domain.

Answer (Please select your correct option)

- continuous and non zero
- piecewise continuous
- defined and non zero
- differentiable

correct

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the derivative of following vector-valued function?

$\vec{r}(t) = \left(t^4, \sqrt{t+1}, \frac{3}{t^2}\right)$

Answer (Please select your correct option)

- $\vec{r}'(t) = \left(4t^3, \frac{1}{\sqrt{t+1}}, \frac{-6}{t^3}\right)$
- $\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{6}{t^3}\right)$
- $\vec{r}'(t) = \left(4t^4, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3}\right)$
- $\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3}\right)$ correct

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the derivative of following vector-valued function?

$\vec{r}(t) = \left(e^{t^2}, t^2, \sec 2t\right)$

Answer (Please select your correct option)

- $\vec{r}'(t) = \left(2te^{t^2}, 2t, 2\sec 2t \tan 2t\right)$
- $\vec{r}'(t) = \left(te^{t^2}, 2t, \sec 2t \tan 2t\right)$ correct
- $\vec{r}'(t) = \left(2te^{t^2}, 2t, \tan 2t\right)$
- $\vec{r}'(t) = \left(t^2e^{t^2}, 2t, \sec 2t \tan 2t\right)$

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

Evaluate the integral $\int \left[(3t-1)\hat{i}+\sqrt{t}\,\hat{j}\right] dt$

Answer (Please select your correct option)

- $\int \left[(3t-1)\hat{i}+\sqrt{t}\,\hat{j}\right] dt = \left(\frac{3}{2}t^2 - t\right)\hat{i} + \left(\frac{3}{2}t^{\frac{3}{2}}\right)\hat{j} + C$
- $\int \left[(3t-1)\hat{i}+\sqrt{t}\,\hat{j}\right] dt = \left(\frac{3}{2}t^2 - t\right)\hat{i} + \left(\frac{2}{3}t^{\frac{3}{2}}\right)\hat{j} + C$ correct
- $\int \left[(3t-1)\hat{i}+\sqrt{t}\,\hat{j}\right] dt = \left(\frac{3}{2}t - t\right)\hat{i} + \left(\frac{2}{3}t^{\frac{3}{2}}\right)\hat{j} + C$
- $\int \left[(3t-1)\hat{i}+\sqrt{t}\,\hat{j}\right] dt = \left(\frac{3}{2}t^2 - t\right)\hat{i} + \left(\frac{1}{2}t^{\frac{3}{2}}\right)\hat{j} + C$

Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

The following differential is exact

$dz = (6xy + 2y^2 - 5)\ dx + (3x^2 + 4xy - 6)\ dy$

Answer (Please select your correct option)

- True

correct

- False

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the amplitude of a periodic function defined by $f(x) = 4\cos 3x$?

Answer (Please select your correct option)

- 1
- 3
- 4 correct
- 12

Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of a periodic function defined by $f(x) = 4\sin 2x$?

Answer (Please select your correct option)

- 2^0
- 4^0
- 8^0
- 180^0 correrect
- 360^0

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of a periodic function defined by $f(x) = \sin\frac{x}{2}$?

Answer (Please select your correct option)

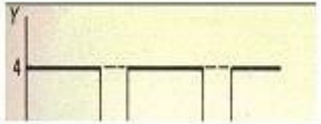
- $\frac{\pi}{2}$
- π
- $\frac{3\pi}{2}$
- 4π

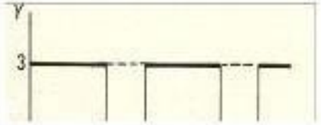
Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

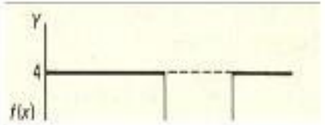
Match the following periodic function with its graph.

$$f(x)=\begin{cases}4 & 0<x<5\\ 0 & 5<x<8\end{cases}$$

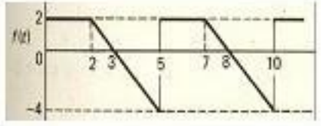
Answer (Please select your correct option)







correct

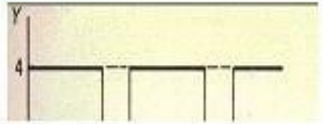


Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

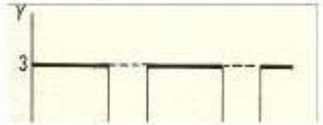
Match the following periodic function with its graph.

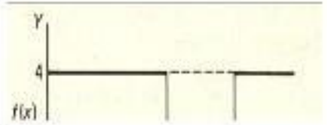
$$f(x)=\begin{cases}4 & 0<x<6\\ 0 & 6<x<8\end{cases}$$

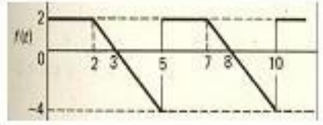
Answer (Please select your correct option)



correct

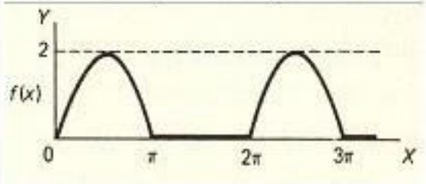






Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of periodic function whose graph is as below?



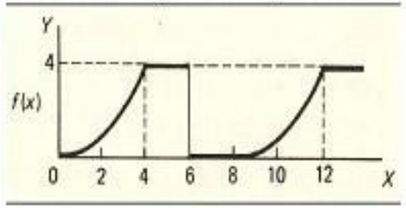
Answer (Please select your correct option)

- 0
- 2
- π
- 2π

correct

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of periodic function whose graph is as below?



Answer (Please select your correct option)

- 0
- 4
- 6
- 8

correct

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

Let L denotes the Laplace Transform.

If $L(F(t)) = f(s)$ where s is a constant and $\lim_{t \to 0}\left(\frac{F(t)}{t}\right)$ exists then which of the following equation holds?

Answer (Please select your correct option)

- $L\left(\frac{F(t)}{t}\right) = f(s+a)$
- $L\left(\frac{F(t)}{t}\right) = f(s-a)$
- $L\left(\frac{F(t)}{t}\right) = \int_s^\infty f(s)\, ds$ correct
- $L\left(\frac{F(t)}{t}\right) = -\frac{d}{ds}(f(s))$

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

The function $f(x) = x^2 \cos 2x$ is ----------

Answer (Please select your correct option)

- Neither even nor odd
- Odd function
- Even function

correct

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of an even function is symmetrical about ----------

Answer (Please select your correct option)

- x-axis
- y-axis

correct

- origin

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of an odd function is symmetrical about ----------

Answer (Please select your correct option)

- x-axis
- y-axis
- origin

correct

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

Sign of line integral is reversed when ----------

Answer (Please select your correct option)

- path of integration is divided into parts.
- path of integration is parallel to y-axis.
- direction of path of integration is reversed.
- path of integration is parallel to x-axis.

correct

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

What is laplace transform of the function $F(t)$ if $F(t) = \cos 2t$?

Answer (Please select your correct option)

- $L\{\cos 2t\} = \frac{2}{s^2+4}$ correct
- $L\{\cos 2t\} = \frac{1}{s-2}$
- $L\{\cos 2t\} = \frac{s}{s^2+4}$
- $L\{\cos 2t\} = \frac{2!}{s^3}$

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

What is Laplace Inverse Transform of $\frac{5}{s^2+25}$

Answer (Please select your correct option)

- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \sin 5t$ correct
- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \cos 5t$
- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \sin 25t$
- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \cos 25t$

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

Evaluate the line integral $\int_C (3x + 2y)\,dx + (2x - y)\,dy$ where C is the line segment from (0, 0) to (0, 2).

Answer (Please select your correct option)

- 1
- 0
- 2 correct
- -2

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

Evaluate the line integral $\int_C (xy)\,dx + (1+y^2)\,dy$ where C is the line segment from (1, 0) to (3, 0).

Answer (Please select your correct option)

- -4
- 0 correct
- 4
- Do not exist

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

If p is the period of a function then that function is said to be periodic if $f(x+p) = f(x)$, _____

Answer (Please select your correct option)

- For all values of x in the domain of f

  correct

- For positive values of x in the domain of f

- For negative values of x in the domain of f

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

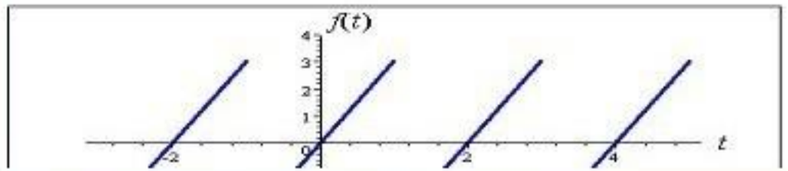
A vector field is a vector each of whose components is a scalar field

Answer (Please select your correct option)

- True
- False

correct

Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)



Answer (Please select your correct option)

- An odd function
- An even function
- Neither even nor odd

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following set is the union of sets of rational and irrational numbers?

Answer (Please select your correct option)

- Set of rational numbers
- Set of integers
- Set of real numbers

correct

- Empty set.

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$ shows ..... (x_1, y_1, z_1) and (x_2, y_2, z_2).

Answer (Please select your correct option)

- Distance between the points

correct

- Midpoint of the line joining the points
- Ratio between the points

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

Domain of the function $f(x, y) = \sqrt{y - x^2}$ satisfies the condition . . . . . .

Answer (Please select your correct option)

- $y < x^2$
- $y \geq x^2$ correct
- $y \neq x^2$
- Entire space

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

If rectangular co-ordinates of a point are $(1, \sqrt{3}, -2)$, then value of "r" in cylindrical co-ordinates is . . . . . .

Answer (Please select your correct option)

- $\sqrt{2}$
- 2
- $2\sqrt{2}$
- $-2\sqrt{2}$

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

Suppose $f(x, y) = x^3 e^{xy}$. Which of the following options is correct?

Answer (Please select your correct option)

- $\frac{\partial f}{\partial y} = 3x^3 e^{xy}$
- $\frac{\partial f}{\partial y} = x^3 e^{xy}$
- $\frac{\partial f}{\partial y} = x^4 e^{xy}$ correct
- $\frac{\partial f}{\partial y} = x^3 y e^{xy}$

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

The function decreases most rapidly in the direction of . . . . . .

Answer (Please select your correct option)

- $-\nabla f$ correct
- $-|\nabla f|$
- $\nabla f \times \hat{u}$
- $|\nabla f|$

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

Two surfaces are said to be orthogonal at the point of their intersection if their normals at that point are ---------

Answer (Please select your correct option)

- Parallel
- Perpendicular

corrrect

- In opposite direction
- Overlapping

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

For a function $f(x,y)$ to have both absolute maximum and minimum, it must be Continuous on . . . . . set R.

Answer (Please select your correct option)

- a closed and bounded
- an open and bounded
- a closed and unbounded
- an open and unbounded

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x, y) : 2 \le x \le 4 \text{ and } 0 \le y \le 1\}$, then $\iint_R (4xe^{2y})dA = \ldots\ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\int_0^1 \int_2^4 (4xe^{2y})dydx$
- $\int_0^1 \int_2^4 (4xe^{2y})dxdy$
- $\int_1^4 \int_0^2 (4xe^{2y})dxdy$
- $\int_1^4 \int_0^2 (4xe^{2y})dydx$

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

Let R be a closed region in two dimensional space then the double integral over R calculates. . . . . .

Answer (Please select your correct option)

- Area of R
- Radius of inscribed circle in R.
- Distance between two endpoints of R.
- None of these

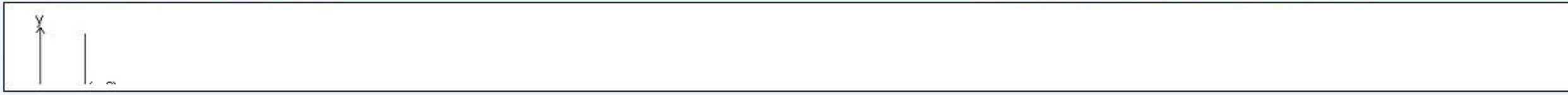
Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

Match the following equation in polar co-ordinates with its graph.

$r \cos\theta = a$

*where a is an arbitrary cons*tan*t*

Answer (Please select your correct option)



Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

Polar co-ordinates of a point are $\left(-2, \frac{-3\pi}{2}\right)$. Which of the following is another possible polar co-ordinates representation of this point?

Answer (Please select your correct option)

- $\left(2, \frac{-\pi}{4}\right)$
- $\left(2, \frac{-\pi}{2}\right)$
- $\left(2, \frac{-\pi}{3}\right)$
- $\left(2, \frac{3\pi}{4}\right)$

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(r, -\theta)$ then the curve is said to be symmetric about .....

Answer (Please select your correct option)

- Initial line
- y-axis

correct

- Pole
- origin

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of curve $r^2 = 4 \cos 2\theta$ is symmetric about .....

Answer (Please select your correct option)

- Initial line correct
- y-axis
- both initial line and y-axis
- none of these

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

If $p(r,\theta)$ is a point in polar coordinate system, then r is the distance of p from . . . . . .

Answer (Please select your correct option)

- Pole
- Imaginary axis
- None of these
- Polar axis

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

The point $p(0,\theta)$ in polar coordinate system lies on . . . . . .

Answer (Please select your correct option)

- Polar axis
- y-axis
- Pole
- None of these

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

Given the integral $\iint_R f(x,y)dxdy$, after converting to polar coordinates, it will become . . . . . where $a \leq \theta \leq b$ and c ≤ r ≤ d.

Answer (Please select your correct option)

- $\int_a^b \int_c^d f(r,\theta)rdrd\theta$
- $\int_a^b \int_c^d f(r,\theta)drd\theta$
- $\int_a^b \int_c^d f(r,\theta)rd\theta dr$
- $\int_a^b \int_c^d f(r,\theta)d\theta dr$

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following is correct Wallis Sine formula when n is odd and $n \geq 3$?

Answer (Please select your correct option)

- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{\pi}{2}\frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{--------}\frac{5}{6}\frac{3}{4}\frac{1}{2}$
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{\pi}{2}\frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{--------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{--------}\frac{6}{7}\frac{4}{5}\frac{2}{3}$ correct
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{--------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the amplitude of a periodic function defined by $f(x) = 4\sin 2x$?

Answer (Please select your correct option)

- 2
- 4
- 8
- 16

correct

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of a periodic function defined by $f(x) = \sin \frac{x}{2}$?

Answer (Please select your correct option)

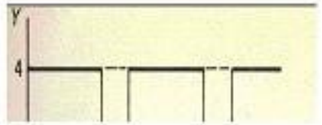
- $\frac{\pi}{2}$
- π
- $\frac{3\pi}{2}$
- 4π

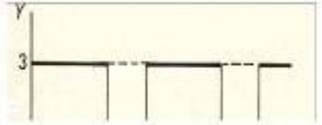
correct

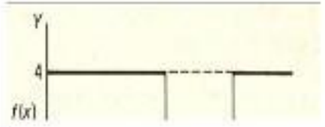
Match the following periodic function with its graph.

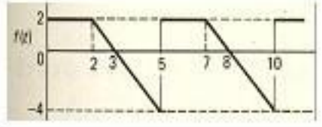
$$f(x) = \begin{cases} 3 & 0 < x < 4 \\ 0 & 4 < x < 6 \end{cases}$$

Answer (Please select your correct option)







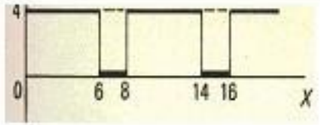


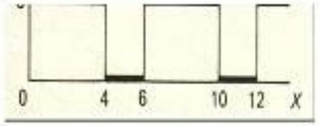
Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

Match the following periodic function with its graph.

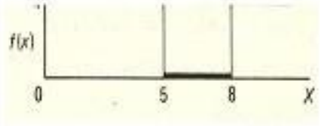
$$f(x) = \begin{cases} 3 & 0 < x < 4 \\ 0 & 4 < x < 6 \end{cases}$$

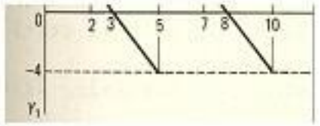
Answer (Please select your correct option)





correct





Match the following periodic function with its graph.

$$f(x) = \begin{cases} 4 & 0 < x < 6 \\ 0 & 6 < x < 8 \end{cases}$$

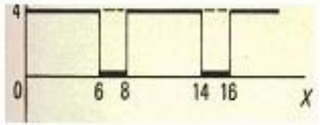
Answer (Please select your correct option)

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

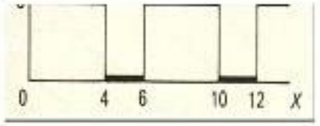
Match the following periodic function with its graph.

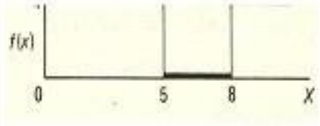
$$f(x) = \begin{cases} 4 & 0 < x < 6 \\ 0 & 6 < x < 8 \end{cases}$$

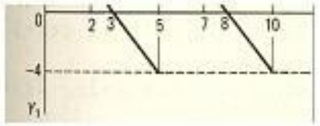
Answer (Please select your correct option)



correct

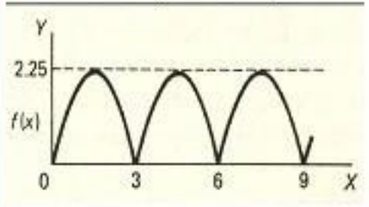






Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of periodic function whose graph is as below?



Answer (Please select your correct option)

- 0
- 2.25
- 3 correct
- 6

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following condition must be satisfied for a vector field $\vec{F}$ to be a conservative vector field?

Answer (Please select your correct option)

- Line integral of $\vec{F}$ along a curve, depends only on the endpoints of that curve, not on the particular route taken.
- Divergence of $\vec{F}$ should be zero
- Gradient of $\vec{F}$ should be zero.
- $\vec{F} = 0$

correct

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

Let L denotes the Laplace Transform.
According to First Shift Theorem, if $L(F(t)) = f(s)$ then which of the following equation holds?
s *and* a are constants.

Answer (Please select your correct option)

- $L(e^{-at}F(t)) = f(s-a)$
- $L(e^{-at}F(t)) = f(s+a)$
- $L(e^{-at}F(t)) = f(s)$
- $L(e^{-at}F(t)) = f(a)$

Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

The function $f(x) = x^2 \cos 2x$ is ----------

Answer (Please select your correct option)

- Even function

correct

- Odd function
- Neither even nor odd

Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is Laplace inverse transform of the function $f(s)$ defined by $f(s) = \frac{3}{s-2} - \frac{2}{s}$?

Answer (Please select your correct option)

- $3te^{2t} - 2$
- $3e^{2t} - 2t$
- $3e^{2t} - 2$ correct
- None of these.

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

What is Laplace transform of a function F(t)?

(s is a constant)

Answer (Please select your correct option)

- $\int_0^s e^{-st} F(t)\, dt$
- $\int_0^\infty e^{st} F(t)\, dt$
- $\int_{-\infty}^\infty e^{-st} F(t)\, dt$
- $\int_0^\infty e^{-st} F(t)\, dt$ correct

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

What is laplace transform of the function $F(t)$ if $F(t) = \sin 3t$?

Answer (Please select your correct option)

- $L\{\sin 3t\} = \frac{3}{s^2+9}$ correct
- $L\{\sin 3t\} = \frac{s}{s^2+9}$
- $L\{\sin 3t\} = \frac{1}{s-3}$
- $L\{\sin 3t\} = \frac{3!}{s^4}$

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

If L denotes laplace transform then
$L(te^{5t}) =$

Answer (Please select your correct option)

- $L(te^{5t}) = \frac{1}{s^2 - 5}$
- $L(te^{5t}) = \frac{1}{s^2 + 5}$
- $L(te^{5t}) = \frac{1}{(s+5)^2}$
- $L(te^{5t}) = \frac{1}{(s-5)^2}$ correct

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

What is Laplace Inverse Transform of $\frac{s}{s^2+25}$

Answer (Please select your correct option)

- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \sin 5t$
- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \cos 5t$ correct
- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \sin 25t$
- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \cos 25t$

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

What is $L(-6)$ if L denotes Laplace Transform?

Answer (Please select your correct option)

- $L(-6) = \frac{1}{s+6}$
- $L(-6) = \frac{-6}{s}$ correct
- $L(-6) = \frac{s}{s^2+36}$
- $L(-6) = \frac{-6}{s^2+36}$

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

Curl of vector function is always a ----------

Answer (Please select your correct option)

- Scalar
- Vector

correct

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is geometrical representation of set of real numbers?

Answer (Please select your correct option)

- Co-ordinate line

correct

- xy-plane
- Sphere
- Circular cylinder

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is the interval notation of real line?

Answer (Please select your correct option)

- (-∞ , +∞) correct
- (-∞ , 0)
- (0 , +∞)

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

An ordered triple corresponds to ---------- in a three dimensional space.

Answer (Please select your correct option)

- A unique point

correct

- A point in each octant
- Three points
- Infinite number of points

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the distance between points (3, 2, 0) and (1, 0, -1)?

Answer (Please select your correct option)

- 3 correct
- $\sqrt{6}$
- $\sqrt{3}$
- $\sqrt{10}$

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following are direction ratios for the line joining the points $(1, 3, 5)$ and $(2, -1, 4)$?

Answer (Please select your correct option)

- 3, 2, 9
- 1, -4, -1
- 2, -3, 20
- 0.5, -3, 5/4

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

In three dimensional space, the equation $y = x^2$ always represents . . . . . .

Answer (Please select your correct option)

- Parabola

correct

- Straight line
- Half cylinder
- Cone

Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

For a function $f(x,y,z)$, the equation $\frac{\partial^2 f}{\partial^2 x}+\frac{\partial^2 f}{\partial^2 y}+\frac{\partial^2 f}{\partial^2 z}=0$ is known as ----------

Answer (Please select your correct option)

- Gauss Equation
- Euler's equation
- Laplace's Equation

correct

- Stoke's Equation

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

Every differentiable function is always . . . . . .

Answer (Please select your correct option)

- Piece wise continuous
- Discontinuous
- Continuous

correct

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

Gradient of a scalar function always results in a . . . . . function.

Answer (Please select your correct option)

- Scalar
- Continuous
- Vector

correct

- Constant

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

The two normal lines for the surfaces $f(x,y,z)=0$ and $g(x,y,z)=0$, are orthogonal if and only if . . . . . where f_x, f_y, f_z and g_x, g_y, g_z are direction ratios for the two normal lines respectively.

Answer (Please select your correct option)

- $f_x g_y + f_y g_z + f_z g_x = 0$
- $f_x g_x + f_y g_y + f_z g_z \geq 0$
- $f_x g_x + f_y g_y + f_z g_z = 0$ correct
- $f_x + f_y + f_z + g_x + g_y + g_z = 0$

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

Match the following equation in polar co-ordinates with its graph.

$r \cos\theta = a$

*where a is an arbitrary cons*tan*t*

Answer (Please select your correct option)

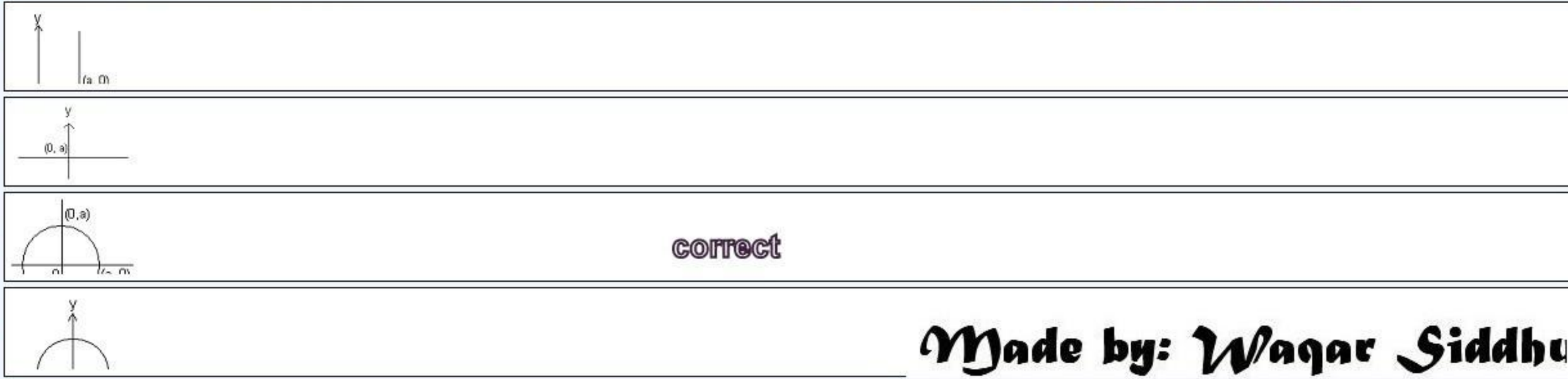
Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

Match the following equation in polar co-ordinates with its graph.

$r \sin\theta = a$

where a is an arbitrary constant

Answer (Please select your correct option)



correct

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Polar co-ordinates of a point are $\left(-2, \frac{-3\pi}{2}\right)$. Which of the following is another possible polar co-ordinates representation of this point?

Answer (Please select your correct option)

- $\left(2, \frac{-\pi}{4}\right)$
- $\left(2, \frac{-\pi}{2}\right)$ correct
- $\left(2, \frac{-\pi}{3}\right)$
- $\left(2, \frac{3\pi}{4}\right)$

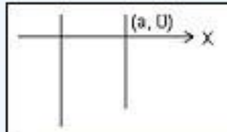
Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

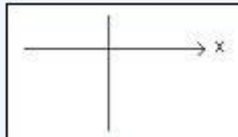
Match the following equation in polar co-ordinates with its graph.

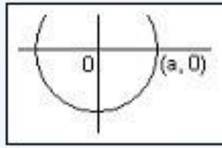
$r \sin\theta = a$

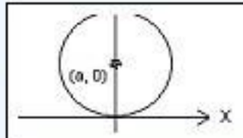
where a is an arbitrary constant

Answer (Please select your correct option)









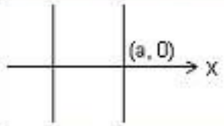
Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

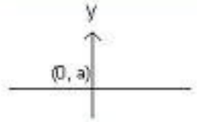
Match the following equation in polar co-ordinates with its graph.

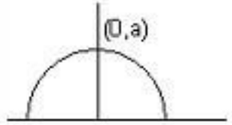
$r \cos\theta = a$

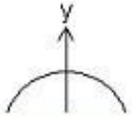
where a is an arbitrary constant

Answer (Please select your correct option)









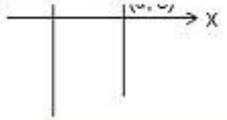
Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

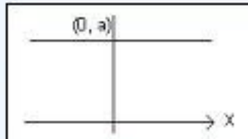
Match the following equation in polar co-ordinates with its graph.

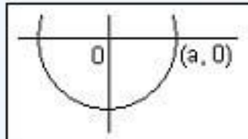
$r \cos\theta = a$

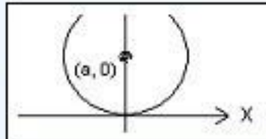
where a is an arbitrary constant

Answer (Please select your correct option)









Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Polar co-ordinates of a point are $\left(-2, \frac{-3\pi}{2}\right)$. Which of the following is another possible polar co-ordinates representation of this point?

Answer (Please select your correct option)

- $\left(2, \frac{-\pi}{4}\right)$
- $\left(2, \frac{-\pi}{2}\right)$
- $\left(2, \frac{-\pi}{3}\right)$
- $\left(2, \frac{3\pi}{4}\right)$

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(r, -\theta)$ then the curve is said to be symmetric about .....

Answer (Please select your correct option)

- Initial line

- y-axis
- Pole
- origin

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

Given the integral $\iint_R f(x,y)dxdy$, after converting to polar coordinates, it will become . . . . . where $a \le \theta \le b$ and c ≤ r ≤ d.

Answer (Please select your correct option)

- $\int_a^b \int_c^d f(r,\theta) r dr d\theta$
- $\int_a^b \int_c^d f(r,\theta) dr d\theta$ correct
- $\int_a^b \int_c^d f(r,\theta) r d\theta dr$
- $\int_a^b \int_c^d f(r,\theta) d\theta dr$

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

The parametric equations that correspond to the vector equation $\vec{r}(t) = \sin^2 t\,\hat{i} + (1-\cos 2t)\,\hat{j}$ are . . . . . .

Answer (Please select your correct option)

- $x = \sin^2 t \quad , \quad y = 1-\cos 2t \quad , \quad z = 0$ correct
- $y = \sin^2 t \quad , \quad x = 1-\cos 2t \quad , \quad z = 0$
- $x = \sin^2 t \quad , \quad y = 1-\cos 2t \quad , \quad z = 1$
- $x = \sin^2 t \quad , \quad y = \cos 2t \quad , \quad z = 1$

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of the equation $r = 3\hat{i} - 2\hat{j} - \hat{k}$ is the point . . . . . .

Answer (Please select your correct option)

- (1, −2, 3)
- (3, −2, −1)
- (3, 2, 1)
- (−3, −2, −1)

correct

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

If $\vec{R}(t)$ is the anti-derivative of a given vector valued function $\vec{r}(t)$ i.e., $\vec{R}'(t) = \vec{r}(t)$ then $\int_a^b \vec{r}(t)dt = \ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\vec{R}(a) + \vec{R}(b)$
- $\vec{R}(b) - \vec{R}(a) + c$ where c is a non-zero constant. correct
- $\vec{R}(a).\vec{R}(b)$
- $\vec{R}(b) - \vec{R}(a)$

Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

For the given vector valued functions $\vec{r}_1(t)$ and $\vec{r}_2(t)$, $\frac{d}{dt}[\vec{r}_1(t)\times\vec{r}_2(t)]$ = ... where "×" and "▪" represent the cross and dot product respectively.

Answer (Please select your correct option)

- $\vec{r}_1 \cdot \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \cdot \vec{r}_2$
- $\vec{r}_1 \times \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$
- $\frac{d\vec{r}_2}{dt} \times \vec{r}_1 + \vec{r}_2 \times \frac{d\vec{r}_1}{dt}$
- $\frac{d\vec{r}_2}{dt} \times \vec{r}_1 + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

A vector valued function $\vec{r}(t) = x(t)\hat{i} + y(t)\hat{j} + z(t)\hat{k}$ is continuous if . . . . . .

Answer (Please select your correct option)

- Atleast one of its components is continuous.
- All of its components are necessarily differentiable.
- All of its components are continuous.
- Limit exists for all of its components.

correct

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

Given a vector valued function $\vec{r}(t) = \frac{1}{(t-3)}\hat{i} + e^t\hat{j}$ and its anti-derivative $\vec{R}(t) = \ln(t-3)\hat{i} + e^t\hat{j}$, then $\int \vec{r}(t)dt = \ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\ln(t-3)\hat{i} + e^t\hat{j} + c$ correct
- $(t-3)\hat{i} + \frac{e^t}{2}\hat{j} + c$
- $(t-3)^{-1}\hat{i} + \frac{e^t}{2}\hat{j} + c$
- $\frac{1}{(t-3)}\hat{i} + e^t\hat{j}$

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

For any two vector valued functions $\vec{r}_1(t)$ and $\vec{r}_2(t)$, $\frac{d}{dt}[\vec{r}_1(t).\vec{r}_2(t)] = \ldots\ldots\ldots\ldots$ where "×" and "▪" represent the cross and dot product respectively.

Answer (Please select your correct option)

- $\vec{r}_1 . \frac{d\vec{r}_2}{dt} - \frac{d\vec{r}_1}{dt} . \vec{r}_2$
- $\vec{r}_1 . \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} . \vec{r}_2$
- $\vec{r}_1 \times \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$
- $\vec{r}_1 . \frac{d\vec{r}_2}{dt} - \frac{d\vec{r}_1}{dt} \times \vec{r}_2$ correct

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

A single curve can be represented by . . . . . vector valued function(s).

Answer (Please select your correct option)

- Two
- Infinitely many
- Single

correct

- Three

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

A function is said to be smooth if it's derivative is . . . . . on any value of its domain.

Answer (Please select your correct option)

- continuous and non zero
- piecewise continuous
- defined and non zero
- differentiable

correct

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following is correct Wallis Cosine formula when n is odd and $n \geq 3$?

Answer (Please select your correct option)

- $\int_0^{\frac{\pi}{2}} \cos^n x\, dx = \frac{\pi}{2} \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \text{--------} \frac{5}{6} \frac{3}{4} \frac{1}{2}$
- $\int_0^{\frac{\pi}{2}} \cos^n x\, dx = \frac{\pi}{2} \frac{(n)}{(n-1)} \frac{(n-2)}{(n-3)} \frac{(n-4)}{(n-5)} \text{--------} \frac{6}{5} \frac{4}{3} \frac{2}{1}$
- $\int_0^{\frac{\pi}{2}} \cos^n x\, dx = \frac{(n)}{(n-1)} \frac{(n-2)}{(n-3)} \frac{(n-4)}{(n-5)} \text{--------} \frac{6}{5} \frac{4}{3} \frac{2}{1}$
- $\int_0^{\frac{\pi}{2}} \cos^n x\, dx = \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \text{--------} \frac{6}{7} \frac{4}{5} \frac{2}{3}$

correct

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the amplitude of a periodic function defined by $f(x) = 4\cos 3x$?

Answer (Please select your correct option)

- 1
- 3
- 4 correct
- 12

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of a periodic function defined by $f(x) = \sin \frac{x}{2}$?

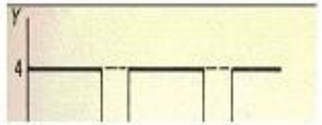
Answer (Please select your correct option)

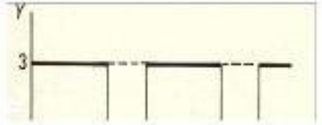
- $\frac{\pi}{2}$
- π correct
- $\frac{3\pi}{2}$
- 4π

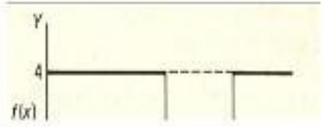
Match the following periodic function with its graph.

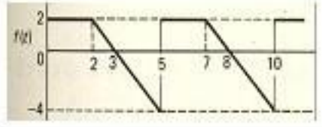
$$f(x) = \begin{cases} 4 & 0 < x < 5 \\ 0 & 5 < x < 8 \end{cases}$$

Answer (Please select your correct option)







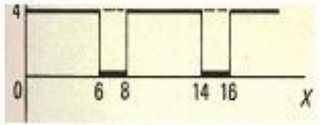


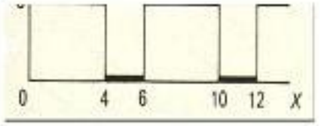
Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

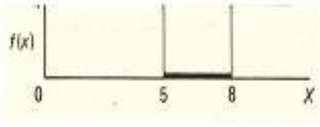
Match the following periodic function with its graph.

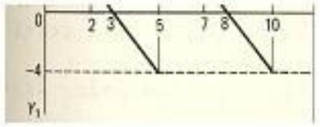
$$f(x) = \begin{cases} 4 & 0 < x < 5 \\ 0 & 5 < x < 8 \end{cases}$$

Answer (Please select your correct option)







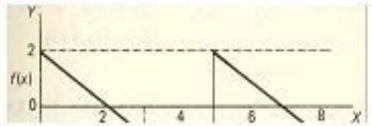


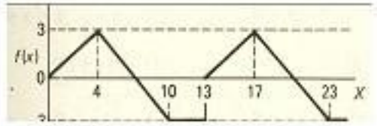
Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

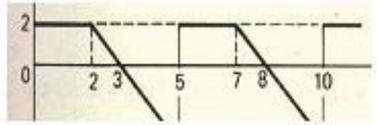
Match the following periodic function with its graph.

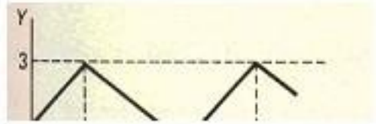
$$f(x) = \begin{cases} 2 - x & 0 < x < 3 \\ -1 & 3 < x < 5 \end{cases}$$

Answer (Please select your correct option)







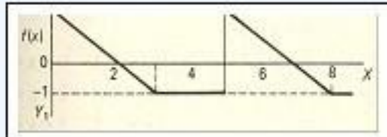


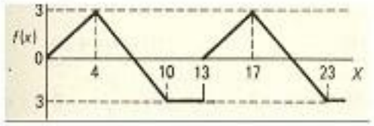
Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

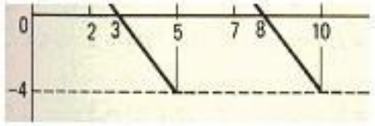
Match the following periodic function with its graph.

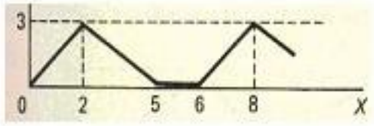
$$f(x) = \begin{cases} 2 - x & 0 < x < 3 \\ -1 & 3 < x < 5 \end{cases}$$

Answer (Please select your correct option)







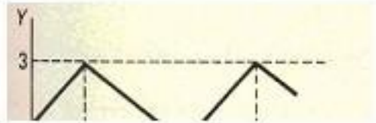


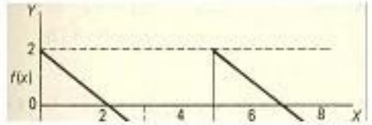
Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

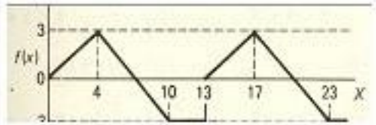
Match the following periodic function with its graph.

$$f(x) = \begin{cases} \frac{3}{4}x & 0 < x < 4 \\ 7 - x & 4 < x < 10 \\ -3 & 10 < x < 13 \end{cases}$$

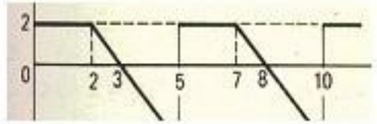
Answer (Please select your correct option)







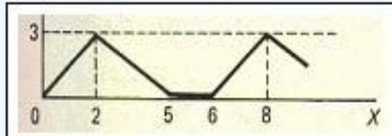
correct

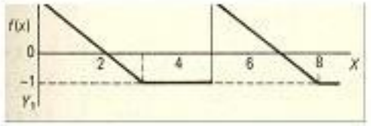


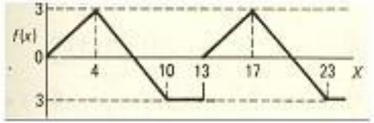
Match the following periodic function with its graph.

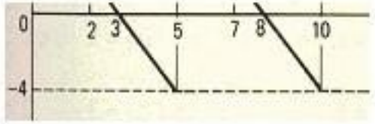
$$f(x) = \begin{cases} \frac{3}{4}x & 0 < x < 4 \\ 7 - x & 4 < x < 10 \\ -3 & 10 < x < 13 \end{cases}$$

Answer (Please select your correct option)



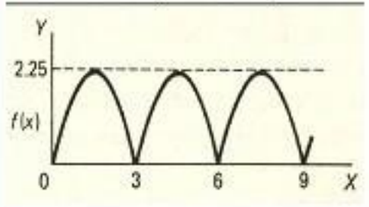






Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the period of periodic function whose graph is as below?



Answer (Please select your correct option)

- 0
- 2.25
- 3

correct

- 6

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

The function $f(x) = x^3 e^x$ is ----------

Answer (Please select your correct option)

- Even function
- Odd function
- Neither even nor odd

correct

Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of an even function is symmetrical about ----------

Answer (Please select your correct option)

- x-axis
- y-axis

correct

- origin

Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is Laplace inverse transform of the function $f(s)$ defined by $f(s) = \frac{3}{s-2} - \frac{2}{s}$?

Answer (Please select your correct option)

- $3te^{2t} - 2$
- $3e^{2t} - 2t$
- $3e^{2t} - 2$

correct

- None of these.

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

What is the value of $L\{e^{5t}\}$ if L denotes laplace transform?

Answer (Please select your correct option)

- $L\{e^{5t}\} = \frac{1}{s-5}$ correct
- $L\{e^{5t}\} = \frac{s}{s^2+25}$
- $L\{e^{5t}\} = \frac{5}{s^2+25}$
- $L\{e^{5t}\} = \frac{5!}{s^6}$

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

What is laplace transform of the function $F(t)$ if $F(t) = \sin 3t$?

Answer (Please select your correct option)

- $L\{\sin 3t\} = \frac{3}{s^2+9}$ correct
- $L\{\sin 3t\} = \frac{s}{s^2+9}$
- $L\{\sin 3t\} = \frac{1}{s-3}$
- $L\{\sin 3t\} = \frac{3!}{s^4}$

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

If L denotes laplace transform then
$L(te^{5t}) =$

Answer (Please select your correct option)

- $L(te^{5t}) = \frac{1}{s^2 - 5}$
- $L(te^{5t}) = \frac{1}{s^2 + 5}$
- $L(te^{5t}) = \frac{1}{(s+5)^2}$
- $L(te^{5t}) = \frac{1}{(s-5)^2}$ correct

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

What is Laplace Inverse Transform of $\frac{s}{s^2+25}$

Answer (Please select your correct option)

- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \sin 5t$
- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \cos 5t$
- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \sin 25t$
- $L^{-1}\left\{\frac{s}{s^2+25}\right\} = \cos 25t$

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

Divergence of a vector function is always a ----------

Answer (Please select your correct option)

- Scalar

correct

- Vector

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

If p is the period of a function then that function is said to be periodic if $f(x+p) = f(x)$, _____

Answer (Please select your correct option)

- For all values of x in the domain of f

correct

- For positive values of x in the domain of f
- For negative values of x in the domain of f

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is associated to each point on a plane?

Answer (Please select your correct option)

- A real number

correct

- A natural number
- An ordered pair

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the interval (-1, 5) on co-ordinate line. What does this interval denote?

Answer (Please select your correct option)

- The set of all real numbers between -1 and 5

- The set of all integers between -1 and 5
- The set of all natural numbers between -1 and 5
- The set of all rational numbers between -1 and 5

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

Equation of the circular disk with radius a and origin at $(0, 0)$ is given by . . . . . .

Answer (Please select your correct option)

- $x^2 + y^2 = a^2$ correct
- $x^2 + y^2 \geq a^2$
- $x^2 + y^2 \leq a^2$

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

In three dimensional space, the equation $y = x^2$ always represents . . . . . .

Answer (Please select your correct option)

- Parabola

correct

- Straight line
- Half cylinder
- Cone

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

Domain of the function $f(x, y, z) = \sqrt{x^2 + y^2 + z^2}$ is .....

Answer (Please select your correct option)

- Entire 3D-Space

correct

- Entire 3D-Space except origin
- First octant of 3D-Space

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

Suppose $f(x, y) = x^3 e^{xy}$. Which of the following options is correct?

Answer (Please select your correct option)

- $\frac{\partial f}{\partial y} = 3x^3 e^{xy}$
- $\frac{\partial f}{\partial y} = x^3 e^{xy}$
- $\frac{\partial f}{\partial y} = x^4 e^{xy}$
- $\frac{\partial f}{\partial y} = x^3 y e^{xy}$ correct

Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

Gradient of a scalar function always results in a . . . . . function.

Answer (Please select your correct option)

- Scalar
- Continuous
- Vector

correct

- Constant

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

Let x, y, z be the length, width and height of a rectangular box. The area of bottom will be . . . . . .

Answer (Please select your correct option)

- $A = yz$
- $A = xz$
- $A = xy$

correct

- $A = xyz$

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

Let x, y, z be the length, width and height of an open rectangular box. The surface area of the box will be . . . . . .

Answer (Please select your correct option)

- $A = xy + 2yz + 2xz$
- $A = yz + 4$
- $A = xz + yz + zx$
- $A = xyz$

correct

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x, y) : 0 \le x \le 2 \text{ and } 0 \le y \le 3\}$, then $\iint_R (1 - ye^{xy}) dA = \ldots\ldots\ldots$

Answer (Please select your correct option)

- $\int_0^2 \int_0^3 (1 - ye^{xy}) dy dx$ correct
- $\int_0^2 \int_0^3 (1 - ye^{xy}) dx dy$
- $\int_2^3 \int_0^0 (1 - ye^{xy}) dx dy$
- $\int_0^2 \int_2^3 (4xe^{2y}) dy dx$

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

Match the following equation in polar co-ordinates with its graph.

$r \sin\theta = a$

where a is an arbitrary constant

Answer (Please select your correct option)

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

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Answer (Please select your correct option)

- 

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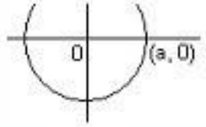
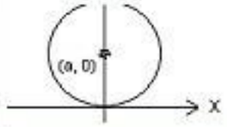
- 

correct
- 

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

Polar co-ordinates of a point are $(-8, 45^0)$. Which of the following is another possible polar co-ordinates representation of this point?

Answer (Please select your correct option)

- $(8, 225^0)$
- $(-8, 225^0)$
- $(8, 45^0)$
- $(8, 315^0)$

correct

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Polar co-ordinates of a point are $\left(7, \frac{-\pi}{4}\right)$. Which of the following is another possible polar co-ordinates representation of this point?

Answer (Please select your correct option)

- $\left(7, \frac{3\pi}{4}\right)$
- $\left(-7, \frac{3\pi}{4}\right)$
- $\left(-7, \frac{-\pi}{4}\right)$
- $\left(7, \frac{-3\pi}{4}\right)$

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

If $p(r,\theta)$ is a point in polar coordinate system, then r is the distance of p from .....

Answer (Please select your correct option)

- Pole

- Imaginary axis
- None of these
- Polar axis

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

Given the integral $\iint_R f(x,y)dxdy$, after converting to polar coordinates, it will become . . . . . where $a \le \theta \le b$ and c ≤ r ≤ d.

Answer (Please select your correct option)

- $\int_a^b \int_c^d f(r,\theta) r dr d\theta$ correct
- $\int_a^b \int_c^d f(r,\theta) dr d\theta$
- $\int_a^b \int_c^d f(r,\theta) r d\theta dr$
- $\int_a^b \int_c^d f(r,\theta) d\theta dr$

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

The graph of the equation $r = 3\hat{i} - 2\hat{j} - \hat{k}$ is the point . . . . . .

Answer (Please select your correct option)

- (1, −2, 3)
- (3, −2, −1)

correct

- (3, 2, 1)
- (−3, −2, −1)

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The natural domain of a vector valued function is the . . . . . of the natural domains of its components

Answer (Please select your correct option)

- Product
- Summation
- Union
- Intersection

correct

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

If $\vec{R}(t)$ is the anti-derivative of a given vector valued function $\vec{r}(t)$ i.e., $\vec{R}'(t) = \vec{r}(t)$ then $\int_a^b \vec{r}(t)dt = \ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\vec{R}(a) + \vec{R}(b)$
- $\vec{R}(b) - \vec{R}(a) + c$ where c is a non-zero constant.

correct

- $\vec{R}(a).\vec{R}(b)$
- $\vec{R}(b) - \vec{R}(a)$

For the given vector valued functions $\vec{r}_1(t)$ and $\vec{r}_2(t)$, $\frac{d}{dt}[\vec{r}_1(t)\times\vec{r}_2(t)]$ = ... where "×" and "▪" represent the cross and dot product respectively.

Answer (Please select your correct option)

- $\vec{r}_1 . \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} . \vec{r}_2$
- $\vec{r}_1 \times \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$
- $\frac{d\vec{r}_2}{dt} \times \vec{r}_1 + \vec{r}_2 \times \frac{d\vec{r}_1}{dt}$
- $\frac{d\vec{r}_2}{dt} \times \vec{r}_1 + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

A vector valued function $\vec{r}(t) = x(t)\hat{i} + y(t)\hat{j} + z(t)\hat{k}$ is continuous if . . . . . .

Answer (Please select your correct option)

- Atleast one of its components is continuous.
- All of its components are necessarily differentiable.
- All of its components are continuous.
- Limit exists for all of its components.

correct

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

Given a vector valued function $\vec{r}(t) = \frac{1}{(t-3)}\hat{i} + e^t\hat{j}$ and its anti-derivative $\vec{R}(t) = \ln(t-3)\hat{i} + e^t\hat{j}$, then $\int \vec{r}(t)dt = \ldots\ldots\ldots\ldots$

Answer (Please select your correct option)

- $\ln(t-3)\hat{i} + e^t\hat{j} + c$
- $(t-3)\hat{i} + \frac{e^t}{2}\hat{j} + c$
- $(t-3)^{-1}\hat{i} + \frac{e^t}{2}\hat{j} + c$
- $\frac{1}{(t-3)}\hat{i} + e^t\hat{j}$ correct

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

For any two vector valued functions $\vec{r}_1(t)$ and $\vec{r}_2(t)$, $\frac{d}{dt}[\vec{r}_1(t).\vec{r}_2(t)] = \ldots\ldots\ldots\ldots$ where "×" and "▪" represent the cross and dot product respectively.

Answer (Please select your correct option)

- $\vec{r}_1 . \frac{d\vec{r}_2}{dt} - \frac{d\vec{r}_1}{dt} . \vec{r}_2$
- $\vec{r}_1 . \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} . \vec{r}_2$
- $\vec{r}_1 \times \frac{d\vec{r}_2}{dt} + \frac{d\vec{r}_1}{dt} \times \vec{r}_2$
- $\vec{r}_1 . \frac{d\vec{r}_2}{dt} - \frac{d\vec{r}_1}{dt} \times \vec{r}_2$ correct

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

A single curve can be represented by . . . . . vector valued function(s).

Answer (Please select your correct option)

- Two
- Infinitely many
- Single

correct

- Three

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

A function is said to be smooth if it's derivative is . . . . . on any value of its domain.

Answer (Please select your correct option)

- continuous and non zero
- piecewise continuous
- defined and non zero
- differentiable

correct