National Testing Agency

Question Paper Name :	Mathematical Analysis 29th August 2021 Shift 1
Subject Name :	Mathematical Analysis
Creation Date :	2021-08-29 13:53:52
Duration :	180
Total Marks :	100
Display Marks:	Yes

Mathematical Analysis

Group Number :	1
Group Id :	603489262
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	100
Is this Group for Examiner? :	No

Mathematical Analysis-1

Section Id :	603489378
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory

Number of Questions :	100
Number of Questions to be attempted :	100
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	603489702
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 60348918543 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The usual metric defined on R is

1. d(x,y)=|x|-|y|
2. d(x,y)=|x-y|
3. d(x,y)=|x+y|
4. d(x,y)=1-|xy|

Options :

60348969909. 1

60348969910. 2

60348969911. 3

60348969912. 4

Question Number : 2 Question Id : 60348918544 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Among the following which one represents the discrete matric on a non-empty set X

1. $d(x,y) = \begin{cases} 0, if\ x = y \\ 1, if\ x \neq y \end{cases}$
2. $d(x,y) = \begin{cases} 0, if\ x \neq y \\ 1, if\ x = y \end{cases}$
3. $d(x,y) = \begin{cases} 0, if\ x \neq y \\ -1, if\ x = y \end{cases}$
4. $d(x,y) = \begin{cases} 0, if\ x = y \\ -1, if\ x \neq y \end{cases}$

Options :

60348969913. 1

60348969914. 2

60348969915. 3

60348969916. 4

Question Number : 3 Question Id : 60348918545 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In a metric space with discrete metric

1. Every element is an open set.
2. Every element is a closed set.
3. No element is an open set.
4. Every element is open and closed set.

Options :

60348969917. 1

60348969918. 2

60348969919. 3

60348969920. 4

Question Number : 4 Question Id : 60348918546 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which one the following is true?

1. Any subset of a compact set is compact.
2. Any open subset of a compact set is compact.
3. Any closed subset of a bounded set is compact.
4. Any closed subset of a compact set is compact.

Options :

60348969921. 1

60348969922. 2

60348969923. 3

60348969924. 4

Question Number : 5 Question Id : 60348918547 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The connected subsets of R are precisely

1. Its Intervals
2. Single points
3. $\varnothing$ and R
4. Single points and $\varnothing$

Options :

60348969925. 1

60348969926. 2

60348969927. 3

60348969928. 4

Question Number : 6 Question Id : 60348918548 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Suppose$\{U_i\}$ is open dense in a complete metric space X for all integer i. Then

1. $\bigcup_{i-1}^{\infty} U_i$ is dense in X
2. $\bigcap_{i-1}^{\infty} U_i$ is dense in X
3. $\bigcap_{i-1}^{\infty} U_i$ is nowhere dense in X
4. $\bigcup_{i-1} U_i$ is not dense in X

Options :

60348969929. 1

60348969930. 2

60348969931. 3

60348969932. 4

Question Number : 7 Question Id : 60348918549 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

For a set S, if $\bar{S} = S$, then

1. $\bar{S}$ is closed.
2. S is open.
3. $\bar{S}$ is neither closed nor open.
4. S is closed.

Options :

60348969933. 1

60348969934. 2

60348969935. 3

60348969936. 4

Question Number : 8 Question Id : 60348918550 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In R^2, the sequence $\left(\left(\frac{1}{n},\frac{1}{n}\right)\right)$ is a convergent sequence which converges to

1. (0,0)
2. (1,1)
3. (1/2,1/2)
4. (1,0)

Options :

60348969937. 1

60348969938. 2

60348969939. 3

60348969940. 4

Question Number : 9 Question Id : 60348918551 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Bolzano-Weistrass theorem states that

1. Every unbounded sequence in R^n has a cluster point
2. Every bounded sequence in R^n has not a cluster point
3. Every bounded sequence in R^n has a cluster point
4. Every unbounded sequence in R^n has not a cluster point

Options :

60348969941. 1

60348969942. 2

60348969943. 3

60348969944. 4

Question Number : 10 Question Id : 60348918552 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Let (X,d) be a metric space and $f : X \to R$ be a continuous mapping. Let c be a non-negative real number. Then the set $\{x \in X : f(x) = c\}$is

1. An open set.
2. A closed set.
3. Closed and open.
4. Not closed.

Options :

60348969945. 1

60348969946. 2

60348969947. 3

60348969948. 4

Question Number : 11 Question Id : 60348918553 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Let (X,d_1) be a bounded metric space and (Y,d_2) be another metric space. Let $f: X \to Y$ be an isometry. Then (Y,d_2) is

1. Bounded
2. Unbounded
3. Open
4. Closed

Options :

60348969949. 1

60348969950. 2

60348969951. 3

60348969952. 4

Question Number : 12 Question Id : 60348918554 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which statement is true?

1. A circle and a straight line in R^2 are homeomorphic.
2. A straight line and an ellipse in R^2 are homeomorphic.
3. A circle and an ellipse in R^2 are homeomorphic.
4. A circle and an ellipse in R^2 are non-homeomorphic.

Options :

60348969953. 1

60348969954. 2

60348969955. 3

60348969956. 4

Question Number : 13 Question Id : 60348918555 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In metric space, what is the name of the property $d(x,y) \leq d(x,z) + d(z,y)$?

1. Non negativity
2. Reflexive
3. Symmetric
4. Triangle inequality

Options :

60348969957. 1

60348969958. 2

60348969959. 3

60348969960. 4

Question Number : 14 Question Id : 60348918556 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Let f and g be two continuous mappings from a metric space (X,d_1) into a metric space (Y,d_2). Then

1. the set $F = \{x \in X : f(x) = g(x)\}$ is a closed set in X
2. the set $F = \{x \in X : f(x) \neq g(x)\}$ is a closed set in X
3. the set $F = \{x \in X : f(x) = g(x)\}$ is an open set in X
4. the set $F = \{x \in X : f(x) = g(x)\}$ is not a closed set in X

Options :

60348969961. 1

60348969962. 2

60348969963. 3

60348969964. 4

Question Number : 15 Question Id : 60348918557 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Let (X,d) be a metric space, then the sequence $(x,y,x,y,x,y,x,...)$

1. has one cluster point
2. has two cluster points
3. has no cluster points
4. has more than two cluster points

Options :

60348969965. 1

60348969966. 2

60348969967. 3

60348969968. 4

Question Number : 16 Question Id : 60348918558 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Let (X,d) be a metric space, and (Y,d_Y) be a subspace of X. A set G is open in Y if

1. there exists an open set G^* in X such that $G = G^* \cup Y$
2. there does not exist an open set G^* in X such that $G = G^* \cap Y$
3. there exists an open set G^* in X such that $G = G^*$
4. there exists an open set G^* in X such that $G = G^* \cap Y$

Options :

60348969969. 1

60348969970. 2

60348969971. 3

60348969972. 4

Question Number : 17 Question Id : 60348918559 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Let f and g be two continuous mappings from a metric space (X,d_1) into a metric space (Y,d_2). If $f(x) = g(x)$ for all points x in a dense subset A in X, then

1. $f = g$
2. $f \neq g$
3. $f < g$
4. $f > g$

Options :

60348969973. 1

60348969974. 2

60348969975. 3

60348969976. 4

Question Number : 18 Question Id : 60348918560 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In a metric space (X, d), d is called a _____ on X.

1. Function
2. Metric
3. Relation
4. Set

Options :

60348969977. 1

60348969978. 2

60348969979. 3

60348969980. 4

Question Number : 19 Question Id : 60348918561 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Suppose (X,d) be a metric space. Which of the following is not a metric on X?

1. $d_1(x,y) = kd(x,y)$, k is positive.
2. $d_2(x,y) = \frac{d(x,y)}{1+d(x,y)}$
3. $d_3(x,y) = \frac{kd(x,y)}{1+kd(x,y)}$
4. $d^2(x,y) = \frac{1-d(x,y)}{1+d(x,y)}$

Options :

60348969981. 1

60348969982. 2

60348969983. 3

60348969984. 4

Question Number : 20 Question Id : 60348918562 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which one is an odd function?

1. cos x
2. sin x
3. |cos x|
4. |sin x|

Options :

60348969985. 1

60348969986. 2

60348969987. 3

60348969988. 4

Question Number : 21 Question Id : 60348918563 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

$\lim_{x \to 0} \left(\frac{x^2 + 2x}{x} \right) = \cdots$

1. 2
2. 0
3. ∞
4. 1

Options :

60348969989. 1

60348969990. 2

60348969991. 3

60348969992. 4

Question Number : 22 Question Id : 60348918564 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $f(x,y) = 2x^2 - xy + 2y^2$, then $\frac{\partial f}{\partial x}$ at the point (1, 2) is

1. 7
2. 2
3. 3
4. -2

Options :

60348969993. 1

60348969994. 2

60348969995. 3

60348969996. 4

Question Number : 23 Question Id : 60348918565 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If f_x and f_y are both differentiable at a point (a, b) of the domain of definition of a function f, then

1. $f_{xy}(a, b) = f_{yx}(a, b)$
2. $f_{xy}(a, b) \neq f_{yx}(a, b)$
3. $f_{xy}(a, b) < f_{yx}(a, b)$
4. $f_{xy}(a, b) > f_{yx}(a, b)$

Options :

60348969997. 1

60348969998. 2

60348969999. 3

60348970000. 4

Question Number : 24 Question Id : 60348918566 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A function $f(x,y)$ which satisfies the relation $f_{xy} = f_{yx}$ at origin

1. $f(x,y) = \begin{cases} x^2 tan^{-1}(y/x) - y^2 tan^{-1}(x/y), x \neq 0, y \neq 0 \\ 0 \ \ elsewhere \end{cases}$
2. $f(x,y) = \frac{x(x^2-y^2)}{x^2+y^2}, (x,y) \neq (0,0), f(0,0) = 0$
3. $f(x,y) = \frac{xy(x^2-y^2)}{x^2+y^2}, (x,y) \neq (0,0), f(0,0) = 0$
4. $f(x,y) = \begin{cases} \frac{x^2y^2}{x^2+y^2}, (x,y) \neq (0,0) \\ 0, (x,y) = (0,0) \end{cases}$

Options :

60348970001. 1

60348970002. 2

60348970003. 3

60348970004. 4

Question Number : 25 Question Id : 60348918567 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $y^3 - 3ax^2 + x^3 = 0$, then

1. $\frac{d^2y}{dx^2} - \frac{2a^2x^2}{y^5} = 0$
2. $\frac{d^2y}{dx^2} - \frac{2a^2x^3}{y^5} = 0$
3. $\frac{d^2y}{dx^2} + \frac{2a^2x^2}{y^5} = 0$
4. $\frac{d^2y}{dx^2} + \frac{2a^2x^3}{y^5} = 0$

Options :

60348970005. 1

60348970006. 2

60348970007. 3

60348970008. 4

Question Number : 26 Question Id : 60348918568 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The solution of the PDE: $\frac{\partial^2 u}{\partial x \partial y} = 12xy^2 + 8x^3e^{2y}$, $u_x(x,0) = 4x$, $u(0,y) = 3$ is

1. $2x^2y^3 + x^4 e^{2y} + 2x^2 - x^4 + 3$
2. $2x^3y^3 + x^4 e^{2y} - 2x^2 + x^4 + 3$
3. $2x^2y^3 - x^4 e^{2y} + 2x^2 - x^4 + 3$
4. $2xy + x^4 e^{2y} + 2x^3 - x^4 + 3$

Options :

60348970009. 1

60348970010. 2

60348970011. 3

60348970012. 4

Question Number : 27 Question Id : 60348918569 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The solution to the problem $c^2 u_{xx} = u_{tt}$, $0 \le x \le L$ such that $u(0,t) = 0$, $u(x,0) = f(x)$, $u(L,t) = 0$, $ut(x,0) = 0$ is given by

1. $u(x,t) = \sum^{\infty}_{n=1} a_n \sin(n\pi x/L) \cos(n\pi t/L)$
2. $u(x,t) = \sum^{\infty}_{n=1} a_n \sin(n\pi t/L) \cos(n\pi x/L)$
3. $u(x,t) = \sum^{\infty}_{n=1} a_n \sin(n\pi x/L)$
4. $u(x,t) = \sum^{\infty}_{n=1} b_n \cos(n\pi x/L)$

Options :

60348970013. 1

60348970014. 2

60348970015. 3

60348970016. 4

Question Number : 28 Question Id : 60348918570 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The function f(x, y) has a saddle point at (a, b) if

1. $rt - s^2 > 0$
2. $rt - s^2 < 0$
3. $rt - s^2 < 1$
4. $rt - s^2 = 0$

Options :

60348970017. 1

60348970018. 2

60348970019. 3

60348970020. 4

Question Number : 29 Question Id : 60348918571 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The critical points of the function $f(x, y) = x^3 + y^3 - 3axy$ are

1. (a, a) and (0, 0)
2. (1, 0) and (0, a)
3. (0, 0) and (-a, -a)
4. (a, a) and (1, 0)

Options :

60348970021. 1

60348970022. 2

60348970023. 3

60348970024. 4

Question Number : 30 Question Id : 60348918572 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Find the Jacobian $\frac{\partial(x,y)}{\partial(u,v)}$ if $x = \frac{1}{2}(u+v), y = \frac{1}{2}(u-v)$

1. -1/2
2. 1/2
3. 1
4. 2

Options :

60348970025. 1

60348970026. 2

60348970027. 3

60348970028. 4

Question Number : 31 Question Id : 60348918573 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The series $\sum_{n=1}^{\infty} \frac{1}{n}$ is

1. divergent
2. convergent
3. oscillatory
4. Cannot say the convergence

Options :

60348970029. 1

60348970030. 2

60348970031. 3

60348970032. 4

Question Number : 32 Question Id : 60348918574 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $x = -1$ the series $1 + x^2 + x^3 + \ldots$

1. oscillates infinitely
2. diverges
3. converges
4. oscillates finitely

Options :

60348970033. 1

60348970034. 2

60348970035. 3

60348970036. 4

Question Number : 33 Question Id : 60348918575 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

What is the sum of the series $\sum_{k=1}^{n} k$?

1. $\frac{n(n-1)(2n+1)}{6}$
2. $\frac{n(n+1)}{2}$
3. $\frac{n(n-1)(2n-1)}{6}$
4. $\frac{n(n-1)}{2}$

Options :

60348970037. 1

60348970038. 2

60348970039. 3

60348970040. 4

Question Number : 34 Question Id : 60348918576 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The geometric series $1 + x^2 + x^3 + \ldots$ converges if

1. $x < -1$
2. $-1 < x < 1$
3. $x \geq 1$
4. $x > 1$

Options :

60348970041. 1

60348970042. 2

60348970043. 3

60348970044. 4

Question Number : 35 Question Id : 60348918577 Question Type : MCQ Option Shuffling : No

Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

For a series $\sum u_n$ which one is true?

1. $\sum u_n$ is convergent implies $\sum |u_n|$ convergent.
2. $\sum |u_n|$ is convergent implies $\sum u_n$ convergent.
3. $\sum |u_n|$ is divergent implies $\sum u_n$ divergent.
4. $\sum u_n$ is convergent implies $\lim_{n \to \infty} u_n \neq 0$.

Options :

60348970045. 1

60348970046. 2

60348970047. 3

60348970048. 4

Question Number : 36 Question Id : 60348918578 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A series obtained from an absolutely convergent series by a rearrangement of terms

1. converges absolutely and has the same sum as the original series.
2. converges absolutely and has not the same sum as the original series.
3. diverges and has not a finite sum.
4. converges conditionally.

Options :

60348970049. 1

60348970050. 2

60348970051. 3

60348970052. 4

Question Number : 37 Question Id : 60348918579 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The series $1+\frac{1}{2^2}+\frac{1}{3^2}+\cdots$ is a

1. Convergent geometric series
2. Divergent geometric series
3. Convergent harmonic series
4. Divergent harmonic series

Options :

60348970053. 1

60348970054. 2

60348970055. 3

60348970056. 4

Question Number : 38 Question Id : 60348918580 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The behaviour of the series $\sum sin\left(\frac{1}{n}\right)$ is

1. convergent
2. divergent
3. neither convergent nor divergent
4. oscillating

Options :

60348970057. 1

60348970058. 2

60348970059. 3

60348970060. 4

Question Number : 39 Question Id : 60348918581 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The series $\sum \frac{\sqrt{n}}{\sqrt{n^2+1}} x^n$

1. converges for $x > 1$ and diverges for $x < 1$
2. converges for $x = 1$ and diverges for $x > 1$
3. converges for $x < 1$ and diverges for $x = 1$
4. converges for $x < 1$ and diverges for $x > 1$

Options :

60348970061. 1

60348970062. 2

60348970063. 3

60348970064. 4

Question Number : 40 Question Id : 60348918582 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The Cauchy's root test says that a positive term series $\sum u_n$ converges or diverges according as $l > 1$ or $l < 1$, where

1. $\lim_{n\to\infty} n\left(\frac{u_n}{u_{n+1}} - 1\right) = l$
2. $\lim_{n\to\infty} \frac{u_{n+1}}{u_n} = l$
3. $l = \lim_{n\to\infty} (u_n)^{1/n}$
4. $l = \lim_{n\to 0} (u_n)^{1/n}$

Options :

60348970065. 1

60348970066. 2

60348970067. 3

60348970068. 4

Question Number : 41 Question Id : 60348918583 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The double sequence $S_{m,n} = (-1)^{m+n}(m+n)$

1. oscillates finitely
2. oscillates infinitely
3. diverges
4. converges

Options :

60348970069. 1

60348970070. 2

60348970071. 3

60348970072. 4

Question Number : 42 Question Id : 60348918584 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The double series $\sum_{m,n=1}^{\infty} \frac{1}{2^m 3^n}$

1. converges
2. diverges
3. oscillates
4. neither converges nor diverges

Options :

60348970073. 1

60348970074. 2

60348970075. 3

60348970076. 4

Question Number : 43 Question Id : 60348918585 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The Cauchy product of $\sum_{n=0}^{\infty} \frac{(-1)^{n+1}}{\sqrt{n+1}}$ with itself is

1. a convergent series
2. an oscillating series
3. a divergent series
4. a finite series

Options :

60348970077. 1

60348970078. 2

60348970079. 3

60348970080. 4

Question Number : 44 Question Id : 60348918586 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The double series $\sum_{m,n}(m^2+n^2)^{-\alpha}$ converges if

1. $\alpha < 1$
2. $\alpha > 1$
3. $\alpha > -1$
4. $\alpha < -1$

Options :

60348970081. 1

60348970082. 2

60348970083. 3

60348970084. 4

Question Number : 45 Question Id : 60348918587 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The repeated series $\sum_{m=1}^{\infty}\sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{(m+4n^2)(m+4n^2-1)}$ converges to the sum

1. $\frac{\pi}{48}$
2. $\frac{\pi^2}{24}$
3. $\frac{\pi^2}{48}$
4. $\frac{\pi}{24}$

Options :

60348970085. 1

60348970086. 2

60348970087. 3

60348970088. 4

Question Number : 46 Question Id : 60348918588 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The order of the differential equation $(y''')^2 - y = e^x$ is

1. 1
2. 2
3. 0
4. 3

Options :

60348970089. 1

60348970090. 2

60348970091. 3

60348970092. 4

Question Number : 47 Question Id : 60348918589 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which of the following is a linear differential equation?

1. $y'' + (y')^2 = sinx$
2. $(y'')^2 + 3y = e^{-x}$
3. $y'' + 3(y')^2 + y = 0$
4. $y'' + 3y' + y = 0$

Options :

60348970093. 1

60348970094. 2

60348970095. 3

60348970096. 4

Question Number : 48 Question Id : 60348918590 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The differential equation $y'' - 5y' + 6y = 0$ has

1. Two linearly independent solutions
2. Three linearly independent solutions
3. Four linearly independent solutions
4. Infinite number of linearly independent solutions

Options :

60348970097. 1

60348970098. 2

60348970099. 3

60348970100. 4

Question Number : 49 Question Id : 60348918591 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In $\frac{d^2y}{dx^2} + P(x)\frac{dy}{dx} + Q(x)y = 0$ if both $P(x) = \frac{a_1(x)}{a_0(x)}$ and $Q(x) = \frac{a_2(x)}{a_0(x)}$ are analytic at x_0, then

1. The point x_0 is said to be a regular point of the differential equation
2. The point x_0 is said to be a singular point of the differential equation
3. The point x_0 is said to be a irregular point of the differential equation
4. The point x_0 is said to be a regular singular point of the differential equation

Options :

60348970101. 1

60348970102. 2

60348970103. 3

60348970104. 4

Question Number : 50 Question Id : 60348918592 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A point x_0 is said to be a singular point of the differential equation $\frac{d^2y}{dx^2} + P(x)\frac{dy}{dx} + Q(x)y = 0$ where $P(x) = \frac{a_1(x)}{a_0(x)}$ and $Q(x) = \frac{a_2(x)}{a_0(x)}$ if

1. both $P(x)$ and $Q(x)$ are analytic at x_0.
2. both $xP(x)$ and $x^2Q(x)$ are analytic at x_0.
3. either of $P(x)$ or $Q(x)$ or both are not analytic at x_0.
4. either of $xP(x)$ or $x^2Q(x)$ or both are not analytic at x_0.

Options :

60348970105. 1

60348970106. 2

60348970107. 3

60348970108. 4

Question Number : 51 Question Id : 60348918593 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

For the differential equation $(1 + x^2)y'' - 6xy' - 4y = 0$, $x = 1$ is

1. An ordinary point
2. A regular singular point
3. An irregular singular point
4. Not a singular point

Options :

60348970109. 1

60348970110. 2

60348970111. 3

60348970112. 4

Question Number : 52 Question Id : 60348918594 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The power series solution of $\frac{d^2y}{dx^2} - y = 0$ is

1. $y = c_0 \cos x + c_1 \sin x$
2. $y = c_0 \cosh x + c_1 \sinh x$
3. $y = c_0 \cos x + c_1 \sinh x$
4. $y = c_0 \cosh x + c_1 \sin x$

Options :

60348970113. 1

60348970114. 2

60348970115. 3

60348970116. 4

Question Number : 53 Question Id : 60348918595 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The general form of Bessel's equation is

1. $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + (x^2 - n^2)y = 0$
2. $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + (x^2 + n^2)y = 0$
3. $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + (x^2 - n^2)y = 0$
4. $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + (x^2 + n^2)y = 0$

Options :

60348970117. 1

60348970118. 2

60348970119. 3

60348970120. 4

Question Number : 54 Question Id : 60348918596 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

When n is an integer, the two Bessel functions $J_n(x)$ and $J_{-n}(x)$ are connected by the relation

1. $J_n(x) = (-1)^n J_{-n}(x)$
2. $J_{-n}(x) = (-1)^{-n} J_n(x)$
3. $J_{-n}(x) = (-1)^n J_n(x)$
4. $J_{-n}(x) = (-1)^{n-1} J_n(x)$

Options :

60348970121. 1

60348970122. 2

60348970123. 3

60348970124. 4

Question Number : 55 Question Id : 60348918597 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

$\frac{d}{dx}[x^n J_n(x)] =$.....

1. $x^{-n} J_{n-1}(x)$
2. $x^n J_{n-1}(x)$
3. $x^{n-1} J_n(x)$
4. $x^n J_{n+1}(x)$

Options :

60348970125. 1

60348970126. 2

60348970127. 3

60348970128. 4

Question Number : 56 Question Id : 60348918598 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Series representation of J_1 is

1. $\frac{x^2}{2} - \frac{x^4}{2^2.4} + \frac{x^6}{2^2.4^2.6} - \ldots$
2. $\frac{x}{2} + \frac{x^3}{2^2.4} - \frac{x^5}{2^2.4^2.6} + \ldots$
3. $-\frac{x}{2} + \frac{x^3}{2^2.4} - \frac{x^5}{2^2.4^2.6} + \ldots$
4. $\frac{x}{2} - \frac{x^3}{2^2.4} + \frac{x^5}{2^2.4^2.6} - \ldots$

Options :

60348970129. 1

60348970130. 2

60348970131. 3

60348970132. 4

Question Number : 57 Question Id : 60348918599 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which one is the expression for $P_2(x)$?

1. $\frac{1}{2}(5x^2 - 1)$
2. $\frac{1}{2}(5x^2 - x)$
3. $\frac{1}{2}(3x^2 - x)$
4. $\frac{1}{2}(3x^2 - 1)$

Options :

60348970133. 1

60348970134. 2

60348970135. 3

60348970136. 4

Question Number : 58 Question Id : 60348918600 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Legendre's polynomial can be obtained by using a generating function which is stated as

1. $(1-2xz+z^2)^{1/2}=\sum_{n=0}^{\infty} z^n P_n(x), z \neq 1$
2. $(1-2xz+z^2)^{-1/2}=\sum_{n=0}^{\infty} z^n P_{n-1}(x), z \neq 1$
3. $(1-2xz+z^2)^{-1/2}=\sum_{n=0}^{\infty} z^n P_n(x), z \neq 1$
4. $(1-2xz+z^2)^{1/2}=\sum_{n=0}^{\infty} z^n P_{n-1}(x), z \neq 1$

Options :

60348970137. 1

60348970138. 2

60348970139. 3

60348970140. 4

Question Number : 59 Question Id : 60348918601 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $f(x) = x^2$, then it may be written in terms of Legendre polynomials as

1. $f(x)=\frac{2P_2(x)}{3}+\frac{P_0(x)}{3}$
2. $f(x)=\frac{2P_2(x)}{3}+\frac{P_1(x)}{3}$
3. $f(x)=\frac{2P_2(x)}{3}-\frac{P_0(x)}{3}$
4. $f(x)=\frac{2P_2(x)}{3}-\frac{P_1(x)}{3}$

Options :

60348970141. 1

60348970142. 2

60348970143. 3

60348970144. 4

Question Number : 60 Question Id : 60348918602 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The eigen functions of Sturm-Liouville problem $y'' + \lambda y = 0, y(0) = 0, y(\pi) = 0$ are

1. $y_n(x) = \sin n\,x, n = 0,1,2,\ldots$
2. $y_n(x) = \cos n\,x, n = 0,1,2,\ldots$
3. $y_n(x) = e^{nx}, n = 0,1,2,\ldots$
4. $y_n(x) = e^{-nx}, n = 0,1,2,\ldots$

Options :

60348970145. 1

60348970146. 2

60348970147. 3

60348970148. 4

Question Number : 61 Question Id : 60348918603 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

$\int_0^1 xJ_n(\alpha x)J_n(\beta x)dx = 0$ is true if

1. $\alpha = \beta$
2. $\alpha < \beta$
3. $\alpha \neq \beta$
4. $\alpha > \beta$

Options :

60348970149. 1

60348970150. 2

60348970151. 3

60348970152. 4

Question Number : 62 Question Id : 60348918604 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The value of $\int_{-1}^1 P_m(x).P_n(x)dx$ for $m \neq n$ is

1. 1
2. 0
3. $\frac{2}{2n+1}$
4. -1

Options :

60348970153. 1

60348970154. 2

60348970155. 3

60348970156. 4

Question Number : 63 Question Id : 60348918605 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $f(x) = \sum_{n=0}^{\infty} c_n P_n(x)$, then

1. $c_n = \left(n - \frac{1}{2}\right) . \int_{-1}^{1} f(x) P_n(x) dx$
2. $c_n = \left(n + \frac{1}{2}\right) . \int_{-1}^{1} f(x) P_n(x) dx$
3. $c_n = \left(n + \frac{1}{2}\right) . \int_{0}^{1} f(x) P_n(x) dx$
4. $c_n = \left(n - \frac{1}{2}\right) . \int_{0}^{1} f(x) P_n(x) dx$

Options :

60348970157. 1

60348970158. 2

60348970159. 3

60348970160. 4

Question Number : 64 Question Id : 60348918606 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

What is the value of $\int_0^{\infty} e^{-x} x^3 dx$?

1. 2
2. 4
3. 6
4. 8

Options :

60348970161. 1

60348970162. 2

60348970163. 3

60348970164. 4

Question Number : 65 Question Id : 60348918607 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $f(x) = \frac{1}{2}a_0 + \sum_{n=1}^{\infty}(a_n \cos n\,x + b_n \sin n\,x)$ in the interval $[\alpha, \alpha + 2\pi]$, then the value of a_0 is

1. $a_0 = \frac{2}{\pi}\int_{\alpha}^{\alpha+2\pi} f(x)dx$
2. $a_0 = \frac{1}{\pi}\int_{\alpha}^{\alpha+2\pi} f(x)dx$
3. $a_0 = \frac{1}{\pi}\int_{\alpha}^{\alpha-2\pi} f(x)dx$
4. $a_0 = \frac{1}{\pi}\int_{0}^{\alpha+2\pi} f(x)dx$

Options :

60348970165. 1

60348970166. 2

60348970167. 3

60348970168. 4

Question Number : 66 Question Id : 60348918608 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If a triangular lamina with vertices (0,0), (0,1) and (1,0) has density function $\delta(x, y) = xy$, then what is its total mass?

1. 1/24
2. 1/12
3. 24
4. 12

Options :

60348970169. 1

60348970170. 2

60348970171. 3

60348970172. 4

Question Number : 67 Question Id : 60348918609 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Let $f(x) = |x|$, $-2 \le x \le 2$, $f(x + 4) = f(x)$ for all x in $(-\infty,\infty)$. Then the Fourier cosine coefficient a_n is given by

1. 0
2. $n\pi$
3. $-\frac{4}{n^2\pi^2}[(-1)^n - 1]$
4. -1

Options :

60348970173. 1

60348970174. 2

60348970175. 3

60348970176. 4

Question Number : 68 Question Id : 60348918610 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The Fourier series of the function $f(x) = x$, $-\pi \le x \le \pi$, $f(x + 2\pi) = f(x)$ is

1. A constant function
2. An identity function
3. A cosine series in x
4. A sine series in x

Options :

60348970177. 1

60348970178. 2

60348970179. 3

60348970180. 4

Question Number : 69 Question Id : 60348918611 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A point z which lies in the region $|z| < 1$

1. $z = 1 + i$
2. 0
3. i
4. $-i$

Options :

60348970181. 1

60348970182. 2

60348970183. 3

60348970184. 4

Question Number : 70 Question Id : 60348918612 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A complex function which is nowhere differentiable

1. $f(z) = \bar{z}$
2. $f(z) = z^2$
3. $f(z) = |z|^2$
4. $f(z) = z$

Options :

60348970185. 1

60348970186. 2

60348970187. 3

60348970188. 4

Question Number : 71 Question Id : 60348918613 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

$v = 2xy$ is the imaginary part of

1. $f(z) = |z|^2$
2. $f(z) = |z|$
3. $f(z) = \bar{z}$
4. $f(z) = z^2$

Options :

60348970189. 1

60348970190. 2

60348970191. 3

60348970192. 4

Question Number : 72 Question Id : 60348918614 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A complex function for which real and imaginary parts do not satisfy C-R equations

1. $(z) = z^2$
2. $f(z) = z$
3. $f(z) = e^z$
4. $f(z) = \bar{z}$

Options :

60348970193. 1

60348970194. 2

60348970195. 3

60348970196. 4

Question Number : 73 Question Id : 60348918615 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

An analytic function with constant modulus is always

1. constant
2. indentify map
3. real valued
4. purely imaginary

Options :

60348970197. 1

60348970198. 2

60348970199. 3

60348970200. 4

Question Number : 74 Question Id : 60348918616 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If u and v are two functions of x and y, then the Cauchy-Riemann equations are

1. $u_x = v_y$ and $u_y = -v_x$
2. $u_x = -v_y$ and $u_y = v_x$
3. $u_x = u_y$ and $u_y = -v_y$
4. $u_x = -u_y$ and $u_y = v_y$

Options :

60348970201. 1

60348970202. 2

60348970203. 3

60348970204. 4

Question Number : 75 Question Id : 60348918617 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

An example of a complex function which is continuous but not differentiable in the entire complex plane

1. $f(z) = z^2$
2. $f(z) = |z|^2$
3. $f(z) = z$
4. $f(z) = c$

Options :

60348970205. 1

60348970206. 2

60348970207. 3

60348970208. 4

Question Number : 76 Question Id : 60348918618 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Real part of $f(z) = log\ z$ is

1. $\log(x^2+y^2)$
2. $\frac{1}{2}\log(x+y)$
3. $\frac{1}{2}\log(x^2+y^2)$
4. $2\log(x^2+y^2)$

Options :

60348970209. 1

60348970210. 2

60348970211. 3

60348970212. 4

Question Number : 77 Question Id : 60348918619 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $f(z) = x^2 + ay^2 - 2xy)i + (bx^2 - y^2 + 2xy)j$ is analytic, then the value of a and b respectively are

1. -1,1
2. 1,1
3. 1,0
4. 0,-1

Options :

60348970213. 1

60348970214. 2

60348970215. 3

60348970216. 4

Question Number : 78 Question Id : 60348918620 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Cauchy's theorem states that if f(z) is analytic and f'(z) is continuous at each point within and on a simple closed curve C, then

1. $\oint_C f(z)dz = 2\pi i$
2. $\oint_C f(z)dz = -2\pi i$
3. $\oint_C f(z)dz = 0$
4. $\oint_C f(z)dz \neq 0$

Options :

60348970217. 1

60348970218. 2

60348970219. 3

60348970220. 4

Question Number : 79 Question Id : 60348918621 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Among the following which one is an analytic function?

1. $f(z) = Re(z)$
2. $f(z) = z^2$
3. $f(z) = Im(z)$
4. $f(z) = |z|^2$

Options :

60348970221. 1

60348970222. 2

60348970223. 3

60348970224. 4

Question Number : 80 Question Id : 60348918622 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which are the singular points of $f(z) = \frac{z}{z^2-1}$?

1. $z = \pm i$
2. $z = \pm 1$
3. $z = \pm 2$
4. $z = \pm 2i$

Options :

60348970225. 1

60348970226. 2

60348970227. 3

60348970228. 4

Question Number : 81 Question Id : 60348918623 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The mapping _____ maps the interior of unit circle in z-plane into the interior of unit circle in w-plane.

1. $w = e^z$
2. $w = z$
3. $w = 1/z$
4. $w = cz$

Options :

60348970229. 1

60348970230. 2

60348970231. 3

60348970232. 4

Question Number : 82 Question Id : 60348918624 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A transformation which is not a bilinear transformation

1. $w = \frac{i-2z}{i+z}$
2. $w = \frac{iz+1}{1-iz}$
3. $w = \frac{z+i}{z-i}$
4. $w = \frac{2z-i}{i-2z}$

Options :

60348970233. 1

60348970234. 2

60348970235. 3

60348970236. 4

Question Number : 83 Question Id : 60348918625 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

What is the image of $y = \frac{1}{2}$ under the transformation $w = \frac{1}{z}$?

1. $2u + 1 = 0$
2. $u^2 + v^2 + 2v = 0$
3. $u^2 - v^2 - 2v = 0$
4. $2u - 1 = 0$

Options :

60348970237. 1

60348970238. 2

60348970239. 3

60348970240. 4

Question Number : 84 Question Id : 60348918626 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The transformation $w = cz$ represents

1. Rotation and magnification
2. Inversion
3. Translation
4. Shifting

Options :

60348970241. 1

60348970242. 2

60348970243. 3

60348970244. 4

Question Number : 85 Question Id : 60348918627 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A point z which lies in the region $|z| < 1$

1. $z = 1 + i$
2. $z = i$
3. $z = 0$
4. $z = -i$

Options :

60348970245. 1

60348970246. 2

60348970247. 3

60348970248. 4

Question Number : 86 Question Id : 60348918628 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The bilinear transformation that maps the points $\infty, i, 0$ into$0, i, \infty$ is

1. $w = z^2$
2. $w = \frac{1}{z}$
3. $w = -\frac{1}{z}$
4. $w = \frac{1}{2z}$

Options :

60348970249. 1

60348970250. 2

60348970251. 3

60348970252. 4

Question Number : 87 Question Id : 60348918629 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Obtain the residue of $f(z) = \frac{\sin z}{z\cos z}$ at the simple pole $z = 0$

1. ∞
2. 1
3. 0
4. -1

Options :

60348970253. 1

60348970254. 2

60348970255. 3

60348970256. 4

Question Number : 88 Question Id : 60348918630 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

For the function $f(z) = \frac{e^z}{(z+1)^2}$ if $z = -1$ is a pole of order 2, then what is the corresponding residue?

1. e
2. $\frac{1}{e}$
3. 2π
4. $\frac{-1}{e}$

Options :

60348970257. 1

60348970258. 2

60348970259. 3

60348970260. 4

Question Number : 89 Question Id : 60348918631 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The components of the vector A with initial point P(5,1,-1) and Q(8,-2,1) is

1. (3, -3,2)
2. (-3, 3,2)
3. (3,3,2)
4. (3,1,-2)

Options :

60348970261. 1

60348970262. 2

60348970263. 3

60348970264. 4

Question Number : 90 Question Id : 60348918632 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The unit vector perpendicular to the plane $4x + 2y + 4z = -7$ is

1. (2/3, 2/3, 1/3)
2. (1/3, 2/3, 1/3)
3. (2/3, -1/3, 2/3)
4. (2/3, 1/3, 2/3)

Options :

60348970265. 1

60348970266. 2

60348970267. 3

60348970268. 4

Question Number : 91 Question Id : 60348918633 Question Type : MCQ Option Shuffling : No

Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $\bar{V} = 4\mathbf{i} - 2\mathbf{j} + 3\mathbf{k}$ is the velocity of a moving particle at any time t, what is the acceleration at t = 1?

1. $2\mathbf{i} + 4\mathbf{j}$
2. $4\mathbf{i} + 2\mathbf{j}$
3. $2\mathbf{i} - \mathbf{j} + 3\mathbf{k}$
4. $2\mathbf{i} + 3\mathbf{k}$

Options :

60348970269. 1

60348970270. 2

60348970271. 3

60348970272. 4

Question Number : 92 Question Id : 60348918634 Question Type : MCQ Option Shuffling : No

Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

What is the value of $\iint xydxdy$ over the first quadrant of the circle $x^2 + y^2 = a^2$

1. $\frac{a^4}{6}$
2. $\frac{a^4}{2}$
3. $\frac{a^4}{8}$
4. $\frac{2a^4}{3}$

Options :

60348970273. 1

60348970274. 2

60348970275. 3

60348970276. 4

Question Number : 93 Question Id : 60348918635 Question Type : MCQ Option Shuffling : No

Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

What is the volume of a solid enclosed by a sphere of radius a?

1. $\frac{4}{3}\pi a^3$
2. $\frac{2}{3}\pi a^3$
3. $4\pi a^3$
4. $\frac{1}{3}\pi a^3$

Options :

60348970277. 1

60348970278. 2

60348970279. 3

60348970280. 4

Question Number : 94 Question Id : 60348918636 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $\vec{r} = x\boldsymbol{i} + y\boldsymbol{j} + z\boldsymbol{k}$, then

1. div $\vec{r}$ = 2
2. div $\vec{r}$ = 3
3. div $\vec{r}$ = 1
4. div $\vec{r}$ = 0

Options :

60348970281. 1

60348970282. 2

60348970283. 3

60348970284. 4

Question Number : 95 Question Id : 60348918637 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A vector field V is called solenoidal if

1. Curl V = 0
2. Grad V = 0
3. Div V = 0
4. Directional derivative is zero

Options :

60348970285. 1

60348970286. 2

60348970287. 3

60348970288. 4

Question Number : 96 Question Id : 60348918638 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, then for a constant vector $\vec{a} = a_1\hat{\imath} + a_2\hat{\jmath} + a_3\hat{k}$, which one is true?

1. $grad\,(\vec{a}\cdot\vec{r}) = \vec{r}$
2. $grad\,(\vec{a}\cdot\vec{r}) = \|\vec{a}\|\vec{r}$
3. $grad\,(\vec{a}\cdot\vec{r}) = \vec{a}$
4. $grad\,(\vec{a}\cdot\vec{r}) = \dfrac{\vec{r}}{\|\vec{a}\|}$

Options :

60348970289. 1

60348970290. 2

60348970291. 3

60348970292. 4

Question Number : 97 Question Id : 60348918639 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Greens theorem states that if M and N are continuous functions of x and y having continuous partial derivatives M_y and N_x in region R of the xy- plane bounded by a closed curve C, then

1. $\oint_C (Mdx + Ndy) = \iint_R (M_y - N_x)dxdy$
2. $\oint_C (Mdx + Ndy) = \iint_R (N_x - M_y)dxdy$
3. $\oint_C (Ndx + Mdy) = \iint_R (N_x - M_y)dxdy$
4. $\oint_C (Mdx - Ndy) = \iint_R (N_x + M_y)dxdy$

Options :

60348970293. 1

60348970294. 2

60348970295. 3

60348970296. 4

Question Number : 98 Question Id : 60348918640 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Among the following which one is a wrong statement?

1. $grad\varphi$ gives the maximum rate of change of the scalar function φ
2. The gradient of a scalar function φ is a vector normal to the surface $\varphi = c$.
3. The gradient of a scalar function φ is always scalar.
4. The direction derivative a scalar function φ is the resolved part of $grad\varphi$ in the direction **n**, **n** is the unit vector in a given direction

Options :

60348970297. 1

60348970298. 2

60348970299. 3

60348970300. 4

Question Number : 99 Question Id : 60348918641 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If a simple closed curve C in the plane and the region R it encloses satisfy the hypotheses of Green's theorem, then the area of the region R is calculated by

1. $A = \frac{1}{2}\oint_C (xdy + ydx)$
2. $A = \frac{1}{2}\oint_C (ydy - xdx)$
3. $A = 2\oint_C (xdy - ydx)$
4. $A = \frac{1}{2}\oint_C (xdy - ydx)$

Options :

60348970301. 1

60348970302. 2

60348970303. 3

60348970304. 4

Question Number : 100 Question Id : 60348918642 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which theorem states a relation between surface integrals and volume integral?

1. Stoke's theorem
2. Green's theorem
3. Diveregence theorem
4. Residue theorem

Options :

60348970305. 1

60348970306. 2

60348970307. 3

60348970308. 4