CHAPTER 9

Syllabus

Ans. Option (C) is correct.

Explanation:

Given that, $y = e^{-x} (A\cos x +$

On differentiating both side

$$\frac{dy}{dx} = -e^{-x}($$

$$+e$$

$$\frac{dy}{dx} = -y + e$$

Again, differentiating both s

$$\frac{d^2y}{dx^2} = \frac{-dy}{dx}$$

$$+e^{-x}($$

$$-e^{-x}($$

$$\Rightarrow \quad \frac{d^2y}{dx^2} = -\frac{dy}{dx} -$$

$$\Rightarrow \quad \frac{d^2y}{dx^2} = -\frac{dy}{dx}$$

$= e^{\frac{1}{2}}$

$= e^{\frac{1}{2}}$

$= \sqrt{1}$

Q. 9. The degree of differential equ

$$\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^3+6y^5=0 \text{ is}$$

(A) 1 **(B)**

(C) 3 **(D)**

Ans. Option (A) is correct.

Explanation:

$$\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^3+6y^5 = 0$$

We know that, the degre

equation is exponent of high

Degree = 1

Put $x^2 = t$ in RHS integral, w

$$2xdx = dt$$

$$\int e^y dy = \int e^t dt$$

$$\Rightarrow \quad e^y = e^t + C$$

$$\Rightarrow \quad e^y = e^{x^2} +$$

Q. 14. The solution of equation $(2y -$
is

(A) $\frac{2x-1}{2y+3} = k$ (B)

(C) $\frac{2x+3}{2y-1} = k$ (D)

Ans. Option (C) is correct.

Explanation: Given that,

$$(2y-1)dx - (2x+3)dy =$$

$$\Rightarrow \quad (2y-1)dx =$$

$$\Rightarrow \qquad \frac{dx}{dy} = \frac{y}{1+y}\Bigg(\ldots$$

$$\Rightarrow \qquad \left(\frac{y}{1+y}\right)dy = \Bigg(\frac{e^x}{e^x+1 \ldots}$$

On integrating both sides, w…

$$\int \frac{y}{1+y}dy = \int \frac{e^x}{1+e \ldots}$$

$$\Rightarrow \qquad \int \frac{1+y-1}{1+y}dy = \int \frac{e^x}{1+e \ldots}$$

$$\Rightarrow \int 1dy - \int \frac{1}{1+y}dy = \int \frac{e^x}{1+e \ldots}$$

$$\Rightarrow \quad y - \log|(1+y) = \log|(1 \ldots$$

$$\Rightarrow \qquad y = \log(1+ \ldots$$

$$\Rightarrow \qquad y = \log\{k(\ldots$$

Now, on substituting the va

$\frac{dy}{dx}$ from equation (i) and (ii)

alternatives, we find that
equation given in alternativ

$$\frac{d^2y}{dx^2} - x^2\frac{dy}{dx} + xy = 0 - x^2$$

$$= -x^2 +$$

$$= 0$$

Q. 23. The general solution of the di

$\frac{dy}{dx} = e^{x+y}$ is

(A) $e^x + e^{-y} = C$ (B)

(C) $e^{-x} + e^y = C$ (D)

Ans. Option (A) is correct.

Explanation:

The given differential equa
derivative which is free from
with power = 1, thus it has a

Ans. Option (A) is correct.

> *Explanation:* Assertion (A)
> are correct, Reason (R) is the
> of Assertion (A).

Q. 3. Assertion (A): Solution of the

$\frac{dy}{dx} = e^{3x-2y} + x^2e^{-2y}$ is $\frac{e^{2y}}{3} = \frac{e^{3}}{}$

Reason (R):

$$\frac{dy}{dx} = e^{3x-2y} + x^2e^{-2y}$$

$$\frac{dy}{dx} = e^{-2y}(e^{3x} + x^2)$$

separating the variables

$$e^{2y}dy = (e^{3x} + x^2)dx$$

CASE-BASE

Attempt any four sub-parts
Each sub-part carries 1 mark

I. Read the following text and
questions on the basis of the

A Veterinary doctor was e
brought by a pet lover. When
hospital, it was already dead.
to find its time of death. He
of the cat at 11.30 pm which w
temperature again after one h
was lower than the first obse
The room in which the cat
70°F. The normal temperature

Explanation:

$$\frac{dy}{dx} = k(50 - y$$

$$\int \frac{dy}{50 - y} = \int K dx$$

$$-\log|50 - y| = Kx + C$$

Q. 4. The value of C in the particul

$y(0) = 0$ and $k = 0.049$ is

(A) $\log 50$

(

(C) 50

(D

Ans. Option (B) is correct.

Explanation:

Given, $y(0) = 0$

We have, $-\log|50 - y| = K$

$\log|50 - y| = -$

Explanation: Given when t

From (i), $\log|N_0| = C$

$\therefore$ (i) $\rightarrow$ $\log|N| = Kt +$

$$\Rightarrow \quad \log\left|\frac{N}{N_0}\right| = Kt$$

Given when $t = 5, N = 3N_0$.

From (ii), $\log|3| = 5K$

$$\Rightarrow \quad K = \frac{1}{5}\log$$

$\therefore$ The particular solution is

$$\log\left|\frac{N}{N_0}\right| = \frac{t}{5}\log$$

When $t = 10$,

$$\log\left|\frac{N}{N_0}\right| = 2\log$$

$$\frac{N}{N_0} = 9$$

Explanation: The general sol

$$y(x^2) = \int(x^2$$

$$x^2y = \frac{x^4}{4}+$$

Q. 5. If $y(1) = 0$, then $y(2) =$ ______

(A) 0

(C) $\frac{15}{4}$

Ans. Option (D) is correct.

Explanation:

Given $y(1) = 0$

$\Rightarrow$ $0 = \frac{1}{4}+C$