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CORRECT ANSWER SOLVED BY HADI
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TEAM HADI(VU LAHORE)

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WARNING: Team HADI is not responsible for any mistake or wrong answer. All students reading and using this document may check and confirm the answers at their own.



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Best of luck!



Question No : 1 of 26

Marks: 1 (Budgeted Time 1 Min)

The form of the exact solution to

$$2\frac{dy}{dx} + 3y = e^{-x}, y(0) = 5$$

is

Answer (Please select your correct option)

☐

$$Ae^{-1.5x} + Bxe^{-x}$$

☐

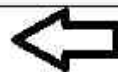
$$Ae^{1.5x} + Be^{-x}$$

☐

$$Ae^{1.5x} + Bxe^{-x}$$

☐

$$Ae^{-1.5x} + Be^{-x}$$



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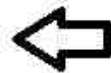
Question No : 2 of 26

Marks: 1 (Budgeted Time 1 Min)

The differential equation $2\frac{dy}{dx} + x^2y = 2x + 3, y(0) = 5$ is

Answer (Please select your correct option)

☐ Linear



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☐ Nonlinear

☐ Linear with fixed constants

☐ Undeterminable to be linear or nonlinear

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Question No : 3 of 26

Marks: 1 (Budgeted Time 1 Min)

The value of amplitude in the solution $X=40\sin(7t+4)$ is

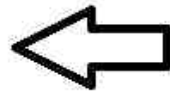
Answer (Please select your correct option)

☐ 7

☐ 4

☒ 40

☐ 20



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Question No : 4 of 26

Marks: 1 (Budgeted Time 1 Min)

The order of the differential equation $(\frac{\partial^2 u}{\partial t^2})^3 + \frac{\partial u}{\partial t} = 0$ is

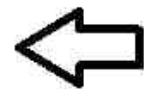
Answer (Please select your correct option)

☐ 0

☐ 1

☒ 2

☐ 3



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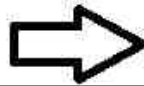
Question No : 5 of 26

Marks: 1 (Budgeted Time 1 Min)

Which of the following is the linear differential equation?

Answer (Please select your correct option)

☐ $x \frac{dy}{dx} + y = 0$



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☐ $y \frac{dy}{dx} + x = 0$

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

☐ $\frac{dy}{dx} = e^y$

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A solution obtained by giving particular values to the arbitrary constants in the General Solution of a differential equation is called a -----

Answer (Please select your correct option)

☐ Singular solution

☒ Particular solution

☐ Explicit Solution

☐ None of these



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Question No : 7 of 26

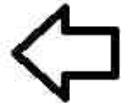
Marks: 1 (Budgeted Time 1 Min)

Which of the following equations satisfy the differential equation $\frac{dy}{dx} = x$

Answer (Please select your correct option)

☐

$$2y = x^2 + c$$



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☐

$$y = x^2 + c$$

☐

$$y = x^2$$

☐

$$y = x + c$$

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Question No : 8 of 26

Marks: 1 (Budgeted Time 1 Min)

A differential equation $\frac{dy}{dx} + p(x)y = q(x)y^n$ for $n \neq 0, 1$ is called a/an ----.

Answer (Please select your correct option)

☐ Non-Exact differential equation

☐ Linear differential equation

☒ Bernoulli equation

☐ Exact differential equation



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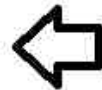
Question No : 9 of 26

Marks: 1 (Budgeted Time 1 Min)

In a Bernoulli equation $\frac{dy}{dx} + \frac{1}{x}y = xy^2$, identify $p(x)$, $q(x)$ & n respectively.

Answer (Please select your correct option)

☐ $\frac{1}{x}, x \text{ \& } 2$



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☐ $y, x^2y \text{ \& } 2$

☐ $y, \frac{1}{x} \text{ \& } 2$

☐ $\frac{1}{y}, y \text{ \& } 2$

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Question No : 10 of 26

Marks: 1 (Budgeted Time 1 Min)

In order to change the Bernoulli Equation

$$\frac{dy}{dx} + p(x)y = q(x)y^n$$

into linear differential equation, we choose -----

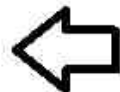
Answer (Please select your correct option)

☐ $v = y^{n-1}$

☒ $v = y^{1-n}$

☐ $v = y^n$

☐ $v = y'$



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Question No : 11 of 26

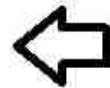
Marks: 1 (Budgeted Time 1 Min)

The differential equation ----- is separable.

Answer (Please select your correct option)

☐ $x(x+y) \frac{dy}{dx} = 4$

☒ $\frac{dy}{dx} = \frac{x^2}{x+xy}$



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☐ $\frac{dy}{dx} = \frac{y}{1+xy^3}$

☐ $\frac{dy}{dx} = \frac{xy+3}{1+2xy}$

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Question No : 12 of 26

Marks: 1 (Budgeted Time 1 Min)

If $y = x$, then $\frac{dy}{dx} = \dots\dots\dots$

Answer (Please select your correct option)

☐ 0

☒ 1



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☐ x

☐ $x+1$

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Question No : 13 of 26

Marks: 1 (Budgeted Time 1 Min)

If $f(x)$ and $g(x)$ are linearly dependent on I , then-----.

Answer (Please select your correct option)

☐ $W(f,g)(x) \neq 0$ (Wronskian) for all x in the interval I .

☒ $W(f,g)(x) = 0$ (Wronskian) for all x in the interval I .

☐ $W(f,g)(x)$ may or may not be zero for all x in the interval I .

☐ $W(f,g)(x)$ is not defined for all x in the interval I .



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Question No : 14 of 26

Marks: 1 (Budgeted Time 1 Min)

Wronskian of $\sin x, \cos x$ is----

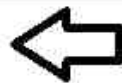
Answer (Please select your correct option)

☐ $\sin x$

☐ 1

☒ -1

☐ $\cos x$



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Question No : 15 of 26

Marks: 1 (Budgeted Time 1 Min)

The orthogonal trajectory to the family of curves $3x + 4y = c$ is-----.

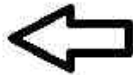
Answer (Please select your correct option)

☐ $y = 2x$

☐ $y - x = c$

☒ $4x - 3y = c$

☐ $4x + 3y = c$



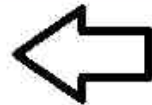
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If T denotes the half life and the initial amount of the substance be A_0 , then the amount of radioactive substance at time T is given by-----

Answer (Please select your correct option)

☐ $A(T) = \frac{A_0}{2}$



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☐ $A(T) = \frac{T}{2}$

☐ $A(T) = A_0$

☐ $A(T) = \frac{kT}{2}$

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Question No : 17 of 26

Marks: 1 (Budgeted Time 1 Min)

If the auxiliary equation has roots $-2, -2$, then the general solution of the differential equation is _____

Answer (Please select your correct option)

☐ $y = c_1 e^{-2x} + c_2 e^{-2x}$

☐ $y = c_1 e^{-2+2x}$

☐ $y = c_1 e^{2x} + c_2 e^{-2x}$

☐ $y = (c_1 + c_2 x) e^{-2x}$



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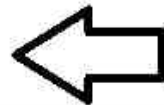
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If the auxiliary equation has complex roots $-2 \pm 3i$, then the general solution of the differential equation is _____

Answer (Please select your correct option)

☐ $y = ce^{2x} (\cos 10x + \sin 10x)$

☐ $y = e^{-2x} (c_1 \cos 3x + c_2 \sin 3x)$



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☐ $y = e^{ix} (c_1 \cos 2x + c_2 \sin 2x)$

☐ $y = e^{2x} (c_1 \cos x - c_2 \sin x)$

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If $y = e^{-6x}$, then which of the following is the most accurate option?

Answer (Please select your correct option)

☐ The annihilator operator of $y = e^{-6x}$ is $(D - 6)^2$.

☐ The annihilator operator of $y = e^{-6x}$ is $(D - 6)^3$.

☐ The annihilator operator of $y = e^{-6x}$ is $(D - 6)$.

☒ The annihilator operator of $y = e^{-6x}$ is $(D + 6)$.



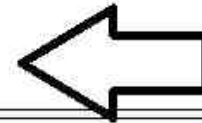
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If the complementary solution of $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 2y = 3\sin x$ is $c_1 e^{-x} + c_2 e^{2x}$, then which of the following is the most accurate option for it?

Answer (Please select your correct option)

- ☐ The general form of the particular solution will be $(A \sin x + B \cos x) e^x$.
- ☐ The general form of the particular solution will be $Ax \sin x + Bx \cos x$.
- ☐ The general form of the particular solution will be $(Ax \sin x + Bx \cos x) e^{-x}$.
- ☐ The general form of the particular solution will be $A \sin x + B \cos x$.



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Evaluate $e^{-\int P(x) dx}$ using the differential equation $x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + \left(x^2 - \frac{1}{4}\right)y = 0$ by writing it in the standard form $\frac{d^2 y}{dx^2} + P(x) \frac{dy}{dx} + Q(x)y = 0$.

Answer ([Please click here to Add Answer](#))



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If the complementary solution of the following differential equation is $c_1 \sin 2x + c_2 \cos 2x$, then what will be the general form of its particular solution:

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

Answer (Please [click here](#) to Add Answer)



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Question No : 23 of 26

Marks: 3 (Budgeted Time 6 Min)

If a mass weighing 8 lb and $k = 40\text{ lb/ft}$ then find the amount of elongation 's'.

Answer (Please [click here](#) to Add Answer)



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If $y_1(x) = e^{-4x}$ is the first solution of $\frac{d^2 y}{dx^2} + 6 \frac{dy}{dx} + 8y = 0$, then construct its second solution using $y_2(x) = y_1(x) \int \frac{e^{-\int P(x) dx}}{y_1^2(x)} dx$.

Note: where $P(x)$ is a coefficient of the first derivative involving in the above given differential equation.

Answer ([Please click here to Add Answer](#))



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Question No : 25 of 26

Marks: 5 (Budgeted Time 10 Min)

A mass weighing $2lb$ stretches a spring 6 inches. Determine the equation of simple harmonic motion.

Answer (Please [click here](#) to Add Answer)



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Question No : 26 of 26

Marks: 5 (Budgeted Time 10 Min)

A radioactive isotope has a half-life of 16 days. We have 45 g at the end of 32 days. How much radioisotope was initially present?

Answer ([Please click here to Add Answer](#))



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