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MID TERM PAST PAPER

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Best of luck!

PAST PAPER

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

Wronskian of the function $y_c = c_1 + c_2 \cos x + c_3 \sin x$ is

Answer (Please select your correct option)

- 0
- 1
- 2
- 3



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Question No : 2 of 26 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- 7
- 4
- 40 ⇦
- 20

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Question No : 3 of 26 Marks: 1 (Budgeted Time 1 Min)

The degree of the differential equation $[1 - x(\frac{dy}{dx})^2]^{\frac{3}{2}} = \frac{d^2y}{dx^2}$ is

Answer (Please select your correct option)

- 1
- 2
- 3
- None of these



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Question No : 4 of 26 Marks: 1 (Budgeted Time 1 Min)

Which of the following is the equation of pendulum?

Answer (Please select your correct option)

- $\frac{d^2\theta}{dt^2} + \frac{g}{l}\sin\theta = F(t)$ ⇦ correct answer solve by hadi
- $\frac{d\theta}{dt} + \frac{g}{l}\sin\theta = F(t)$
- $\frac{du}{dt} = F(u)G(t)$
- None of these

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Question No : 5 of 26 Marks: 1 (Budgeted Time 1 Min)

The differential equation $(x^2 - 2x + 2y^2)\,dx + 2xy\,dy = 0$ is a/an -----differential equation.

Answer (Please select your correct option)

- Exact
- Non-exact
- Homogenous
- Separable



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Question No : 6 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)

- $\frac{1}{x}, x$ & 2 
- y, x^2y & 2
- $y, \frac{1}{x}$ & 2
- $\frac{1}{y}, y$ & 2

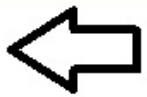
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Question No : 7 of 26 Marks: 1 (Budgeted Time 1 Min)

If a differential equation is of the form $y\,f(x,y)dx + xg(x,y)\,dy = 0$ with $xM - yN \neq 0$, then the Integrating factor is------.

Answer (Please select your correct option)

- $\mu = \frac{1}{yN - xM}$
- $\mu = \frac{1}{xM + yN}$
- $\mu = \frac{1}{xM - yN}$ 
- $\mu = \frac{1}{yM + xN}$

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Question No : 8 of 26 Marks: 1 (Budgeted Time 1 Min)

If the given differential equation is homogeneous and $xM + yN \neq 0$, then the integrating factor of the given differential equation is given by------.

Answer (Please select your correct option)

- $u = \frac{1}{xM + yN}$ ⇦ correct answer solve by hadi
- $u = \frac{1}{xM - yN}$
- $u = \exp\left(\int \frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{\quad} dy\right)$
- $u = \exp\left(\int \frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{\quad} dx\right)$

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Question No : 9 of 26 Marks: 1 (Budgeted Time 1 Min)

Number of constant solutions obtained from the separable differential equation $\frac{dy}{dx} = \frac{y^3 - 1}{x}$ is---.

Answer (Please select your correct option)

- 0 ⇦ correct answer solve by hadi
- 1
- 2
- 3

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Question No : 10 of 26 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- $y = \frac{x^2}{2} + c$ ⇦ correct answer solve by hadi
- $y = x^2 + c$
- $y = x + c$
- $y = \frac{x}{2} + c$

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Question No : 11 of 26 Marks: 1 (Budgeted Time 1 Min)

To convert the non-homogenous differential equation $\frac{dy}{dx} = \frac{2x+3y-4}{4x+6y+9}$ into variable separable form, we use the substitution -----.

Answer (Please select your correct option)

- $Z = x + y$
- $Z = 4x + 3y$
- $Z = 2x + 6y$
- $Z = 2x + 3y$



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Question No : 12 of 26 Marks: 1 (Budgeted Time 1 Min)

In exponential model for the population growth $P(t) = P_0 e^{kt}$ *If* $k < 0$, *then* $\lim_{t \to \infty} P(t) = - - -$.

Answer (Please select your correct option)

- ∞
- 0
- −∞
- 1

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infinte

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Question No : 13 of 26 Marks: 1 (Budgeted Time 1 Min)

In exponential model for the population growth $P(t) = P_0 e^{kt}$ *If* $k > 0$, *then* $\lim_{t \to \infty} P(t) = - - -$.

Answer (Please select your correct option)

- ∞
- $-\infty$
- 0
- 1



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Question No : 14 of 26 Marks: 1 (Budgeted Time 1 Min)

The constant solutions of the logistic equation $\frac{dP}{dt} = P(a - bP)$ are----.

Answer (Please select your correct option)

- P=0, P= b/a
- P=0, P=a/b
- P=a/b, P=b/a
- P=0,P=0



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Question No : 15 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 : 16 of 26 Marks: 1 (Budgeted Time 1 Min)

What is annihilator operator of the function $g(x) = \sin x$?

Answer (Please select your correct option)

- $(D^3 + 1)$
- D^2
- $D^2 - 1$
- $D^2 + 1$



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Question No : 17 of 26 Marks: 1 (Budgeted Time 1 Min)

Which of the following is the annihilator operator of the function $g(x) = 4x - 5$?

Answer (Please select your correct option)

- D^2 
- $(D+4)$
- (D^3-4)
- $(D-4)$

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Question No : 18 of 26 Marks: 1 (Budgeted Time 1 Min)

The differential equation of the orthogonal trajectory to the family of curves $y = cx$ is-----.

Answer (Please select your correct option)

- $\frac{dy}{dx} = -\frac{x}{y}$
- $\frac{dy}{dx} = \frac{x}{y}$
- $\frac{dy}{dx} = -\frac{y}{x}$
- $\frac{dy}{dx} = \frac{y}{x}$ 

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Question No : 19 of 26 Marks: 1 (Budgeted Time 1 Min)

If $y = 1 + 6x^2 - 7x^3$, then which of the following is true for it ?

Answer (Please select your correct option)

- Its annihilator operator is D.
- Its annihilator operator is D^2.
- Its annihilator operator is D^3.
- Its annihilator operator is D^4.



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Question No : 20 of 26 Marks: 1 (Budgeted Time 1 Min)

If $y_1 = x^2$ and $y_2 = x$ are the first and second solution of $x^2\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + 2y = 0$, then which of the following is the most accurate option?

Answer (Please select your correct option)

- $W(y_1, y_2)$ must be equal to zero on the indicated interval.
- $W(y_1, y_2)$ must be equal to non-zero on the indicated interval.
- $W(y_1, y_2)$ may or may not be equal to zero on the indicated interval.
- $W(y_1, y_2)$ may or may not be equal to non-zero on the indicated interval.



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Question No : 21 of 26 Marks: 2 (Budgeted Time 4 Min)

In which sciences or subjects Logistic equations are useful?

Answer (Please click here to Add Answer)



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Question No : 22 of 26 Marks: 2 (Budgeted Time 4 Min)

Define cycle of a vibrating body?

Answer (Please click here to Add Answer)



Question No : 23 of 26 Marks: 3 (Budgeted Time 6 Min)

What is Logistic equation, write it mathematically?

Answer (Please click here to Add Answer)



Question No : 24 of 26 Marks: 3 (Budgeted Time 6 Min)

Write the solution $x(t) = c_1 \cos \omega t + c_2 \sin \omega t$ of a simple harmonic motion in a simple alternative form?

Answer (Please click here to Add Answer)



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Question No : 25 of 26 Marks: 5 (Budgeted Time 10 Min)

Find the general solution of the following non-homogenous differential equation using annihilator operator

$y'' - 3y' + 2y = 4x^2 + 5$?

Answer (Please click here to Add Answer)



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Question No : 26 of 26 Marks: 5 (Budgeted Time 10 Min)

Given that $y = c_1 e^{x} + c_2 e^{-x}$ is a two parameter family of solutions of the differential equation $\frac{d^2y}{dx^2} - y = 0$ on $(-\infty, \infty)$ find a member of the family satisfying the boundary conditions

$y(0) = 0,\ y'(1) = 1$

Answer (Please click here to Add Answer)



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