N K MATHS ACADEMY

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UNIT TEST-(LN-9, 10)

MARKS: 50   **TIME: 1.30 MIN**

I. CHOOSE THE BEST ANSWER: **10X1=10**

1. The value of $\int_{-1}^{2} |x| dx$ is   (1) $\frac{1}{2}$ (2) $\frac{3}{2}$ (3) $\frac{5}{2}$ (4) $\frac{7}{2}$

2. The value of $\int_{\frac{\pi}{4}}^{\frac{\pi}{4}} \left(\frac{2x^2 - 3x^5 + 7x^3 - x + 1}{\cos^2 x} \right) dx$ is

     (1) 4   (2) 3   (3) 2   (4)0

3. The value of $\int_0^{\frac{\pi}{6}} \cos^3 3x \, dx$ is   (1) $\frac{2}{3}$ (2) $\frac{2}{9}$ (3) $\frac{1}{9}$ (4) $\frac{1}{3}$

4. The order and degree of the differential equation $\sqrt{\sin x}(dx + dy) = \sqrt{\cos x}(dx - dy)$ is

     (1) 1, 2   (2) 2,2   (3) 1,1   (4) 2,1

5. The general solution of the differential equation $\frac{dy}{dx} = \frac{y}{x}$ is

     (1) $xy = k$ (2) $y = k \log x$ (3) $y = kx$ (4) $\log y = kx$

6. The solution of $\frac{dy}{dx} = 2^{y-x}$ is

     (1) $2^x + 2^y = c$ (2) $2^x - 2^y = c$ (3) $\frac{1}{2^x} - \frac{1}{2^y} = c$ (4) $x + y = c$

7. The value of $\int_0^{\pi/2} \frac{\cos^{5/3} x}{\cos^{5/3} x + \sin^{5/3} x} dx$ is   1) $\pi/2$ 2) $\pi/4$ 3) 0   4) π

8. The area bounded by the line y = x, the x axis, the ordinates x = 1 , x = 2 is.

     1) 3 / 2.   2) 5 / 2.   3) 1 / 2   4) 7 / 2

9. Integrating factor of $\frac{dy}{dx} + \frac{1}{x \log x}.y = \frac{2}{x^2}$ is   1) e^x.   2) log x.   3) 1/ x   4) e^{-x}.

10. The differential equation obtained by eliminating a and b from $y = ae^{3x} + be^{-3x}$ is.

     1) $\frac{d^2y}{dx^2} + ay = 0$ 2) $\frac{d^2y}{dx^2} - 9y = 0$ 3) $\frac{d^2y}{dx^2} - 9\frac{dy}{dx} = 0$ 4) $\frac{d^2y}{dx^2} + 9x = 0$

II. ANSWER ANY 5 QUESTIONS: **5X2=10**

11. Evaluate $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} x \, \cos x \, dx$

12. Evaluate $\int_0^{\frac{\pi}{2}} \left(\sin^2 x + \cos^4 x \right) dx$

13. Determine the order and degree $3\left(\dfrac{d^2y}{dx^2}\right)=\left[4+\left(\dfrac{dy}{dx}\right)^2\right]^{\frac{3}{2}}$

14. Show that $y=2x^2$ is a solution of the differential equation $xy'=2y$

15. Form the differential equation by eliminating the arbitrary constants A and B from $y=A\cos x+B\sin x$

16. Solve $(1+x^2)\dfrac{dy}{dx}=1+y^2$

III. ANSWER ANY 5 QUESTIONS: 5X3=15

17. Evaluate: $\displaystyle\int_0^{\frac{\pi}{2}}\dfrac{e^{-\tan x}}{\cos^6 x}\,dx$

18. Find the area of the region bounded by $2x-y+1=0$, $y=-1$, $y=3$ and y-axis

19. Show that $\displaystyle\int_0^{\frac{\pi}{2}}\dfrac{dx}{4+5\sin x}=\dfrac{1}{3}\log_e 2$

20. Solve $\dfrac{dy}{dx}-x\sqrt{25-x^2}=0$

21. Solve $\tan y\dfrac{dy}{dx}=\cos(x+y)+\cos(x-y)$

22. Solve $\dfrac{dy}{dx}+\dfrac{y}{x\log x}=\dfrac{\sin 2x}{\log x}$

IV. ANSWER ANY 3 QUESTIONS: 3X5=15

23. The curve $y=(x-2)^2+1$ has a minimum point at P. A point Q on the curve is such that the slope of PQ is 2. Find the area bounded by the curve and the chord PQ

24. Find the volume of the solid formed by revolving the region bounded by the ellipse, $\dfrac{x^2}{a^2}+\dfrac{y^2}{b^2}=1$

    $a>b$ about the major axis

25. Solve $\left(x^2+y^2\right)dy=xydx$. It is given that $y(1)=1$ and $y\left(x_0\right)=e$. Find the value of x_0

26. Find the population of a city at any time t, given that the rate of increase of population is proportional to the population at that instant and that in a period of 40 years the population increased from 3, 00,000 to 4, 00,000

27. Assume that the rate at which radioactive nuclei decay is proportional to the number of such nuclei that are present in a given sample. In a certain sample 10% of the original number of radioactive nuclei has undergone disintegration in a period of 100 years. What percentage of the original radioactive nuclei will remain after 1000 years?

CONTACT FOR HOME TUITIONS / ONLINE CLASSES

(9, 10, 11, 12 MATRIC /CBSE/ISC/ICSE)

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