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Name: _____ R. No.___ Class/ Sec:_____ Date:_____ Invig. Sign_____

ATOMIC ENERGY CENTRAL SCHOOL, NARORA

CLASS XII MATHS HALY YEARLY EXAMINATION 2018-19

MM: 100 TIME: 3 Hr.

General Instructions:

- All questions are compulsory and marks are mentioned in front of each question.
- Electronic devices are prohibited to use in the examination.
- Use Blue or Black Pen only.
- Question Nos. 1 to4 are 1 mark each .
- Question Nos. 5 to 12 are 2 marks each .
- Question Nos. 13 to 23 are 4 marks each
- Question Nos. 24 to 29 are 6 marks each

1: Find the principal value of $\cos^{-1}(\cos -2\pi/3)$

2 : A matrix A of order 3 x 3 has determinant 5 ,find $|3A|$

3 : Evaluate $\int [x]\, dx$

4 Write the order and degree of the diff. equation $d^2y/dx^2 + \sqrt{(dy/dx)} = 0$

5 : If $x = a\cos t$ and $y = b(t + \sin t)$ find dy/dx

6: If $\begin{bmatrix} x & y \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 4 & 2 \\ 5 & 3 \end{bmatrix}$ find x and y .

7: Find the slope of the normal to the curve $y = 5x^3 + 3$, at $x = 1$

8: Evaluate $\int_{-\pi/2}^{\pi/2} \sin^3 x\, dx$

9 : If $a * b = a / b$ find $(8 * 2) * 1$

10: Evaluate $\int \sin x \sin 2x \sin 3x\, dx$

11: Evaluate $\int \sec^3 x\, dx$

12: If $y = \sin(\tan x^x)$,find dy/dx

13 Prove that the relation R defined by (a, b) R (c ,d) if a + d= b + c on the set of N x N is an equivalence relation

14 : Using properties of determinant prove that

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$$

15: Evaluate $\int \sqrt{(\tan x)}\, dx$

16 : Solve the diff. equation $(x^2 - y^2)\, dx + 2xy\, dy = 0$

17: Solve the diff. equation $\sin x (dy/dx) + y \cos x = \cos x . \sin^2 x$

18 : Find the interval in which function $f(x) = \sin^4 x + \cos^4 x$, $0 \le x \le \pi$ increasing or decreasing

19 Find k if $f(x) = \begin{cases} \dfrac{\tan x - \sin x}{x^3}, & \text{if } x > 0 \\ K \sin \pi (x+1)/2, & \text{if } x \le 0 \end{cases}$ is continues at x == 0

20: Find the equation of tangent $16x^2 - 9y^2 = 144$ at the point(h, k)

21: Sole the equation $\tan^{-1}[(-1+x)/(-2+x)] = \pi/4 - \tan^{-1}(1+x)/(x+2)$, $0 < x < 1$

22: : Form a diff. equation for the curve $y = A e^{3x} + B e^{-4x}$

23: Using matrix solve the following equations $x - 2y + z = -4$, $2x + 3y + 3z = 5$, and $3x - y - 2z = 3$

24 : Evaluate $\int_1^3 (x^2 + 5x)\,dx$ as limit of a sum

25 : Evaluate $\int_0^{\pi/2} \log \cos x \; dx$

26 : Find the area of the reason enclosed between two circles $x^2 + y^2 = 4$ $x^2 + (y-2)^2 = 4$

27 : Show that the volume of the greatest right cylinder that can be ins cribbed in a cone of height h and semi vertical angle θ is $(4/27)\,\pi h^3 \tan^2\theta$

28 : If the sum of the length of the hypotenuse and a side of a right angled is given , show that the area of the triangle is maximum when the angle between them is $\pi/3$.

29 : Using the method of integration , find the area of the region bounded by the lines $2x + y = 4$, $3x - 2y = 6$ and $x - 3y + 5 = 0$
