TIME:1HR. **M.MARKS:30**

CHAPTER TEST

CLASS: XII

Definite Integral & Differential Equation

1. Evaluate $\int_a^b \frac{\log x}{x}\,dx$ 3

2. Evaluate $\int_0^{\pi/2} \left(\sqrt{\tan x}+\sqrt{\cot x}\right) dx$ 3

3. Form a differential equation corresponding to $ay^2 = (x-c)^3$ by eliminating c. 3

4. Solve $x^2 \frac{dy}{dx} = x^2 + xy + y^2$ 3

5. Prove that $\int_0^{\pi/2} \log(1+\tan x)\,dx = \frac{\pi}{8}\log 2$ 4

6. Evaluate $\int_1^3 f(x)\,dx$ where $f(x) = \begin{cases} 2x+1, & \text{when } 1 \le x \le 2 \\ x^2+1, & \text{when } 2 \le x \le 3 \end{cases}$ 4

7. Solve the differential equation $\frac{d^2y}{dx^2} = \log x.$ 4

8. (i) Find the area bounded by the parabola $y^2 = 4ax$ and its latus rectum x = a. 3

   (ii) Evaluate $\int_1^3 (x^2+x)\,dx$ as a limit of sum. 3