MONTHLY TEST

CLASS XII

SUBJECT-MATHEMATICS (SET-2)

TIME 90 MIN MM 40

GENERAL INSTUCTIONS-

1-All questions are compulsory.

2-Section A , each question 1 mark, Section B , each question 2 marks, Section C , each question 3 marks, Section D , each question 4 marks, Section E is case based 4 MCQ's, each of 1 mark.

SECTION A

Q.NO. 1-The side of an equilateral triangle is increasing at the rate of $\frac{1}{3}$ cm/sec. Find the rate at which its perimeter is increasing.

Q.NO. 2-Evaluate $\int sin^2x\, dx$.

Q.NO.3-Evaluate $\int \frac{(\tan^{-1}x)^2}{1+x^2}\, dx$

SECTION B

Q.NO.4- At what points on the curve $y = x^3$, at which y –coordinate changes three times more fast than x –coordinate

Q.NO.5- Find the intervals in which the function f given by $f(x) = -3x^2 + 12x + 8$ is increasing and Decreasing.

Q.NO.6 Evaluate $\int \frac{sin^2x - cos^2x}{sin^2x\,.\,cos^2x} dx$

SECTION C

Q.NO.7-Evaluate $\int \frac{1}{\sqrt{5-8x-x^2}} dx$

Q.NO.8- Evaluate $\int \frac{\sin x}{1-sinx} dx$

Q.NO.9-. Find the intervals in which $f(x) = \sin x + \cos x$, $0 \leq x \geq \frac{\pi}{2}$, is (a) increasing (b) decreasing

Q.NO.10-Find the maximum value of the function $f(x) = x + \sin x$, $x \in [0, 2\pi]$

Q.NO.11- A man 2m heigh walks at a uniform speed of 6 km/hour away from a lamp post 6m high. Find the rate at which the length of his shadow is increases.

SECTION D

Q.NO.12-Show that the right circular cone of given volume and least curved surface is such that its height is equal to $\sqrt{2}$ times the radius of the base.

Q.NO.13- Evaluate $\int (\sqrt{\tan x} + \sqrt{\cot x})\, dx$.

Q.NO.14- Integrate with respect to x , $\frac{2x}{(x^2+3)(x^2+4)}$.

SECTION E

CASE BASE STUDY :

Q.NO. 15 Read the following text and answer the following questions on the bases of same.

An open box is to be made out of a piece of card board measuring (45 cm × 24 cm) by cutting of equal Squares of side 'x' from the corners and turning up the sides .

(i) The volume of the open box is

(a) $4x^3 + 138x^2 + 1080x$ (c) $4x^3 - 138x^2 - 1080x$

(b) $2x^3 - 138x^2 + 1080x$ (d) $2x^3 + 138x^2 + 1080x$

(ii) The value of $\frac{d^2V}{dx^2}$ $(where\ V\ is\ the\ volume\ of\ box\ so\ obtained)$ is

(a) $12(2x + 21)$ (b) $12(2x - 24)$ (c) $12(x - 23)$ (d) $12(2x - 23)$

(iii) The value of x for which volume of the box is maximum

(a) -12 (b) 18 (c) 5 (d) 6

(iv) Length of the box of maximum volume is

(a) 15 (b) 20 (c) 25 (d) 35