S. B. Roll. No $\qquad$

## APPUED M ATHEM ATICS-II

$2^{\text {nd }}$ Exam/ Common/ 0553/Jun'2021
(For 2018 Batch Onwards)

Duration: 1.15Hrs.
Q1. Attempt any three questions.
M.Marks:25

SECTION-A
a. Evaluate $\lim _{x \rightarrow 0} \frac{\cos 5 x-\cos 11 x}{\cos 3 x-\cos 7 x}$
b. Find the equation of the tangent to the curve $y=x^{2}+7 x+1$ which makes an angle of $45^{\circ}$ with X axis.
c. Evaluate $\int \frac{d x}{x(x+1)}$
d. If $y=\left(\sin ^{-1} x\right)^{2}$, prove that $\left(1-x^{2}\right) \frac{d^{2} y}{d x^{2}}-x \frac{d y}{d x}=2$.
e. Find the area of the curve $\frac{x^{2}}{a^{2}}+\frac{y^{2}}{b^{2}}=1$ between $x=0$ and $x=a$.
f. Evaluate $\int_{0}^{\sqrt{3}} \frac{e^{m \tan ^{-1} x}}{1+x^{2}} d x$
g. Solve the differential equation $\sec ^{2} y \frac{d y}{d x}+2 x \tan y=x^{3}$.

## SECTION-B

Q2. Attempt any one question.
$1 \times 10=10$
i. (a) Show that $\int_{0}^{\frac{\pi}{2}} \frac{1}{a^{2} \sin ^{2} x+b^{2} \cos ^{2} x} d x=\frac{\pi}{2 a b}$
(b) Evaluate $\int_{0}^{\pi}|\cos x| d x$.
ii. Differentiate $x^{\sin x}$ w.r.t. $(\sin x)^{x}$.
iii. Find the maximum and minimum values of the function $y=2 x^{3}-21 x^{2}+36 x-20$.
iv. Solve the following linear programming problem graphically Maximize $z=3 x+2 y$, subject to the constraints
$x+2 y \leq 10$
$3 x+y \leq 15$
$x, y \geq 0$

