

S.B. Roll No.....

APPLIED MATHEMATICS-II
2nd Exam/Common/0553/Feb'2021
(For 2018 Batch onwards)

Duration: 1.15Hrs.

M.Marks:25

SECTION-A

Q1. Attempt any three questions.

3x5=15

- i. If $x = 5t - t^3$, $y = t^2 + 4t$, find $\frac{dy}{dx}$ at $t = 1$.
- ii. Differentiate $\log(\log(\log x))$ w.r.t. x .
- iii. Differentiate $\sqrt{\frac{1-\cos x}{1+\cos x}}$ w.r.t. x .
- iv. Solve the differential equation $e^y(dy + dx) = xe^y dx$
- v. Evaluate $\int x^2 \tan^{-1} x \, dx$.
- vi. Find the equation of the normal to the curve $y = 6x^2 - 5x + 3$ at $(1, 4)$.
- vii. Calculate by Simpson's rule an approximate value of $\int_{-3}^3 x^6 \, dx$, by taking seven equidistant ordinates.

SECTION-B

Q2. Attempt any one question.

1x10=10

- a. Find maximum and minimum or extreme value of the function $2x^3 - 15x^2 + 36x + 10$
- b. Find $\frac{dy}{dx}$ of $(\sin x) x + x^x$ w.r.t. x .
- c. If $x = a(\theta + \sin \theta)$ and $y = a(1 - \cos \theta)$ find $\frac{d^2y}{dx^2}$
- d. Evaluate $\int \frac{(x^2 + 4)}{(x^2 + 1)(x^2 + 3)} dx$.
- e. Solve the following linear programming problem graphically:
Minimize $Z = 200x + 500y$
Subject to constraints: $x + 2y \geq 10$
 $3x + 4y \leq 24$
 $x \geq 0, y \geq 0$