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Section: 06

Paper Source

Subject

Date

Time

### Quiz-4

①

$$f(x) = x \ln(x) + (3x^2 - 2)^3$$

$$x_0 = 2.$$

$$\text{Step size, } h = 0.01.$$

Backward difference for  $f(x)$ ,

$$\frac{2 \ln(2) + (3 \cdot 2^2 - 2)^3 - [(2-h) \ln(2-h) + \{3(2-h)^2 - 2\}^3]}{h} \quad \left[ \begin{array}{l} \text{We know,} \\ \frac{f(x_0) - f(x_0+h)}{h} \end{array} \right]$$
$$= \frac{1001.3863 - [(2-h) \ln(2-h) + \{3(2-h)^2 - 2\}^3]}{h} \quad [h = 0.01]$$

$$= 3549.8784 \quad (\text{Ans}).$$

②

$$x_0 = 2:$$

$$f(x) = x \ln(x) + (3x^2 - 2)^3 \quad [f(x) = \ln(x) + 1 + 3 \cdot (3x^2 - 2)^2 \cdot 3 \cdot 2x]$$

$$f'(x) = \ln(x) + 1 + 18x(3x^2 - 2)^2$$

$$= 3601.6931 \quad (\text{Ans}).$$

③

$$\text{Error} = \frac{(3601.6931 - 3549.8784)}{3601.6931} \times 100$$

$$= 1.4386\% \quad (\text{Ans})$$