

MATHEMATICS (Honours)

Paper: MATH-H-DC-12

Time: 1 h.

Full Marks: - 14

$$6 \times 1 = 6$$

1. Answer the following questions:

(a) Find the number of significant figures in $V_A = 11.2461$ given its absolute error as 0.25×10^{-2}

(b) Find the relative error and percentage error in x_A when $x_T = \frac{1}{3}$, $x_A = 0.333$

(c) Round-off the following numbers to four significant figures: 0.000568652

(d) Evaluate $\left(\frac{\Delta^v}{E}\right)x^3$

(e) Show that $E \equiv \Delta + 1$

(f) Show that $\mu \equiv \frac{1}{2} \left(E^{\frac{1}{2}} + E^{-\frac{1}{2}} \right)$

2. Answer the following questions:

$$2 \times 4 = 8$$

(a) Prove that, if a number is correct upto n significant figures and the first significant digit of the number is k , then the relative error is less than $\left(\frac{1}{k \times 10^{n-1}} \right)$

(b) (i) Proved that, $(1+\Delta)(1-\nabla)f(x) = f(x)$

(ii) proved that, $\Delta^v f(x) = (E-1)^v f(x)$