

- (B) Find the value of :

$$\int \frac{\sin^4 x}{\cos^2 x} dx$$

- (C) Evaluate the following :

(i) $\lim_{x \rightarrow 0} \frac{(1+x)^6 - 1}{(1+x)^2 - 1}$

(ii) $\lim_{x \rightarrow 0} \frac{\log x}{x}$

- (D) Find C of the mean value theorem, when :

$$f(x) = x^3 - 3x - 2$$

in $[-2, 3]$.

- (E) Find the rank of the matrix :

$$A = \begin{bmatrix} 5 & 6 & 7 & 8 \\ 6 & 7 & 8 & 9 \\ 11 & 12 & 13 & 14 \\ 16 & 17 & 18 & 19 \end{bmatrix}$$

- (F) Find the maximum and minimum value of the function :

$$f(x) = x^3 - 3x^2 + 6$$

- (G) Evaluate :

$$\int_0^1 x^4 (1 - \sqrt{x})^5 dx$$

- (H) If :

$$\vec{a} = \hat{i} + \hat{j} + 2\hat{k}$$

and $\vec{b} = 3\hat{i} + 2\hat{j} - \hat{k}$

find the value of :

$$(\vec{a} + 4\vec{b}) \cdot (2\vec{a} - \vec{b})$$

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 time the total pressure $p_a \times \text{mole fraction}_a = \text{mole}_a / \text{moles total}$
 $\sum_{i=1}^n x_i = 1$ mole fraction of substance a is often denoted by x_a and

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