

## Question

- (a) Show that the WKB approximation gives an exact answer for harmonic oscillator energy levels. [6]
- (b) Obtain an estimate of the ground state energy of harmonic oscillator using variational method and taking trial wave function as [6]

$$\psi(x) = Ne^{-\alpha x^2}.$$

## Evaluation of Q3(b)

- **Category D: Marks 2/6**

Attempts to minimize but

Integrals not computed correctly.

Problems with taking second derivative in KE average.

Insufficient details.

- **Category F: Marks zero**

No mention/attempt to minimize the average of energy

No attempt to fix normalization

Normalization computed but not used in average of energy expression.

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