# PhysicsByAaryan

CSIR NET . GATE . JEST . BARC - Physics

# KG and Dirac equation - CSIR NET Physics PYQs

Quantum Mechanics . All PYQs (2015-2025) with answer key

**1 questions . Answer key included**

**Q1. [Dec 2016] . 5.0 marks**

Quantum Mechanics > KG and Dirac equation

| CSIR NET | 2016 Dec | 5M |
|---|---|---|

The dynamics of a free relativistic particle of mass $m$ is governed by the Dirac Hamiltonian

$H = c\vec{\alpha} \cdot \vec{p} + \beta mc^2$, where $\vec{p}$ is the momentum operator and $\vec{\alpha} = (\alpha_x, \alpha_y, \alpha_z)$ and $\beta$ are four $4 \times 4$ Dirac matrices. The acceleration operator can be expressed as

1. $\frac{2ic}{\hbar}(c\vec{p} - \vec{\alpha}H)$
2. $2ic^2\vec{\alpha}\beta$
3. $\frac{ic}{\hbar}H\vec{\alpha}$
4. $-\frac{2ic}{\hbar}(c\vec{p} + \vec{\alpha}H)$

# Answer Key

1 questions . Subject and topic for quick revision

| Q. No | Subject | Topic | Answer |
|---|---|---|---|
| Q1 | Quantum Mechanics | KG and Dirac equation | **1** |

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