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**PG (CBCS)**
**M.SC. Semester- IV Examination, 2026**
**PHYSICS**
PAPER: PHS 402
**(PARTICLE PHYSICS)**

**Full Marks: 20** **Time: 1 Hours**

The figures in the right-hand margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

## GROUP-A

Answer any **TWO** of the following questions: 2×2=4

1. What is the difference between a pseudoscalar meson and a vector meson?
2. Give the quark combination of P (proton) and Λ (lambda).
3. Which of the following processes is allowed by the strong interaction?
   (i) $K^- + n \rightarrow \Lambda^0 + \pi^-$ (ii) $K^+ \rightarrow \pi^+ + \pi^0$
4. Explain the spontaneous symmetry in particle physics.

## GROUP-B

Answer any **TWO** of the following questions: 2×4=8

5. In which way Left handed and Right-handed neutrinos differ from each other?
6. Check the conservation of Baryon no., Lepton no., Strangeness, and Angular momentum of the following reaction: $p + \pi^0 \rightarrow e^+ + \nu_e + \Lambda$
7. What is τ-θ puzzle? How it is resolved?
8. Give the representation of eightfold way of meson octet and baryon decuplet.

## GROUP-C

Answer any **ONE** of the following questions: 1×8=8

9. What is G-parity? Describe the G-parity of charged and neutral pions and their behavior under charge conjugation. In which way C- Parity and G- Parity differ from each other. 1+5+2
10. (i) Which of the following processes are allowed by the strong interaction, the electromagnetic interaction, the weak interaction, or no interaction at all?

    $(a)\pi^- + p \rightarrow \Lambda^0 + K^0 (b) p + \nu \rightarrow p + \pi^0 (c) \Lambda^0 \rightarrow p + \pi^0 (d) \pi^- + p \rightarrow 2\eta$

    (ii) State CPT theorem. 6+2

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