

(i) Printed Pages : 2

Roll No.

(ii) Questions : 9

Sub. Code :

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Exam. Code :

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M.Sc. Physics 3rd Semester
(2122)

PARTICLE PHYSICS—I

Paper : PHY-8032

Time Allowed : Three Hours]

[Maximum Marks : 60

Note :— Attempt five questions in all, including Question No. IX (Unit-V) which is compulsory and selecting one question each from Units I–IV.

UNIT—I

- I. (a) What do you understand by 'November Revolution'? Discuss its significance in Particle Physics. 9
- (b) Give a classification of weak interactions with the help of appropriate Feynmann diagrams. 3
- II. Give a detailed account of various conservation laws used in particle physics interactions by using suitable examples. 12

UNIT—II

- III. (a) Explain the CPT theorem in detail along with its consequences. 5
- (b) How the spin of neutral pion is measured? 7
- IV. (a) What do you understand by isospin symmetry? Discuss its application in the pion nucleon system. 9
- (b) Write a short note on 'G-Parity'. 3

UNIT—III

- V. (a) What are Dalitz plots ? Discuss the significance of a non uniformly populated Dalitz plot by considering the three body phase space. 5
- (b) What are Mandelstem variables ? Derive an expression for sum of these variables. Also discuss the limits on the values of these variables. 7
- VI. (a) Discuss and derive the Breit-Wigner resonance formula. 6
- (b) Draw and explain the 'Baryon Decuplet'. 3
- (c) What was the need to introduce 'quark color' ? 3

UNIT—IV

- VII. (a) Is parity conserved in weak interactions ? Discuss in detail the experimental determination of parity conservation violation in weak interactions. 9
- (b) Write a short note on the significance of CKM matrix. 3
- VIII. (a) What do you understand by strangeness oscillations ? 5
- (b) Discuss the phenomenon of CP violation in neutral K meson decays. 7

UNIT—V

- IX. Answer the following :
- (a) What do you mean by infrared slavery ?
- (b) What is tau-theta puzzle ?
- (c) What is the significance of fine structure constant in particle physics ?
- (d) What are strange particles ?
- (e) Are strangeness and isospin related ?
- (f) What do you understand by helicity ? $6 \times 2 = 12$