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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

M. Sc. (Fourth Semester) Regular Examinations, April – 2025

22PHPC401 – Elementary Particle Physics

(Physics)

Time: 3 hrs Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

Q.1. Answer ALL Questions	CO#	Blooms Level
a. Mention the carrier/ gauge particles exists in each interaction.	CO1	K2
b. Define color quantum number in Baryons.	CO1	K1
c. Define lepton number with examples.	CO1	K2
d. Discuss the test for isospin with examples.	CO2	K1
e. Mention two particle reactions to state conservation of hypercharge	CO2	K1
f. Define time reversal	CO3	K1
g. Summarize briefly the consequences of CPT theorem	CO3	K1
h. Explain SU (2) symmetry	CO4	K2
i. What do you mean by eight-fold way	CO4	K1
j. State the importance of color quantum number.	CO4	K1

PART – B **(10 x 5=50 Marks)**

Answer ***ANY FIVE*** the questions	Marks	CO#	Blooms Level
2. Discuss the historical background of elementary particles	10	CO1	K1
3.a. Explain various types of interactions exist in nature.	5	CO1	K2
b. Mention the classification of Leptons and hadrons.	5	CO1	K2
4. a. Explain the charge independence of nuclear forces	5	CO2	K2
b. Discuss the associated production of strange particles	5	CO2	K2
5. State and prove Gell-Mann Nishijima Scheme and apply to hadrons and leptons	10	CO2	K2
6. a. Define parity and the test for parity conservation with examples	5	CO3	K2
b. Define charge conjugation and discuss briefly charge conjugation in field theories.	5	CO3	K2
7. Explain the concept of U- spin, V-spin and I-spin	10	CO4	K2
8. Write a note on Baryon Octet and Baryon Decuplet with necessary graph and discuss their quantum numbers in tabular form	10	CO4	K2

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