QP Code: RM22MSC121 Reg. No | | | | | | | | | | | AY 22

GIET UNIVERSITY, GUNUPUR – 765022

M. Sc. (Fourth Semester) Examinations, May – 2024

20PHPC401 - 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. Which of the following elementary particle processes does not conserve strangeness? (a) $\pi^0 + p \rightarrow k^+ + \wedge^0$ (b) $\pi^- + p \rightarrow k^0 + \wedge^0$ (c) $\Delta^0 \rightarrow \pi^0 + n$ (d) $K^0 \rightarrow \pi^+ + \pi^-$	CO1	K2
b. Define photon.	CO1	K1
c. Define Lepton quantum number.	CO1	K1
d. What are strange particles.	CO2	K1
e. A baryon X decays by strong interaction as $X \rightarrow \Sigma^+ + \pi^- + \pi^0$. The third component I_3 of the isospin of X is _____.	CO2	K2
f. What is parity?	CO3	K1
g. Define charge conjugation.	CO3	K1
h. A particle, which is a composite state of three quarks u d, and s, has electric charge, spin and strangeness respectively, equal to _____.	CO4	K2
i. Discuss SU (3) symmetries.	CO4	K2
j. Give the concept of V – Spin.	CO4	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ANY FIVE*** the questions	Marks	CO#	Blooms Level
2. Give the classifications of elementary particles by considering the interaction exist between them	10	CO1	K1
3.a. Discuss the classification of mesons with quantum numbers.	5	CO1	K2
b. Mention the classification of Baryons with quantum numbers.	5	CO1	K2
4. a. Explain the charge independence of nuclear forces.	5	CO2	K2
b. Discuss the test for isospin conservation with examples.	5	CO2	K2
5. Explain the conservation laws with respect to particle reactions with examples.	10	CO2	K2
6. a. Discuss CPT Theorem and its consequences.	6	CO3	K2
b. Show that charge of a particle is equal to negative of its antiparticle	4	CO3	K2
7. Define eight-fold way and represent Mesons and Baryons with necessary graphs.	10	CO4	K2
8. Discuss quark model. Mention the importance of color with examples	10	CO4	K2

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