DEPARTMENT OF SCIENCES
IV SEMESTER M. Sc. (Physics)
END SEMESTER MAKE UP EXAMINATION, JUNE 2023
THEORETICAL PHYSICS II [PHY-6015]
(CHOICE BASED CREDIT SYSTEM-2020)

Time: 3 Hours   Date: 2 June 2023   MAX. MARKS: 50

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Note: (i) Answer all questions.
(ii) Answer the questions to the point.

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Q. No.		Marks	CO	BL
1.(i)	Write few reasons regarding need of quantum field theory.	5	CO1	I
(ii)	Derive the Euler Lagrange equation in field theory.	5	CO2	III
2.(i)	Construct the helicity projection operator.	5	CO2	III
(ii)	Discuss the problems of quantization of electromagnetic fields.	5	CO4	IV
3.(i)	Write the Lagrangian and equations of motion in tensor form for electromagnetic fields.	3	CO4	I
(ii)	Explain the phase space factor in decay constant.	4	CO3	II
(iii)	What are Mandelstam variables?	3	CO3	I
4.	Show that $U(t) = \mathcal{T}[exp(-i \int_{-\infty}^{t} dt' H_I(t'))]$.	10	CO3	V
5.(i)	Obtain a relation between decay rate and transition matrix element.	5	CO3	III
(ii)	Mention Feynman rules for scattering processes.	5	CO3	I