

Reg.No. _____



Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : **15PH3012**
Sub. Name : **Nuclear and Particle Physics**

Semester : **2016-17 ODD**
Duration : **3hrs**
Max. marks : **100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	If the wave function is extended beyond the nuclear box, how it would affect the problem of a nucleon trapped inside an infinite potential well? Solve using appropriate methods.	CO1	15
	b.	Write short notes on nuclear size and radius.	CO1	5
(OR)				
2.	a.	Find the eigen values and eigen function of a particle in a box by applying Schrodinger's wave equation.	CO1	15
	b.	Write short notes on the internal structure of proton.	CO1	5
3.	a.	Derive Weisacker Semi empirical mass formula from first principles.	CO1	15
	b.	Explain briefly about negatron and positron decay.	CO1	5
(OR)				
4.	a.	On the surface of planet earth, a nucleus with two neutrons are not found in nature. Explain the existence of a nucleus with billions of neutrons in space in the form of a neutron star.	CO1	15
	b.	What are the various radioactive decay modes?	CO1	5
5.	a.	What are the significant successes of the shell model of a nucleus?	CO1	15
	b.	The liquid drop model failed to explain the existence of magic numbers. Explain.	CO1	5
(OR)				
6.	a.	The nucleus was successfully explained in analogy with a drop of spherically shaped drop of water. Explain in detail how it was developed into a successful model.	CO1	15
	b.	Give any three evidences for the existence of magic numbers.	CO1	5
7.	a.	Explain in detail about the four fundamental forces of nature.	CO1	15
	b.	Write short notes on residual electromagnetic force.	CO1	5
(OR)				
8.	a.	What is nuclear fission? Explain with a model how controlled nuclear fission reaction can be achieved.	CO1	15
	b.	Write short notes on controlled thermonuclear fusion reaction.	CO1	5
<u>Compulsory:</u>				
9.	a.	Elaborate the classification scheme of fundamental particles with suitable examples.	CO1	15
	b.	Which particle gives particles their mass? Describe briefly.	CO1	5

ALL THE BEST