

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name: Nuclear and particle physics

Subject Code: 5SC03PHC2

Branch: M.Sc.(Physics)

Semester: 3

Date: 03/12/2015

Time: 2:30 To 5:30

Marks: 70

Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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SECTION – I

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|------------|--|-------------|
| Q-1 | Attempt the Following questions | (07) |
| | a. What is semi Empirical mass formula? | 02 |
| | b. Define nuclear binding energy. | 02 |
| | c. Define separation energy. | 02 |
| | d. What is magic numbers? | 01 |
| Q-2 | Attempt all questions | (14) |
| | a) Explain in detail nuclear binding energy. | 05 |
| | b) Explain in detail Intrinsic Angular momentum. | 05 |
| | c) What are drawbacks of Liquid drop model? | 04 |
| | OR | |
| Q-2 | Attempt all questions | (14) |
| | a) Explain in detail single particle Shell model. | 05 |
| | b) Explain in detail nuclear separation energy. | 05 |
| | c) Define (i) Isotopes (ii) Mass number. | 04 |
| Q-3 | Attempt all questions | (14) |
| | a) Explain in detail semi Empirical mass formula for nucleus. | 07 |
| | b) Explain in detail following time dependent nuclear properties: (1) Nuclear charge
(2) Nuclear mass (3) Nuclear size. | 07 |
| | OR | |
| Q-3 | Attempt all questions | (14) |
| | a) Explain spin orbit coupling model in details. | 07 |
| | b) Explain Shell model in details. | 07 |



SECTION – II

Q-4	Attempt the Following questions	(07)
	a. What is Quarks?	02
	b. Give the name of conservation laws.	02
	c. Define internal conversion.	02
	d. What is Isospin?	01
Q-5	Attempt all questions	(14)
	a) Explain in detail energies of Gamma decay.	05
	b) Explain in detail Non- Relativistic Q- Equation.	05
	c) Explain in detail classification of beta decay.	04
	OR	
Q-5	Attempt all questions	(14)
	a) Explain in detail Inverse Beta decay.	05
	b) Explain in detail properties of Quarks.	05
	c) Explain in detail detection and properties of Neutrino.	04
Q-6	Attempt all questions	(14)
	a) Explain in detail Fermi's theory of beta decay.	07
	b) Explain in detail allowed and forbidden transition in beta decay.	07
	OR	
Q-6	Attempt all Questions	(14)
	a) Explain in details fundamental interactions.	07
	b) Explain in details interaction of gamma rays with matter.	07

