

# Unit 11: Particle physics:

## Subunit 11.2: Fundamental particles:

### Topical Question No: 1

- 40 A neutron decays to form a proton.

Which particle is **not** involved in the decay process?

- A antineutrino
- B down quark
- C positron
- D up quark

### Topical Question No: 2

- 40 An isolated neutron decays to produce a proton, a  $\beta^-$  particle and an antineutrino.

Which row gives the quark composition of the neutron and the proton and the type of force that gives rise to this reaction?

	quark composition		type of force
	neutron	proton	
A	down, down, up	down, up, up	strong interaction
B	down, down, up	down, up, up	weak interaction
C	down, up, up	down, down, up	strong interaction
D	down, up, up	down, down, up	weak interaction

### Topical Question No: 3

- 40 Which row gives the correct type and quark composition for the named particle?

	particle	type	quark composition
A	neutron	hadron	u u d
B	neutron	lepton	u d d
C	proton	hadron	u u d
D	proton	lepton	u d d

key  
u = up quark  
d = down quark

Topical Question No: 4

40 The nuclei of common isotopes of hydrogen, lithium and beryllium are shown.

Which nucleus contains equal numbers of up and down quarks?

A  ${}^1_1\text{H}$

B  ${}^4_2\text{He}$

C  ${}^7_3\text{Li}$

D  ${}^9_4\text{Be}$

Topical Question No: 5

38 Which flavours of quark have charge  $+\frac{2}{3}e$ ?

	charm	strange	top	bottom
A	✓	x	✓	x
B	✓	x	x	x
C	x	✓	✓	✓
D	x	✓	x	✓

key

✓ = has charge  $+\frac{2}{3}e$

x = does not have charge  $+\frac{2}{3}e$

Topical Question No: 6

38 Which list contains only fundamental particles?

- A antineutrinos, baryons, neutrons, electrons
- B mesons, electrons, neutrinos, protons
- C positrons, quarks, hadrons, protons
- D quarks, positrons, neutrinos, leptons

Topical Question No: 7

39 What is **not** a fundamental particle?

- A electron
- B neutrino
- C neutron
- D positron

Topical Question No: 8

39 What is the name of the group (class) of particles containing mesons, and the name of the group (class) of particles containing baryons?

	group (class) of particles containing mesons	group (class) of particles containing baryons
A	hadrons	hadrons
B	hadrons	leptons
C	leptons	hadrons
D	leptons	leptons

## Answer Key

1. N/A
2. N/A
3. C
4. B
5. A
6. D
7. N/A
8. A