

Standard Model Review

2019

**2** State the definition of a

• **HADRON**

**3** State the definition of a

• **MESON**

**4** State the Definition of a

• **BARYON**

**5** State the definition of a

• **LEPTON**

**6** Can a particle be

• **A HADRON and  
a LEPTON?**

**7**

Define a

# • FERMION

**8**

Mix and Match

Gluon, Graviton\* Photon W and Z bosons

Force	Exchange particle
Strong nuclear	
Weak nuclear	
Electromagnetic	
Gravitational	

**9**

Mix and Match

- Beta decay; decay of unstable hadrons
- Holding electrons in atoms
- Holding nucleons in the nucleus
- Holding matter in planets, stars and galaxies

Force	Responsible for....
Strong nuclear	
Weak nuclear	
Electromagnetic	
Gravitational	

**10**

## State the meaning of the PHOTOELECTRIC EFFECT

**11**

State the conditions for....

- PHOTOEMISSION – i.e. the emission of electrons  
.....to occur

**12**

Answers

- 2. hadrons are composite particles made of quarks.
- 3. Mesons are hadrons composed of a quark and antiquark
- 4. Baryon are hadrons made of 3 quarks
- 5. Leptons are fundamental particles that are solitary
- 6. No
- 7. A fermion is a particles that makes matter. Quarks and leptons, as well as most composite particles, like protons and neutrons, are fermions.

## 13

## Answers 2

Force	Range (m)	Relative strength	Exchange particle	Example effects
Strong nuclear	$10^{-15}$	$10^{38}$	Gluon	3. Holding nucleons in the nucleus
Weak nuclear	$10^{-18}$	$10^{25}$	W and Z bosons	1. Beta decay; decay of unstable hadrons
Electro-magnetic	$\infty$	$10^{36}$	Photon	2. Holding electrons in atoms
Gravitational	$\infty$	1	Graviton*	4. Holding matter in planets, stars and galaxies

## 14

## Answers 3

- The production of a free electron from the **surface of a metal** when **e-m radiation of sufficiently high frequency is incident on it!**