

(iii) Explain why your answers to (i) and (ii) are **not** contradictory.

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..... [2]

(c) State why the method of creating a ${}^0_0\text{Z}$ particle described in (b) is not very efficient.

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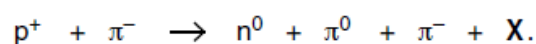
..... [1]

[Total: 13]

- Illustrate your answer by referring to the composition of **one** hadron.
- Include in your answer the names of **all** the known quarks.
- Give as much information as you can about **one** particular quark.

[5]

- (b) A proton (p^+) can interact with a π^- particle to produce the three particles shown and an unknown particle **X**. The equation for the reaction is



The charge, baryon number and strangeness of the π^- and π^0 particles are shown in Fig. 6.1.

	charge	baryon number	strangeness
π^-	-1	0	0
π^0	0	0	0

Fig. 6.1

- (i) Assuming that strangeness is conserved in this reaction, find the charge, baryon number and strangeness of particle **X**.

charge

.....

baryon number

.....

strangeness

..... [3]

- (ii) Suggest what particle **X** is.

.....

..... [1]

[Total: 9]