

**Support Worksheet – Option J, Worksheet 1**

- 1** State the quark content of a baryon. [1]
- 2** Predict the possible values of spin for a baryon. [3]
- 3** State the quark content of a meson. [1]
- 4** Predict the possible values of spin for a meson. [3]
- 5** State a particle that is its own antiparticle. [1]
- 6** Explain why particles which are their own antiparticles must be electrically neutral. [2]
- 7** In particle physics interactions are described in terms of exchange particles. Outline what this means. [3]
- 8** State the exchange particle of the electromagnetic interaction. [1]
- 9** State the exchange particles of the weak interaction. [2]
- 10** State the exchange particles of the strong (colour) interaction. [1]
- 11** State the quark content of:
  - a** a proton [1]
  - b** a neutron. [1]
- 12** Explain why the reaction  $p \rightarrow \pi^+ + \pi^-$  does not occur. [2]
- 13** Explain why the reaction  $p^+ + p^- \rightarrow n + \pi^+ + \pi^-$  does not occur. [2]
- 14** In an interaction a red u quark emits a gluon and turns itself into a blue quark according to  $u \rightarrow q + \text{gluon}$ . State:
  - a** the name of the quark q. [1]
  - b** the colour quantum numbers of the emitted gluon. [1]
- 15** State the strangeness and electric charge of the baryon  $\Omega = sss$ . [2]
- 16** State the strangeness and electric charge of the meson  $K = u \bar{s}$ . [2]