Mastering AO1 marks - Mark scheme

1(a)(i) Quarks **and** leptons **and** mesons – all required

(ii) Quarks **and** mesons

Q2(a) Vector: Magnitude (size) and direction

Scalar: Magnitude (size) only

Minimum acceptable response: *a vector has direction* [1]

Relevant example of each **e.g.** independent mark [1]

Vectors	Scalars
Displacement	Speed
Velocity	Time
Acceleration	Distance
Force	Pressure
	Temperature

Q3(a) The (vector) sum of the momenta of bodies in a system stays constant (even if forces act between the bodies) accept overall momentum remains constant [1]

provided there is no external / resultant force [1]

Accept: Total momentum of a system (or bodies) before a collision (or explosion) = total momentum after collision (explosion)... [1]

....provided no external / resultant forces act [1]

Q5(a) For a system to be in equilibrium (1)

$\sum$ anticlockwise moments [about a point] = $\sum$ clockwise moments [about the same point] (1)

N.B. Award 1 mark for $\sum$ C.M = $\sum$ A.C.M. only

Alternative:

For a system to be in equilibrium (1) algebraic sum of moments / net moment / resultant moment [about a point] = 0 (1)

Q6(a) 2 materials chosen and microscopic structure of each explained [2 × (1)] See below.

1 example given of each material [2 × (1)] See below.

Crystalline - long range order / lattice like arrangement/regular arrangement structure e.g. metals

Amorphous - short range order / irregular or random arrangement / no order e.g. glass, ceramics, brick

Polymeric - long chain molecule arrangement [of hydrocarbons] e.g. rubber, polythene accept plastic

7(a) <u>Continuous spectrum</u> due to radiation of all wavelengths emitted <u>from surface</u> of star [1]

[superimposed] line <u>absorption</u> spectrum (due to passage of radiation) <u>through atmosphere</u> (of star) [1]

Candidate 1

Q1(a)(i)+(ii) = 0 marks

Q2(a) = 2 marks

Q3(a) = 2 marks

Q5(a) = 0 marks

Q6(a) = 3 marks

Q7(a) = 0 marks

Total = 7 marks

Candidate 2

Q1(a)(i)+(ii) = 2 marks

Q2(a) = 2 marks

Q3(a) = 0 marks

Q5(a) = 0 marks

Q6(a) = 4 marks

Q7(a) = 0 marks

Total = 8 marks

Candidate 3

Q1(a)(i)+(ii) = 0 marks

Q2(a) = 2 marks

Q3(a) = 1 mark

Q5(a) = 1 mark

Q6(a) = 1 mark

Q7(a) = 0 marks

Total = 5 marks