

MARKING SCHEME AND MODEL ANSWERS

Chapter 6: System of Particles and Rotational Motion

Maximum Marks: 40 | Suggested time: 60 minutes

Use after attempting the paper. Accept equivalent correct methods.

Suggested mark allocation:

1 mark: Correct fact, formula, unit or direction.

2 marks: Principle/formula (1); explanation, working or result (1).

3 marks: Relation (1); working/reasoning (1); final result and unit (1).

4 marks: Principle (1); setup/equation (1); working (1); result/interpretation (1).

Mark splits are a guide; award partial credit for valid steps.

Q1 - 1 mark

Mass-weighted mean position.

Q2 - 1 mark

$rF \sin\theta$.

Q3 - 1 mark

kg m^2 .

Q4 - 1 mark

$I\omega^2$.

Q5 - 1 mark

Net external torque is zero.

Q6 - 1 mark

$v = r\omega$.

Q7 - 1 mark

$F=0$ and $\tau=0$.

Q8 - 1 mark

$I = I_{\text{cm}} + Md^2$.

Q9 - 2 marks

3 m.

Q10 - 2 marks

2 N m.

Q11 - 2 marks

24 J.

Q12 - 2 marks

20 rad/s.

Q13 - 2 marks

3 rad/s^2 .

Q14 - 2 marks

Constant.

Q15 - 3 marks

3 m.

Q16 - 3 marks

5 N m.

Q17 - 3 marks

$I = 5 \text{ kg m}^2$; $K = 25 \text{ J}$.

Q18 - 3 marks

2 rad/s^2 ; 24 rad.

Q19 - 4 marks

3 m; 2 m/s^2 .

Q20 - 4 marks

$\omega = 7.5 \text{ rad/s}$; K increases 18 to 45 J because skater does work.