1.7 Mechanisms and Motion: 10-minute Pack

AQA 8552 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions.

1 A display turntable rotates continuously in one direction about a fixed vertical axis. Name the type of motion.

(Total for Question 1 is 1 mark)

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2 A 15-tooth driver turns a 45-tooth gear. That gear is fixed to the same shaft as a 10-tooth compound driver, which meshes with a 40-tooth output gear. The input turns at 240 rpm. Find the output speed. Assume ideal gears and no slip.

(Total for Question 2 is 3 marks)

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3 A hand-operated mixing paddle must turn continuously in one direction. Its handle is turned by the user, and the paddle shaft must turn more slowly but with greater ideal torque. Choose a suitable mechanism from a pair of meshing gears, a crank and slider, or a cam and follower. The available gears are 12-tooth input and 36-tooth output gears. Explain the choice and calculate the output speed ratio as output speed divided by input speed.

(Total for Question 3 is 3 marks)

4 A windscreen wiper blade turns through 70 degrees, stops, then turns back through 70 degrees about the same pivot. State the type of motion.

(Total for Question 4 is 1 mark)

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Mark scheme · 1.7 Mechanisms and Motion: 10-minute Pack

Question 1

rotary (circular) motion	**B1**

Answer: Rotary motion

Question 2

first stage speed = 240 x 15/45 = 80 rpm	**M1**
second stage speed = 80 x 10/40	**M1**
output speed = 20 rpm	**A1**

Answer: 20 rpm

Question 3

select a pair of meshing gears	**B1**
ratio = driver teeth / driven teeth = 12/36	**M1**
output speed / input speed = 1/3; output turns more slowly, giving an ideal torque increase by a factor of 3	**A1**

Answer: Pair of meshing gears; speed ratio 1:3 (output/input = 1/3), ideal torque multiplication 3

Question 4

oscillating motion	**B1**

Answer: Oscillating motion

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