FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**January 2022**
Programme	:	Diploma in Mechanical Engineering (DMEN)
Course	:	**EGM1181: Engineering Dynamics**
Date of Examination	:	9 March 2022 (Wednesday)
Time	:	8.00am – 10.30am Reading Time : Nil
Duration	:	2 Hours 30 Minutes

Special Instructions :

This paper consists of **FOUR (4)** questions. Answer all **FOUR (4)** questions.

Material permitted :

Non-Programmable Scientific Calculator

Materials provided :

Nil

Examiner(s)	:	**Dr. Mohd Fairuz Abd Manab,** Ganaswaran
Chief Moderator	:	Phua Chin Lai

*This paper consists of **4** printed pages, including the cover page*

DIPLOMA IN MECHANICAL ENGINEERING PROGRAMME (DMEN)
EGM1181: ENGINEERING DYNAMICS
FINAL ALTERNATIVE ASSESSMENT: JANUARY 2022 SESSION

Instructions: This paper consists of **FOUR (4)** questions. Answer all **FOUR (4)** questions.

Question 1

Figure Q1 shows a large window is opened using a hydraulic cylinder *AB*. If the cylinder extends at a constant rate of 0.7 m/s and the window at the instant $\theta = 35^{\circ}$, determine:

(a) the length of s,

(5 marks)

(b) the angular velocity, ω,

(10 marks)

(c) the angular acceleration, α

(10 marks)

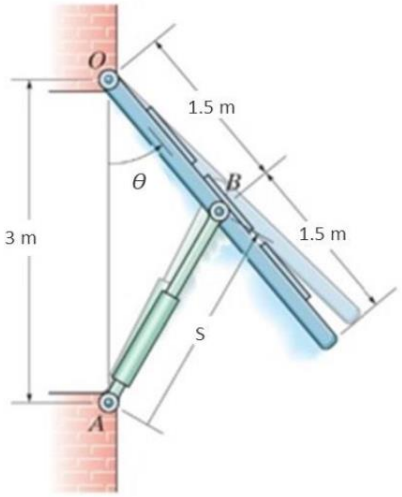

Figure Q1

Question 2

Figure Q2 shows the rod AB has angular velocity ω_{AB} = 4 rad/s and an angular acceleration α_{AB} = 6 rad/s². Determine:

(a) the angular velocity

(15 marks)

(b) the angular acceleration of rod at this instant. The collar at *C* is pin connected to *CD* and slides over *AB*.

(10 marks)

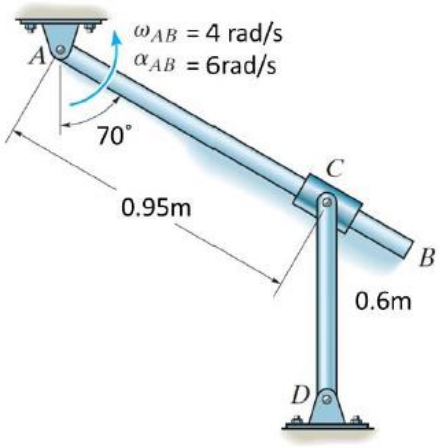

Figure Q2

Question 3

The sphere is formed by revolving the shaded area around the *x* axis. The material has a constant density.

a) Describe the moment of inertia.

(5 marks)

b) Determine the moment of inertia I_x and express the result in terms of the total mass *m* and radius *r* of the sphere in Figure Q3b.

(17 marks)

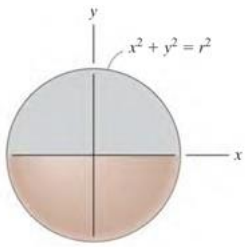

Figure Q3b

c) Based on the result of part (b), calculate the moment of inertia of I_x, if radius and mass of sphere are 10 mm and 100 g respectively.

(3 marks)

Question 4

At a given instant the 5 kg slender bar has the motion shown in Figure Q4.

a) Explain the angular momentum of the system

(5 Marks)

b) Calculate the angular momentum about point *G* and about the *IC* at this instant.

(15 marks)

c) Determine the velocity v_G if the angle reduce to half.

(5 marks)

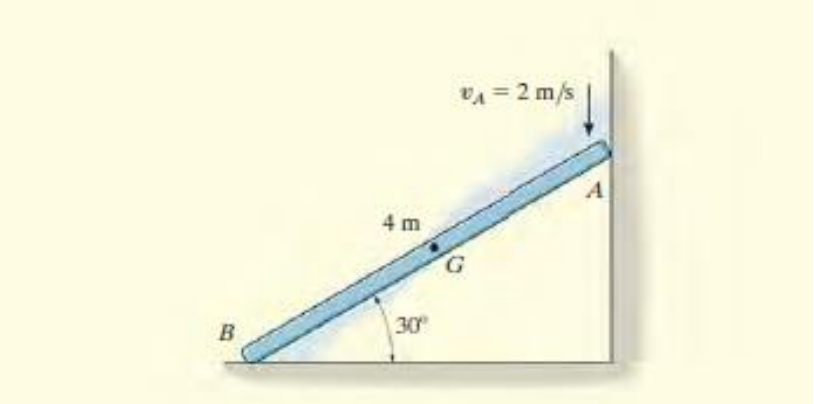

Figure Q4

~THE END~