Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022

COURSE NAME	:	ENGINEERING MECHANICS
COURSE CODE	:	BDX 10603
PROGRAMME CODE	:	BDX
EXAMINATION DATE:		JULY 2022
DURATION	:	3 HOURS
INSTRUCTIONS	:	1. ANSWER **FIVE (5)** QUESTIONS **ONLY** FROM **SIX (6)** QUESTIONS GIVEN
		2. THIS FINAL EXAMINATION IS CONDUCTED VIA ~~**OPEN**~~ / **CLOSE** BOOK
		3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSE BOOK

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

TERBUKA

Q1. **Figure Q1** shows a gear rotating about an axis

(a) When the gear rotates 20 revolutions, it achieves an angular velocity of v = 30 rad/s, starting from rest. Determine its constant angular acceleration and the time required.

(10 marks)

(b) The gear rotates with an angular velocity of $v = (0.005\theta^2)$ rad/s, where θ is in radians. Determine the angular acceleration when it has rotated 20 revolutions.

(10 marks)

Q2 If crank OA (**Figure Q2**) rotates with an angular velocity of v = 12 rad/s,

(a) Calculate the velocity of piston B

(13 marks)

(b) Calculate angular velocity of rod AB at the instant shown

(7 marks)

Q3 The 75-lb block is released from rest 5 ft above the plate as shown in **Figure Q3**. By neglecting the mass of the plate,

(a) Evaluate the compression of each spring A and C when the block momentarily comes to rest after striking the plate.

(16 marks)

(b) Calculate the compression of spring B

(4 marks)

Q4 The 2.5-Mg four-wheel-drive SUV tows the 1.5-Mg trailer as shown in **Figure Q4**. The traction force developed at the wheels is FD = 9 kN, By neglecting the mass of the wheels,

(a) Determine the speed of the truck in 20 s, starting from rest

(10 marks)

(b) Determine the tension developed in the coupling, A, between the SUV and the trailer

(10 marks)

TERBUKA

Q5 (a) In **Figure Q5 (a),** calculate the angular velocity of the rod and the velocity of point C at the instant shown.

(5 marks)

(b) If cable AB is unwound with a speed of 3 m/s (**Figure Q5(b)**), and the gear rack C has a speed of 1.5 m/s, determine the angular velocity of the gear and the velocity of its center O.

(15 marks)

Q6 (a) From **Figure Q6**, determine the reaction force at position A and F of the structure. the force in members ED

(5 marks)

(b) Examine the force in members ED, EH, and GH of the truss, whether the members are in tension or compression in **Figure Q6**.

(15 marks)

-END OF QUESTION-

TERBUKA

FINAL EXAMINATION

SEMESTER / SESSION	: SEMESTER II /2020/2021	PROGRAMME	: BDX
COURSE NAME	: ENGINEERING MECHANICS	COURSE CODE	: BDX 10603

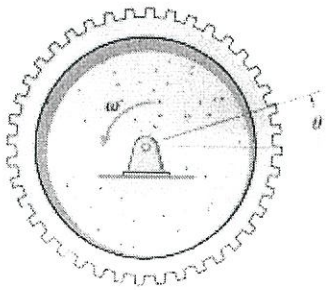

Figure Q1

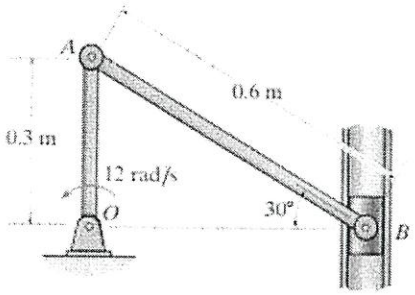

Figure Q2

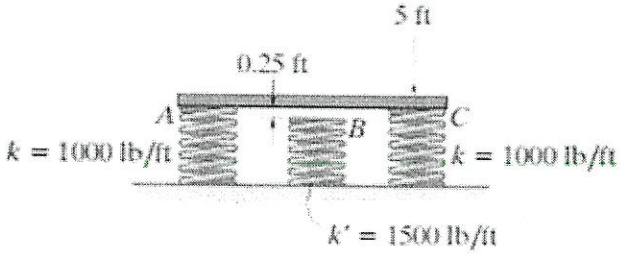

Figure Q3(a)

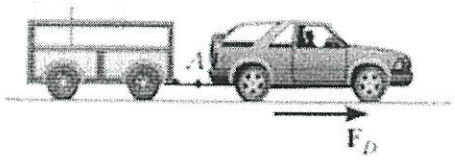

Figure Q4

TERBUKA

FINAL EXAMINATION

SEMESTER/SESSION	: SEMESTER II /2020/2021	PROGRAMME :	BDX
COURSE	: ENGINEERING MECHANICS	COURSE CODE :	BDX 10603

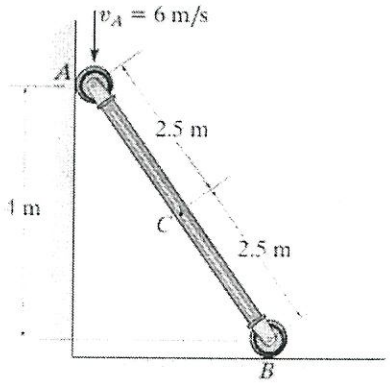

Figure Q5(a)

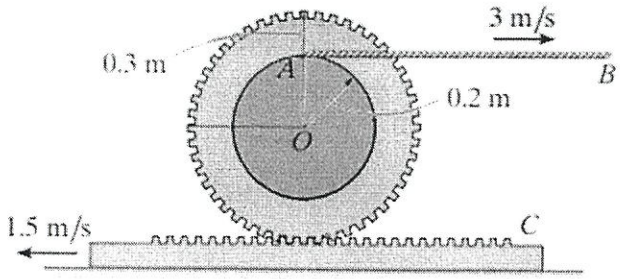

Figure Q5(b)

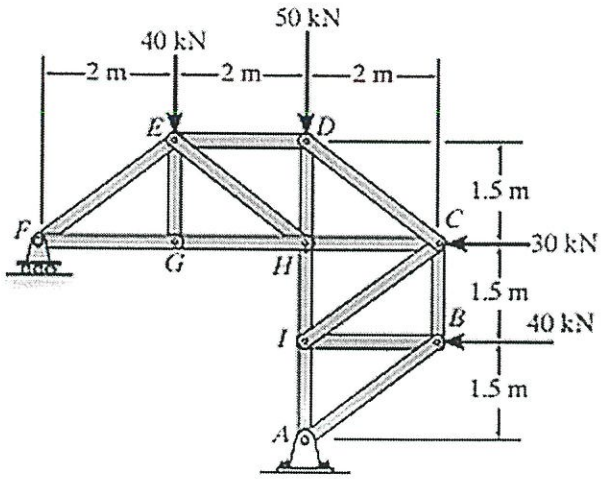

Figure Q6

TERBUKA