These problems address topics from the NCEES FE Civil CBT Exam Specifications at https://ncees.org/wp-content/uploads/FE-Civil-CBT-specs-1.pdf, see below.

YouTube Playlist

FE Civil Review 2022

Dynamics

NCEES Fundamentals of Engineering (FE)
CIVIL CBT Exam Specifications

Effective Beginning with the July 2020 Examinations

Knowledge	Number of Questions
5. Dynamics	**4–6**
A. Kinematics (e.g., particles, rigid bodies)	
B. Mass moments of inertia	
C. Force acceleration (e.g., particles, rigid bodies)	
D. Work, energy, and power (e.g., particles, rigid bodies)	

Notes
V1.0 published 4/19/2022
V1.1 update to problem 8, 6/13/2022

A. Kinematics (e.g., particles, rigid bodies)

Question 1: A vehicle is moving uphill at a speed of 30 mph on a +2% grade. If a braking deceleration of 10.0 ft/sec^2 is applied, the time it will it take the vehicle to stop in seconds is most nearly:

A. 2.1

B. 2.8

C. 4.1

D. 4.4

A. Kinematics (e.g., particles, rigid bodies)

Question 2: A disc is rotating in a clockwise direction with a constant counterclockwise acceleration applied. At a time of 2 seconds, the angular velocity is 12 rad/sec and at 4 seconds, the angular velocity is 9 rad/sec. The time in seconds (from time 0) that it takes the disc to stop is most nearly:

A. 8

B. 10

C. 12

D. 16

A. Kinematics (e.g., particles, rigid bodies)

Question 3: In a carnival, a dirt bike launches off a ramp at an angle of 20 degrees at a speed 17.5 meters/sec. Another ramp of the same height is to be placed some horizontal distance away from the first ramp for the bike to land. The distance the second ramp should be placed away from the first ramp is most nearly:

A. 18 m

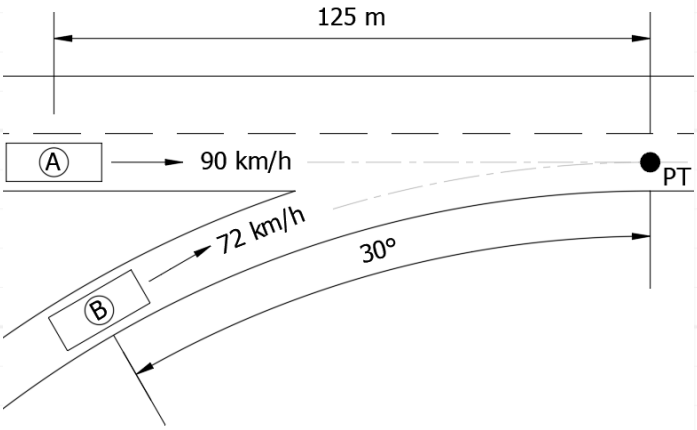
B. 19 m

C. 20 m

D. 21 m

A. Kinematics (e.g., particles, rigid bodies)

Question 4: Vehicle A is traveling at a speed of 90 km/hr along a highway. A side ramp with a radius of 210 meters (to the centerline of travel) merges into the highway. A second vehicle, Vehicle B, is traveling at 72 km/hr along the ramp at the location indicated below. Both vehicles are 6 m long and the speeds are maintained. When the center of Vehicle B arrives at the PT, the front bumper of B will most nearly be:



A. 18 m behind the back bumper of Vehicle A

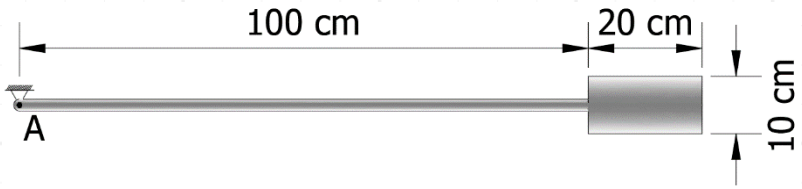
B. 12 m behind the back bumper of Vehicle A

C. 6 m behind the back bumper of Vehicle A

D. 0 m behind the back bumper of Vehicle A

B. Mass moments of inertia

Question 5: A rod and cylinder are welded together to form a rigid assembly. They are supported by a frictionless pin at one end and held horizontal. The rod diameter is 2-cm and the cylinder diameter is 10-cm. The mass of the rod is 2.5 kg and the mass of the cylinder is 12 kg. The **mass moment of inertia** about the point of rotation at the pin A is most nearly:



A. 0.5 kg-m^2

B. 5.5 kg-m^2

C. 15.1 kg-m^2

D. 15.4 kg-m^2

C. Force acceleration (e.g., particles, rigid bodies)

Question 6: A vehicle with mass of 1000 kg is traveling at 90 km/hr around a circular horizontal curve. A standard coefficient of friction of 0.35 is assumed between the car and the road. The curve has no superelevation. The minimum radius required to keep the car from sliding when traveling around the curve is most nearly:

A. 180 m

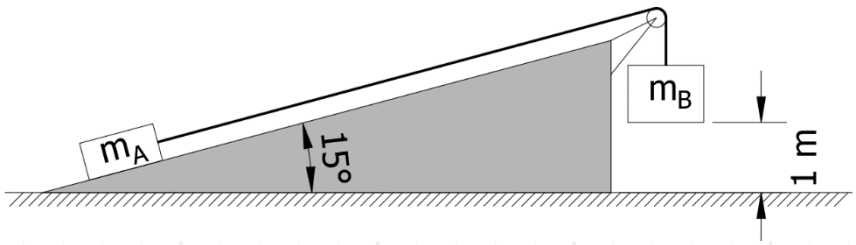
B. 182 m

C. 184 m

D. 186 m

C. Force acceleration (e.g., particles, rigid bodies)

Question 7: Two blocks are connected by a cable as shown in the figure below and are held at rest. Block A has a mass of 10 kg and block B has a mass of 20 kg. The cable passes over a massless-frictionless pin. The coefficient of friction between the block and plane is 0.3 and the angle of the plane is 15°. If the blocks are released from rest, the time it takes in seconds for Block B to make contact with the surface is most nearly:



A. 0.50

B. 0.55

C. 0.60

D. 0.65

D. Work, energy, and power (e.g., particles, rigid bodies)

Question 8: A rod and cylinder are welded together to form a rigid assembly. They are supported by a frictionless pin at one end and held horizontal. The rod diameter is 2-cm and the cylinder diameter is 10-cm. The mass of the rod is 2.5 kg and the mass of the cylinder is 12 kg. The mass moment of inertia about with reference to point A is 15.4 kg-m^2. The assembly is released and it begins to rotate in a clockwise direction due to gravity. The angular velocity when the assembly reaches a vertical orientation is most nearly:

A. 4.3 rad/s

B. 4.5 rad/s

C. 4.7 rad/s

D. 4.9 rad/s