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NPTEL

Courses » Mechanics of Human Movement

Announcements   **Course**   Ask a Question   Progress   Mentor   FAQ

Unit 9 - Week 7

Course outline

How to access the portal

Pre-requisite

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

● Kinetics: Angular Motion Part III

● Kinetics: Angular Motion Part IV

● Kinetics of Arm Swinging during Walking

● Inverse Dynamics Analysis

● Week 7 - Lecture Notes

○ WEEK 7 - FEEDBACK - Mechanics of Human Movement

○ Quiz : Assignment 7

○ Week 7 Feedback : Mechanics of Human

Assignment 7

The due date for submitting this assignment has passed.   **Due on 2018-09-19, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Which of the following quantities are required to perform an inverse dynamic analysis?   ***1 point***

☐ Joint reaction forces between the body segments

☐ Segmental kinematics

☐ Muscle tensions

☐ Segmental parameters such as mass and moment of inertia

No, the answer is incorrect.
Score: 0

Accepted Answers:
Segmental kinematics
Segmental parameters such as mass and moment of inertia

2) The output from an inverse dynamics analysis consists of the following: ***1 point***

○ Joint reaction forces between the body segments

○ Segmental kinematics

○ Muscle tensions

○ Segmental parameters such as mass and moment of inertia

No, the answer is incorrect.
Score: 0

Accepted Answers:
Joint reaction forces between the body segments

3) For a rigid link undergoing general planar motion,   ***1 point***

☐ The angular velocity does not change from point to point in the link

☐ The linear velocity is the same for all points in the link

☐ The angular acceleration varies from point to point on the link

☐ The linear acceleration varies from point to point on the link

No, the answer is incorrect.
Score: 0

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☐ Force Platforms

☐ ECG

☐ VO$_2$ Analyser

No, the answer is incorrect.
Score: 0

Accepted Answers:
Motion Capture System
Force Platforms

5) A body is more likely to remain in balance even if disturbed, if its   *1 point*

☐ Centre of mass lies outside base of support

☐ Centre of mass lies on the base of support

☐ Centre of mass remains within the base of support

☐ Centre of mass is at a low elevation with respect to the ground

No, the answer is incorrect.
Score: 0

Accepted Answers:
Centre of mass remains within the base of support
Centre of mass is at a low elevation with respect to the ground

6) Muscle tension calculated from the net joint moment when a single muscle is   *1 point*
assumed to be acting about a joint

○ Is likely to be less than the actual muscle tension

○ Is an accurate estimate of the actual muscle tension

○ Is likely to be an overestimate of the actual muscle tension

○ Is unrelated to the net joint moment

No, the answer is incorrect.
Score: 0

Accepted Answers:
Is likely to be less than the actual muscle tension

7) While drawing the free body diagram of a system the following force(s) is/are NOT *1 point*
considered

○ Weight of the system

○ Forces exerted by the system

○ Forces exerted at the boundaries on the system

○ External forces on the system

No, the answer is incorrect.
Score: 0

Accepted Answers:
Forces exerted by the system

8) Select the major agonist, antagonist pair that helps a gymnast in maintaining a   *1 point*
straight body posture while swinging down from a bar.

○ Back muscles, Abdominal muscles

○ Abdominal muscles, Back muscles

○ Abdominal muscles, Shoulder Muscles

○ Shoulder muscles, Abdominal Muscles
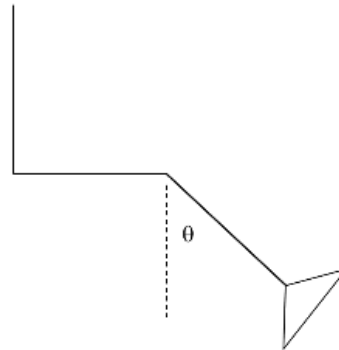
No, the answer is incorrect.
Score: 0

Accepted Answers:

Abdominal muscles, Back muscles

Based on the data, Answer from Questions 9-15

A person is doing leg lifts using ankle weights to strengthen his quadriceps muscles.

9)   *1 point*

Let θ be the angle made by the shank with the vertical axis. At an instant when θ = degrees, ω = 5 rad/s and α = 100 rad/s², and assuming the weight of the shank and foot be 50 N and ankle weights of 10 N, moment arm of the quadriceps muscle about the knee be 4 cm, location of the COM of the shank and foot to be 22 cm from the knee joint, locat of the ankle at 50 cm from the knee, the line of action of the quads muscle to be at degrees to the axis of the lower leg and parallel to the thigh, and the moment of inertia the shank+foot about the knee joint is 0.25 kgm², answer the following (Assume g=10m/s

The new COM of the lower leg is located at _____ from the knee.

○ 22.7 cm
○ 25.7 cm
○ 26.7 cm
○ 50 cm

No, the answer is incorrect.
Score: 0

Accepted Answers:
26.7 cm

10) The MOI of the system about the knee is   *1 point*

○ 0.25 kgm²
○ 0.35 kgm²
○ 0.5 kgm²
○ 0.65 kgm²

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.5 kgm²

11) The net torque produced about the knee joint is _____   *1 point*

○ 25 Nm
○ 50 Nm
○ 60 Nm
○ 70 Nm

No, the answer is incorrect.
Score: 0

Accepted Answers:
50 Nm

12) The tension in the patellar tendon is _____   *1 point*

○ 488 N

○ 1533 N

○ 1307 N

○ 3423 N

No, the answer is incorrect.
Score: 0

Accepted Answers:
1533 N

13) The moment of inertia of the system about its CoM is _____ kgm^2 *1 point*

○ 0.007

○ 0.07

○ 0.7

○ 7

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.07

14) The reaction force at the tiobiofemoral joint is _____ N   *1 point*

○ 800

○ 684

○ 1384

○ 925

No, the answer is incorrect.
Score: 0

Accepted Answers:
1384

15) The net force on the patella is _____ N   *1 point*

○ 7630

○ 1736

○ 3670

○ 925

No, the answer is incorrect.
Score: 0

Accepted Answers:
1736

Previous Page   End

Wednesday 07 November 2018 11:06 PM