[LF 0212] **AUGUST 2014** **Sub.Code :2415**

B.Sc. PROSTHETICS & ORTHOTICS
SECOND YEAR
PAPER V – BIO – MECHANICS - II

Q.P. Code: 802415

Time: Three hours **Maximum : 100 Marks**

Answer All questions

I. Elaborate on: **(3 x 10 = 30)**

1. Discuss the biomechanical principles of Knee disarticulation socket designs.
2. Describe the Biomechanics of Osteoarthritic knee.
3. Describe the Biomechanics of HKAFO system and its effect.

II. Write notes on: **(8 x 5 = 40)**

1. Screw home mechanism.
2. What is pathological gait? Mention any 6 pathological gait patterns.
3. Mechanics of Plugfit Socket.
4. Five point force system and its applications.
5. A man **X** walking with a constant step length of 79 cm, if he covered a distance of 462 meter in five minute calculate his.
   a) Stride length b) Cadence c) Velocity of walking
6. Degree of freedom and its significance in P&O designs.
7. Pathomechanics of Waddling gait.
8. Explain Hip Hiking, Circumduction and Vaulting.

III. Short answers on: **(10 x 3 = 30)**

1. ISO standards.
2. Crutch gait.
3. Static and Dynamic Devices.
4. What is Antalgic gait? Write its common causes.
5. Torsional stress.
6. Energetics of Walking.
7. Open helical Springs.
8. Axial bending stress.
9. Significance of Normal foot arches in locomotion.
10. Keel length in prosthetic feet.

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[LH 0815] **AUGUST 2015** **Sub.Code :2415**

BACHELOR IN PROSTHETICS AND ORTHOTICS
SECOND YEAR
PAPER V – BIO – MECHANICS - II

Q.P. Code: 802415

Time: Three Hours **Maximum : 100 Marks**

Answer All questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain the biomechanical principles that led to design and development of quadrilateral Socket.
2. Discuss the Biomechanics of Residual limb-socket Interface.
3. Analyze KAFO from a Biomechanical perspective under following heads
   a) Alignment of Joint Axes b) Forces c) Joint Motion

II. Write notes on: **(8 x 5 = 40)**

1. How would you assess the energy expenditure in walking with unilateral hybrid KAFO?
2. Outline the KAFO Gait Deviations due to various Pathological Conditions.
3. Explain the Biomechanical principles of anterior floor reaction Orthosis in a CP child.
4. Assess the maximum deflection for a Metallic KAFO in genu valgum.
5. What are the biomechanical reasons of Stirrup failure?
6. Explain the biomechanical theory of any one through knee socket design.
7. Describe ICR and its applications in P/O.
8. Describe 4-point force and its applications with relevant examples.

III. Short answers on: **(10 x 3 = 30)**

1. Structural testing standards in P/O designs.
2. BIS Certification of P/O devices.
3. How would you achieve stance flexion in a prosthetic knee?
4. Mechanics of Alignment.
5. Effects of Mal-alignment.
6. Design of thigh cuff in KAFO for Male Paraplegics.
7. Biomechanical advantages of Eccentric knee orthoses.
8. Biomechanical Effects of trimlines variations in an AFO.
9. Axes of Lower limb and their relationships.
10. Biomechanical deficits in Scissoring gait.

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[LJ 0816] AUGUST 2016 **Sub. Code :2415**

B.Sc. PROSTHETICS AND ORTHOTICS
SECOND YEAR
PAPER V – BIO-MECHANICS - II

Q.P. Code: 802415

Time: Three Hours **Maximum : 100 Marks**

Answer All questions

I. Elaborate on: **(3 x 10 = 30)**

1. Write in details about Kinematics of anatomical knee joint.
2. Explain the biomechanics of polycentric prosthetic knee joint.
3. Explain Circumduction, Vaulting and Foot slap.

II. Write notes on: **(8 x 5 = 40)**

1. Explain the biomechanical principle of Quadrilateral socket design.
2. Explain Terminal impact, Abducted gait and Lateral trunk bending.
3. Outline the Biomechanical concepts of KAFO.
4. Explain in brief open and closed kinematic chain with their examples.
5. Describe the biomechanics of Transfemoral Residual Limb of short length.
6. Differentiate Pronated foot with supinated foot and their biomechanical effects.
7. What do you understand by whip and its causative factors?
8. Discuss the biomechanical effects of Knee Cuff.

III. Short answers on: **(10 x 3 = 30)**

1. Explain Tripod crutch gait and its types.
2. A person walking with a constant speed of 5640 steps in one hour calculate his cadence.
3. What are the biomechanical reasons of SACH foot breakage?
4. Explain stride and step duration.
5. Write the biomechanical advantages of patella.
6. Explain Swing to and swing through crutch gait.
7. How Transfemoral prosthesis with quadrilateral socket can be aligned for voluntary knee control?
8. How enhanced stability is achieved prosthesis with in a polycentric knee?
9. Explain Windlass mechanism.
10. What are the Advantages of Titanium for KAFO system?

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[LK 0217] FEBRUARY 2017 **Sub. Code :2415**

B.Sc. PROSTHETICS AND ORTHOTICS
SECOND YEAR
PAPER V – BIO-MECHANICS - II

Q.P. Code: 802415

Time: Three Hours **Maximum : 100 Marks**

Answer All questions

I. Elaborate on: **(3 x 10 = 30)**

1. With Neat labeled sketches describe the Biomechanics of Ischial Containment Socket Design?
2. Discuss the Biomechanics of walking with above knee prosthesis of any design.
3. Classify Pathological Gait. Explain the components of Hemiplegic Gait.

II. Write notes on: **(8 x 5 = 40)**

1. Explain the biomechanics of knee locking.
2. How Torsional stresses are minimized in lower limb prosthesis?
3. Outline determinants of Gait.
4. How center of Gravity shifts in a Trendelenberg Gait?
5. Write a note on Parkinson's Gait.
6. Biomechanics of Safety knee joint.
7. Classify Prosthetic Knee Actuators.
8. Explain KAFO as a Mechanical System.

III. Short answers on: **(10 x 3 = 30)**

1. What are the various Loading patterns on Prosthetic Pylon?
2. How Frictional loading on stump-socket interfaces can be minimized?
3. What do you mean by Five point Pressure system?
4. What are the disadvantages of knee Drop lock in a KAFO?
5. State the mechanics of heel Wedges.
6. What are the advantages of Pyramid Alignment system?
7. Explain Bony Lock Mechanism in Ischial containment socket.
8. What do understand by term Pelvic Obliquity?
9. Explain the working principle of Ratchet locking pin of Silicone Liner.
10. A person walking with a constant speed of 5400 steps in one hour calculate his cadence?

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[LL 0817] AUGUST 2017 **Sub. Code :2415**

B.Sc. PROSTHETICS & ORTHOTICS
SECOND YEAR
PAPER V – BIO-MECHANICS - II

Q.P. Code: 802415

Time: Three hours **Maximum : 100 Marks**

Answer All questions

I. Elaborate on: **(3 x 10 = 30)**

1. Explain about Ischial Containment Socket and Biomechanics.
2. Prescription principle for knee disarticulation amputation.
3. Explain about prosthetic hip joint & biomechanics.

II. Write notes on: **(8 x 5 = 40)**

1. Orthotic management for T12 Paraplegia.
2. Explain about through knee prosthesis alignment.
3. Explain about prosthetic hip joint and biomechanics.
4. Biomechanics of Floor Reaction orthosis.
5. Types of orthotic knee joint.
6. Biomechanics of HKAFO.
7. KAFO alignment principle.
8. Biomechanics of SACH foot.

III. Short answers on: **(10 x 3 = 30)**

1. What is CAT – CAM?
2. Overview about biomechanical concepts of KAFO.
3. Types of orthotic hip joint.
4. Kinematics of anatomical knee joint.
5. Describe about polycentric knee joint.
6. Biomechanics about MAS socket.
7. Explain about microprocessor knee joint.
8. Explain about single axis prosthesis knee joint.
9. Explain about prosthetic gait deviation.
10. Explain about biomechanical principle of quadrilateral socket.

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[LN 0818] AUGUST 2018 **Sub. Code: 2415**

BACHELOR IN PROSTHETICS & ORTHOTICS

SECOND YEAR

PAPER V – BIO-MECHANICS - II

Q.P. Code: 802415

Time: Three Hours **Maximum : 100 Marks**

Answer All questions

I. Elaborate on: **(3 x 10 = 30)**

1. What is transfemoral amputation? Describe suitable prosthesis with socket design.
2. What is gait analysis? Explain different type of gait analysis with neat sketches. Describe different stages of normal gait.
3. Describe the biomechanics of through knee prosthesis.

Write notes on: **(8 x 5 = 40)**

1. PTB Socket.
2. Biomechanics and kinesiology.
3. Mechanics and Biomechanics.
4. Moment and torque.
5. Phantom pain.
6. SMO.
7. Explain terminal impact, abducted gait and lateral trunk bending.
8. Explain biomechanical principle of quadrilateral socket design.

III. Short answers on: **(10 x 3 = 30)**

1. What do you mean by five point pressure system?
2. Locking and unlocking mechanism of knee.
3. Knee Orthosis.
4. Syme's prosthesis.
5. FRO.
6. Characteristics of Normal gait.
7. Bench alignment in knee prosthesis.
8. Flat foot.
9. Abnormal gait due to quadriceps muscle.
10. AFO.

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