

[LN 0818]

AUGUST 2018

Sub. Code: 2457

**BACHELOR IN PROSTHETICS AND ORTHOTICS
FIRST YEAR
PAPER VII – PROSTHETIC SCIENCE – I**

Q.P. Code: 802457

Time: Three Hours

Maximum : 100 Marks

Answer All questions

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

1. Prosthetic management for Syme's Amputation.
2. Explain about Prosthetic Alignment for Trans Tibial Prosthesis.
3. Biomechanics of Partial foot prosthesis.

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

1. Trans Tibial Prosthetic gait deviation.
2. Check-Out Procedures for Syme's Prosthesis
3. Prosthetic Components used for Trans Tibial Prosthesis.
4. Types of Prosthetic Feet.
5. Suspension System Used for Trans Tibial Prosthesis.
6. Explain about Endoskeleton prosthesis and Exoskeletal prosthesis.
7. Biomechanics of Trans Tibial Prosthesis.
8. Materials used for partial foot prostheses.

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

1. Check-out Procedures for Chopart.
2. PTB Socket.
3. Check-out Procedures for Trans Tibial Prosthesis.
4. PTBSC Socket Trim lines.
5. SACH Foot.
6. Trans Tibial Patient Physical Assessment.
7. Roles of Multidisciplinary team members.
8. TSB Socket.
9. Casting Procedure for Syme's Amputation.
10. Syme's Prosthesis Suspension System.

[LO 0219]

FEBRUARY 2019

Sub. Code: 2457

**BACHELOR IN PROSTHETICS AND ORTHOTICS
FIRST YEAR
PAPER VII – PROSTHETIC SCIENCE – I**

Q.P. Code: 802457

Time: Three Hours

Maximum : 100 Marks

Answer All questions

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

1. Prosthetic Management for Partial Foot Amputation.
2. Syme's Prosthetic Gait Deviation.
3. Explain about types of Prosthetic Feet.

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

1. Types of Trans Tibial socket designs.
2. Fabrication techniques of partial foot prosthesis.
3. Explain about PTB-SCSP Socket.
4. Fabrication Technique for Trans-Tibial Conventional Prosthesis.
5. Endoskeletal prosthesis and Exoskeletal prosthesis.
6. Check-out Procedures for Chopart.
7. Materials used for Trans – Tibial Prosthesis.
8. Prosthetic Management for Trans Tibial knee flexion contracture.

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

1. Trans Tibial Prosthesis Suspension System.
2. Measurement Techniques for Partial Foot Prostheses.
3. Trans – Tibial Resin Lamination socket fabrication Procedure.
4. Check-Out Procedure for Syme's Prostheses.
5. Material Used for Partial foot Prosthesis.
6. SACH Foot.
7. Casting Technique for Syme's Prosthesis.
8. PTBSC Socket Trim lines.
9. Roles of Multidisciplinary team members.
10. Trans Tibial Prosthesis Bench alignment.

[LP 0819]

AUGUST 2019

Sub. Code: 2457

**BACHELOR IN PROSTHETICS AND ORTHOTICS
FIRST YEAR
PAPER VII – PROSTHETIC SCIENCE – I**

Q.P. Code: 802457

Time: Three Hours

Maximum : 100 Marks

Answer All questions

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

1. Types of Prosthetic Feet. Partial Foot Measurement Procedures.
2. What is Jaipur foot? Chopart amputation describe in detail.
3. Check-Out Procedures for Trans Tibial Prosthesis.

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

1. Partial Foot prosthesis Fabrication Procedures.
2. Syme's Prosthesis check-Out Procedures.
3. Trans Tibial Prosthetic Gait Deviation.
4. Components used for Trans Tibial Prosthesis.
5. Measurement Procedure for Syme's Prosthesis.
6. Prosthetic Components used for Syme's Prosthesis.
7. Biomechanics of partial foot prosthesis.
8. Explain about energy storage foot.

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

1. Types of Trans Tibial Prosthetic Suspension.
2. Trans Tibial Prosthetic Measurement.
3. Bench Alignment for Syme's Prosthesis.
4. Materials used for Trans-Tibial Prosthesis.
5. Exoskeletal Prosthesis.
6. Lower Extremity Levels of Amputation.
7. PTB-SCSP socket Trim line.
8. Trans Tibial Prosthesis Static Alignment.
9. Endoskeletal prosthesis.
10. Materials Used for Partial foot Prosthesis.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0422]

APRIL 2022

Sub. Code: 2457

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSIONS)

BACHELOR IN PROSTHETICS AND ORTHOTICS

FIRST YEAR (Regulations 2017-2018)

PAPER VII – PROSTHETIC SCIENCE I

Q.P NO. 802457

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on :

(3X10=30)

1. Historical development in Lower Extremity Prosthetics.
2. Trans-tibial Prosthetic Prescription Guidelines.
3. Biomechanics of Symes foot prosthesis.

II. Write Notes on :

(8X5=40)

1. Distinguish between PTB and PTS socket designs.
2. Distinguish between Open and Closed ended below knee Socket.
3. Describe TSB transtibial Socket with a neat labelled diagram.
4. Describe supracondylar cuff suspension with a neat labelled diagram.
5. Dynamic alignment of transtibial prostheses.
6. Patellar tendon bearing socket principles.
7. Gait characteristics of a unilateral transtibial amputee with a prosthesis.
8. Effects of Ill-fitting Transtibial sockets.

III. Short Answers on :

(10X3=30)

1. STEN Foot.
2. Hydrostatic Socket.
3. Multi-axial prosthetic feet.
4. Uses of Prosthetic Socks.
5. Prosthetic solution of Ray Amputation.
6. Thigh Corset Suspension for below knee Prostheses.
7. Wood and metal Below knee prosthetics.
8. Exoskeletal Below knee leg.
9. Pressure-relief areas in Transtibial Socket.
10. Conventional Prostheses.

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[AHS 0423]

APRIL 2023

Sub. Code: 2457

BACHELOR IN PROSTHETICS AND ORTHOTICS

FIRST YEAR (Regulation 2017-2018 onwards)

PAPER VII – PROSTHETIC SCIENCE I

Q.P. Code: 802457

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on :

(3X10=30)

1. Draw a neat labeled diagram of SACH Foot and describe its mechanism of action.
2. Draw a neat labeled Antero-posterior (AP) and Medio-lateral (ML) diagrammatic view of Trans-tibial Ideal residual limb. Mention the Pressure Tolerant and Intolerant area on the Residuum.
3. Describe with neat labeled sketch different types of Trans-tibial socket designs.

II. Write Notes on :

(8X5=40)

1. Brief on Historical development in Lower Extremity Prosthetics in India.
2. Describe Biomechanics of Partial foot Prosthesis.
3. Classify various types of Prosthetic Feet.
4. Brief on various types of Symes Prosthesis.
5. Different types of suspension mechanism for transtibial Prostheses.
6. Brief on various types of materials used in fabrication of partial foot Prosthesis.
7. What would be the possible biomechanical effects of inappropriately designed transtibial prostheses socket?
8. Consider a young active trans-tibial amputee. During the alignment process the patient complains that the knee is being pushed into excessive extension during the mid-stance. What alignment change should be performed?

III. Short Answers on :

(10X3=30)

1. What are the gait deviations observed during swing phase in Transtibial Prosthesis user?
2. Explain Socket/stump interface in below knee amputees.
3. Suggest Prosthetic design for Chopart amputation.
4. Explain Pressure distribution in Total Surface Bearing Transtibial socket.
5. Write Trans-tibial Prosthetic Prescription principles.
6. Enumerate Engineering materials used in Trans-tibial Prosthesis.
7. Draw a neat labeled sketch of Jaipur Limb design.
8. State the Benefits of Open ended socket.
9. What are the Causes of Lateral trunk bending in transtibial gait?
10. What do you mean by Good transtibial prosthetic socket fit?

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[AHS 1123]

NOVEMBER 2023

Sub. Code: 2457

**BACHELOR IN PROSTHETICS AND ORTHOTICS
FIRST YEAR (Regulation 2017-2018 onwards)
PAPER VII – PROSTHETIC SCIENCE - I
Q.P. Code: 802457**

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on :

(3X10=30)

1. Explain various suspension systems used in Transtibial Prosthesis under following headings: a) Indication b) Contra-indication c) Function.
2. Explain the check-out procedure of a Transtibial amputee with Prosthesis.
3. Elaborate on the Biomechanics of Syme's Prosthesis.

II. Write Notes on :

(8X5=40)

1. Illustrate with neat diagram the procedure of Bench Alignment in Transtibial Prosthesis in relation to sagittal and frontal views.
2. Parts and working mechanism of C-walk foot.
3. Explain the causes of early and delayed knee flexion in view of Transtibial Prosthesis.
4. With neat diagram, explain a prosthetic management for Chopart's Amputation.
5. Describe in detail with a neat diagram a non-articulated foot that helps in barefoot walking.
6. Explain VASS System.
7. Differentiate between PTB and TSB socket designs.
8. Write a brief note on SACH foot with a labelled diagram.

III. Short Answers on :

(10X3=30)

1. State the evolution of Socket of Syme's amputation.
2. Draw a labelled diagram showing various components of a Transtibial Prosthesis.
3. What are the challenges a Prosthetist will face during fabrication of a Syme's Prosthesis?
4. With neat diagram mention the trimlines of a PTB-SC socket design.
5. State the surface anatomy of Lower Extremity.
6. Classify Prosthetic feet with examples.
7. What do you mean by IPOP? Write a brief note on it.
8. What is pyramid adapter, its use and placement in Transtibial Prosthesis?
9. Explain evolution of Lower Extremity Prosthetics in India.
10. Draw a flow chart illustrating the Prosthetic Clinical Procedure.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0424]

APRIL 2024

Sub. Code: 2457

BACHELOR IN PROSTHETICS AND ORTHOTICS

FIRST YEAR (Regulation 2017-2018 onwards)

PAPER VII – PROSTHETIC SCIENCE - I

Q.P. Code: 802457

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on :

(3 X 10 = 30)

1. Explain in detail the various types of socket designs used in Transtibial Prosthesis.
2. Explain with neat diagram the parts and functions of most widely used Non-articulated foot.
3. Describe briefly the fabrication procedure of Syme's Prosthesis.

II. Write Notes on :

(8 X 5 = 40)

1. Describe Static and Dynamic alignment.
2. Explain Harmony Suspension System.
3. With a neat labelled diagram, explain SAFE foot in relation to windlass mechanism.
4. Types of anatomical suspension system used for trans-tibial prosthesis.
5. State the anatomical landmarks of below knee amputee and classify them according to the pressure tolerant and sensitive areas.
6. Which gait deviation is observed in the midstance phase of the Transtibial gait? Explain its causes.
7. Materials used in fabrication of laminated prosthetic socket.
8. Biomechanical implications of Partial Foot Prosthesis.

III. Short Answers on :

(10 X 3 = 30)

1. What are the types of Transtibial prosthesis?
2. Explain the importance of Follow-up procedure in trans-tibial Prosthesis.
3. Define : a) Prosthesis b) Prosthetics c) Prosthetist.
4. What are the advantages of a Syme's Amputation?
5. Describe indication, contra-indication, parts and functions of Cuff suspension.
6. Torque absorber rotator.
7. Explain Flex foot.
8. Explain ISNY trans-tibial socket design.
9. Differentiate between open end and close end socket designs.
10. Differentiate the importance between short keel and long keel Prosthetic foot.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1124]

NOVEMBER 2024

Sub. Code: 2457

BACHELOR IN PROSTHETICS AND ORTHOTICS

FIRST YEAR (Regulation 2017-2018 onwards)

PAPER VII – PROSTHETIC SCIENCE - I

Q.P. Code: 802457

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on :

(3 X 10 = 30)

1. Explain Gait deviations of a Amputee using Transtibial Prosthesis.
2. Explain in detail the assessment and evaluation of a Transtibial amputee.
3. Describe the various Alignment procedure used in Transtibial Prosthesis.

II. Write Notes on:

(8 X 5 = 40)

1. Differentiate Single axis and Multi axis Prosthetic foot.
2. Describe the Biomechanics of Partial foot amputation.
3. Explain about Vacuum Assisted Socket Suspension.
4. Explain different types of non-articulated prosthetic foot.
5. Suggest socket designs for Ankle Disarticulation Prosthesis.
6. Modification procedure and trimlines of a PTB socket design.
7. A patient X is having very short below knee amputation with both M-L and A-P instability around knee. What will you prescribe? Justify it.
8. Describe the Amputee activity levels (K -Levels).

III. Short Answers on:

(10 X 3 = 30)

1. Explain a prosthetic management for Lisfranc Amputation.
2. Knee Sleeves.
3. Carbon Copy II Prosthetic foot.
4. State the importance of Check-out procedure in Transtibial Amputee.
5. STEN Prosthetic foot.
6. What is total contact principle? Explain its importance.
7. What are the levels of amputation in lower extremity?
8. What is TSB Socket design?
9. What are the different types of Prosthesis? What is the ideal time for fitment of Prosthesis after amputation.
10. How will you choose the required density of the cushion heel in prosthetic foot in an amputee?

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0425]

APRIL 2025

Sub. Code: 2457

BACHELOR IN PROSTHETICS AND ORTHOTICS

FIRST YEAR (Regulation 2017-2018 onwards)

PAPER VII – PROSTHETIC SCIENCE - I

Q.P. Code: 802457

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on :

(3 X 10 = 30)

1. Fabrication and alignment technique for Syme's Prosthesis.
2. Gait Deviations in Transtibial Prostheses.
3. Measurement and casting techniques for Partial Foot Prosthesis.

II. Write Notes on :

(8 X 5 = 40)

1. Distinguish between PTBSC and PTB-SC SP Socket.
2. Prosthetic ankle-foot mechanisms.
3. Prosthetic versus non prosthetic causes of gait deviations in transtibial amputee.
4. Below knee Prosthetic checkout procedure.
5. Check-Out Procedures of Chopart Prosthesis.
6. Functional characteristics of Transtibial Prosthetic components.
7. Distinguish between Modular and Conventional below knee Prostheses.
8. Interface Options for Transtibial Socket.

III. Short Answers on :

(10 X 3 = 30)

1. SAFE Foot.
2. Draw Cross- sectional view of Jaipur Foot.
3. External Suspension Sleeve for below knee socket.
4. Prosthetic solution for Lisfranc level of foot amputation.
5. Transtibial Static Alignment.
6. Load tolerant regions in PTB socket.
7. Transtibial silicone self-suspending sockets.
8. POP Cast Rectification Tools.
9. Energy storage and return foot.
10. Define Prosthetic alignment.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1125]

NOVEMBER 2025

Sub. Code: 2457

BACHELOR IN PROSTHETICS AND ORTHOTICS

FIRST YEAR (Regulation 2017-2018 onwards)

PAPER VII – PROSTHETIC SCIENCE - I

Q.P. Code: 802457

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on :

(3 x 10 = 30)

1. Describe how lower limb prostheses empower to restore mobility to the patient with a lower limb amputation.
2. Describe Below-Knee Prosthetic Gait Deviations.
3. Define Alignment. Explain Bench Alignment of the Below Knee Prosthesis.

II. Write Notes on :

(8 x 5 = 40)

1. Draw a neat labeled sketch of Uniaxial Ankle-Foot Prosthetic foot.
2. Surface anatomy of Below knee stump..
3. Write the mechanism of action of Energy Recovery Feet.
4. Draw a neat labeled sketch of cuff suspension system. Write its functions.
5. Functional loss after partial foot amputation.
6. Draw Stump socket forces during the stance phase after Transmetatarsal Amputation prosthesis.
7. Indications and Contra-indications of PTB Socket.
8. Suggest Solution for Discomfort at the end of the tibia when walking with PTB Below Knee Prosthesis.

III. Short Answers on :

(10 x 3 = 30)

1. Toe Filler.
2. Colins partial foot prosthesis.
3. Close ended socket.
4. Madras Foot.
5. Disadvantages of Conical Below Knee Stump.
6. PTB Hard Socket Materials.
7. Wrap draping procedure.
8. The arches of the foot.
9. Advantages and disadvantages of Exoskeletal Shank.
10. Slipper-Type Elastomer Prosthesis (STEP).
