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

[AHS 0321] MARCH 2021 Sub. Code: 2472

(AUGUST 2020 EXAM SESSION)

BACHELOR IN PROSTHETICS AND ORTHOTICS

THIRD YEAR (Regulation 2017-2018)

PAPER II – BIOMECHANICS III

Q.P. Code : 802472

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Explain about different types of TR socket biomechanics.
2. Biomechanics of normal spine.
3. Biomechanical principle of spine braces.

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

1. Biomechanics of inter vertebral disk.
2. Lumbar spine loading during normal activities.
3. Biomechanics of corset.
4. Biomechanics of thoracolumbar orthosis.
5. Shear force and bending moment diagram.
6. Open and closed helical spring.
7. Theorem of parallel axis.
8. Airplane splint biomechanics.

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

1. Functional of IV disk.
2. Biomechanical principles of lumbar pad.
3. Five point pressure system.
4. Intra cavity pressure.
5. Pelvic stabilization in spine brace.
6. Stress concentration.
7. Biomechanical principles of fracture bracing.
8. Fluid mechanics.
9. Beam deflection.
10. Force system in LS corset.

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

[AHS 0222] **FEBRUARY 2022** **Sub. Code: 2472**
(AUGUST 2021 EXAM SESSION)

BACHELOR IN PROSTHETICS AND ORTHOTICS
THIRD YEAR (Regulation 2017-2018)
PAPER II – BIOMECHANICS III
Q.P. Code : 802472

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Explain the biomechanics of Elbow joint.
2. Write about Biomechanics of spine.
3. Explain the biomechanics of trans-humeral socket.

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

1. Biomechanics of cervical orthosis.
2. Draw a sketch of typical vertebra and explain the parts.
3. Explain Euler's theory of buckling.
4. Explain kinetics and kinematics.
5. What is Scoliosis and its orthotic management?
6. Explain open and closed helical spring.
7. Biomechanics of Wilmington brace.
8. What is myoelectric prosthesis.

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

1. What are the functions of IV disc.
2. Biomechanics of lumbar pad.
3. Define shoulder joint complex.
4. What is difference between power and precision grasp.
5. What is intra cavity pressure.
6. Biomechanics of fracture bracing.
7. What is torsional stress.
8. What is function of pedicle.
9. What is buckling.
10. Biomechanics of Shoulder sling.

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

[AHS 0423] **APRIL 2023** **Sub. Code: 2472**

BACHELOR IN PROSTHETICS AND ORTHOTICS
THIRD YEAR (Regulation 2017-2018 onwards)
PAPER II – BIOMECHANICS III
Q.P. Code : 802472

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Biomechanics of scoliosis correction using spinal brace.
2. Biomechanics of shoulder complex.
3. Application of myoelectric control and external power usage of devices in Upper Limb Prosthesis.

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

1. Munster socket biomechanics.
2. Follower load.
3. Combined and Torsional stresses.
4. Miami brace biomechanics.
5. Centroids.
6. Knuckle bender control mechanism.
7. Functional mechanism of Tenodesis splint.
8. Grasp forces.

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

1. TLSO control of spine.
2. Importance of functional position of hand.
3. Claw hand correction forces in splint.
4. Long stump TR socket biomechanics.
5. Swank neck deformity correction forces.
6. TRAC socket biomechanics.
7. LSVT.
8. Euler’s theory of buckling.
9. Forces in CASH brace.
10. Three jaw chuck prehension.

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

[AHS 1123] **NOVEMBER 2023** **Sub. Code: 2472**

BACHELOR IN PROSTHETICS AND ORTHOTICS
THIRD YEAR (Regulation 2017-2018 onwards)
PAPER II – BIOMECHANICS III
Q.P. Code: 802472

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Describe biomechanics of Lumbar corset.
2. Describe biomechanics of Air plane splint.
3. Explain biomechanics principle of Trans-humeral socket.

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

1. Explain the ligaments of the spine.
2. Draw a diagram of typical vertebrae and explains the parts with functions.
3. What is pelvic stabilization in spinal brace? Explain it.
4. Briefly explain Biomechanics of Scoliotic curvature.
5. Describe intra-cavitary pressure in a spinal orthosis.
6. Explain negative effects of spinal orthosis.
7. Describe stabilizer of the shoulder joint.
8. What is functional electrical stimulation?

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

1. Define Fatigue. Give its biomechanical description.
2. What is load-deformation curve? Why is this important in biomechanical description?
3. What is bending stiffness? Give examples.
4. What is free body diagram? How it is applied for problem solving of biomechanical conditions?
5. Describe the concept of three point control?
6. What is angle of pull?
7. Name the five regions of vertebral column.
8. What is mobile segment?
9. What are the functions of IV disk.
10. Define Torsion.

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

[AHS 0424] **APRIL 2024** **Sub. Code: 2472**

BACHELOR IN PROSTHETICS AND ORTHOTICS
THIRD YEAR (Regulation 2017-2018 onwards)
PAPER II – BIOMECHANICS III
Q.P. Code: 802472

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Biomechanics of Trans-Humeral Prosthetic socket.
2. Introduction of Functional Electrical Stimulation application in P and O field.
3. Grasp pattern and Grasp force.

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

1. Mechanical replacement of hand function.
2. Structure and function of Thoracic spine.
3. Theorem of Parallel axes.
4. Myoelectric control system in P and O appliances.
5. Biomechanics of spinal injuries.
6. Follower load.
7. Biomechanical function of Charleston bending Orthosis.
8. Open and closed helical spring.

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

1. Hueters Volkman Law.
2. Ligament of Spine.
3. Kinesthetic reminder.
4. Structure of IV disk.
5. Primary curve and secondary curve of spine.
6. Hybrid Orthosis.
7. Phalen’s test.
8. Biomechanics of hard collar.
9. PIP and DIP splint biomechanics.
10. Opponance bar function.

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

[AHS 1125] **NOVEMBER 2025** **Sub. Code: 2472**

BACHELOR IN PROSTHETICS AND ORTHOTICS
THIRD YEAR (Regulation 2017-2018 onwards)
PAPER II – BIOMECHANICS III
Q.P. Code: 802472

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Briefly describe application of Functional Electrical Stimulation (FES) in Prosthetics.
2. Explain the Biomechanics of Milwaukee brace.
3. Explain the Biomechanical principles of Arm sling.

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

1. What are three columns of spine? Explain it.
2. Explain Stabilization of Utah socket used for above elbow amputees.
3. Briefly describe the Biomechanics of Cervical orthosis.
4. Explain about Spinal coupling.
5. Draw different types of hand grasp pattern.
6. What is followed load? Describe with diagram.
7. Describe open and closed helical spring.
8. Explain lumbar spinal loading during normal activities.

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

1. Name the two categories of prehensile activities.
2. What is the function of anatomic pulley?
3. Explain the finger flexor mechanism.
4. What is vertebral endplate?
5. Name the composition of IV disk.
6. What do you mean by Torsional stress? Give examples.
7. Give an experimental illustration of Stress Relaxation.
8. Show the effects of Stress Concentration in a plate with hole of diameter.
9. Draw moment diagram for a cantilever beam subjected to concentrated load.
10. How Creep Test is performed?

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