

November-1993

[PR 638]

Bachelor of Physiotherapy
Degree Examination

IV Semester — New (Regulation)

BIOMECHANICS

Time : Three hours

Maximum : 100 Marks

Answer ALL the Questions

1. Describe a hemiplegic gait. Give a detail account of various muscles responsible for each movement in hemiplegic gait cycle [20]

2. Describe the components of the shoulder complex. Describe the movements and the muscles responsible for those movements at the shoulder complex [20]

3. Write briefly on the following : [6X10=60]

(a) Semilunar cartilage

(b) Arches of foot

(c) ligaments of knee joint and bio mechanical significance

(d) Stance phase

(e) Normal gait and upper extremity muscle action

(f) Factors affecting muscle function

(g) Equilibrium-law of Inertia

(h) Classification of joints and examples

(i) Compare closed kinematic chain with open chain

(j) Congruous and incongruous joints - compare.

November-1994

~~[NO 197]~~

**Bachelor of Physiotherapy
Degree Examination**

Fourth Semester

(New Regulation)

Paper III - BIOMECHANICS

Time : Three hours

Maximum : 100 marks

Write Section A & B in separate Answer Books.

SECTION - A

1. Answer any ONE of the following (1×14 = 14)
 - a) Explain the relationship between intervertebral and facet joints during motions of vertebral column.
 - b) Describe the various mechanisms which play a role in maintaining posture and explain in detail the various types of posture.
2. Answer any TWO of the following (2×8 = 16)
 - a) Describe the motion of tibia in flexion and extension in an open kinematic chain.
 - b) Compare coxa vara and coxa valga on the basis of hip stability and mobility.
 - c) Analyse the muscle work from stride standing to half-kneeling.
3. Short notes answer any FIVE (5×4 = 20)
 - a) Bursae around the knee joint
 - b) Triplanar nature of ankle joint
 - c) Functions of menisci
 - d) Kyphosis
 - e) Intervertebral Disc
 - f) Lumbar pelvic system
 - g) Extensor expansion

SECTION - B

(50 marks)

1. Answer any ONE of the following (1×14 = 14)
 - a) Describe gravity, segmental centres of gravity centre of gravity of human body and explain how the external forces can be manipulated to maximise torque.
 - b) Describe how the location of body's gravity line affects gravitational moments acting around the hip joint.
2. Answer any TWO of the following (2×8 = 16)
 - a) Compare the normal gait with gait in which there is unequal leg length.
 - b) Explain the structure and function of plantar arches.
 - c) Define time and distance parameters of gait.
3. Answer any FIVE of the following (5×4 = 20)
 - a) Reaction forces.
 - b) Parallel force system.
 - c) Determinants of gait.
 - d) Q angle.
 - e) Factors affecting muscle tension.
 - f) Reverse action.
 - g) Angle of inclination and torsion in hip joint

Bachelor of Physiotherapy Degree Examination
Semester IV - New Regulation
BIOMECHANICS

Time : 3 hours

Max. marks: 1

Answer Section A and Section B in separate answer books

SECTION - A

1. Discuss arches of foot and explain its biomechanical significance

(OR)

Write in detail about the structure of the ankle joint.
Discuss the biomechanics of the various movements.

2. Write briefly on any TWO of the following :
(2x8 = 16)

- a) Describe centre of gravity. Explain its biomechanics of standing and walking.
- b) Describe the structures that contribute to joint stability.
- c) Role of interossei muscle at MCP and IP joint.

3. Write short notes on any FIVE of the following
(5x4 = 20)

- a) Mechanical advantage
- b) Rotational equilibrium
- c) Newton's Second Law
- d) Sternoclavicular joint
- e) Saddle joint
- f) Precision
- g) Dynamic stability

SECTION - B

4. Describe the functional position hand. What is the role of wrist musculature in producing various movements at the wrist ?

(OR)

Discuss biomechanics of hand function.

5. Write briefly on any TWO of the following :
- a) Lumbar pelvic rhythm
 - b) Discuss curvatures of the vertebral column and add a note on scoliosis
 - c) Describe the shoulder complex and the movements taking place at the scapulo thoracic joint.
6. Write short notes on any FIVE of the following :
- a) Determinants of gaits
 - b) Q angle
 - c) Active insufficiency
 - d) Screw home movement
 - e) why certain part of spinal column is mobile?
 - f) Inter vertebral disc
 - g) Syndesmosis

November-1995

[MB 914]

BACHELOR OF PHYSIOTHERAPY DEGREE EXAMINATION.

(New/Revised Regulations)

Fourth Semester

Paper III — BIOMECHANICS

Time : Three hours

Maximum : 100 marks

Write Section A and B in separate answer books.

SECTION A

1. Answer any ONE of the following : (1 × 14 = 14)

(a) Describe a linear, concurrent and parallel force system and its applicability.

(b) Describe the basic principles of joint design in a human body.

2. Answer any TWO of the following : (2 × 8 = 16)

(a) Describe the different factors affecting muscle tension.

(b) Analyse posture with respect to C.G. (Centre of Gravity) line and joint alignment.

(c) Describe the general effects of injury and disease.

[MB 914]

3. Write short notes on any FIVE : $(5 \times 4 = 20)$
- (a) Isokinetic exercise.
 - (b) Two joint muscles.
 - (c) Anteversion.
 - (d) Annular ligament.
 - (e) Torque.
 - (f) Pelvic rotation.
 - (g) Base of support.

SECTION B

4. Answer any ONE of the following : $(1 \times 14 = 14 \text{ marks})$
- (a) Describe the function and structure of the Tibiofemoral joint.
 - (b) Explain the normal mechanism of glenohumeral stability in the dependent arm.
5. Answer any TWO of the following : $(2 \times 8 = 16)$
- (a) Describe the role of each of the determinants of gait.
 - (b) Enumerate and explain the causes for a lordotic posture and gait.
 - (c) Describe the motions of the vertebral column.

[MB 914]

6. Write short notes on any FIVE :
- (a) Trendlenburg sign.
 - (b) Quadriceps lag.
 - (c) Dynamic equilibrium.
 - (d) Motor units.
 - (e) Articular cartilage.
 - (f) Foot drop.
 - (g) Push-ups.
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October-1996

K 909]

[PK 909]

BACHELOR OF PHYSIOTHERAPY DEGREE EXAMINATION.

Fourth Semester

(New/Revised Regulations)

Paper III — BIOMECHANICS

Time : Three hours

Maximum : 100 marks

Answer Sections A and B in separate answer books.

SECTION A — (50 marks)

Write an essay on any ONE of the following : (1 × 14 = 14)

- (a) Describe the Biomechanics involved in a person who underwent Excision arthroplasty of Hip on one side.
- (b) Draw a diagram of knee joint. Explain in detail how stability of knee joint is maintained.

Write brief answers on any TWO of the following :

(2 × 8 = 16)

- (a) Closed kinematic chain and open kinematic chain.
- (b) Extensor mechanism of fingers.
- (c) Biomechanics of Lumbo sacral junction.

Write short notes on any FIVE of the following : (5 × 4 = 20)

- (a) Intervertebral disc.
- (b) Thumb opposition.
- (c) Scoliosis.
- (d) Torque.
- (e) Potential energy.
- (f) All-or-none law.
- (g) Eccentric contraction.

SECTION B — (50 marks)

4. Write an essay on any ONE of the following : (1 × 14 = 14)

- (a) Describe the structural components of the shoulder complex and discuss the mechanism of shoulder abduction.
- (b) Draw a diagram of skeletal muscle fibre. Discuss in detail about how the muscle contraction is initiated.

5. Write brief answers on any TWO of the following :

(2 × 8 = 16)

- (a) What is a lever? Discuss about the types of lever.
- (b) Discuss briefly about Newton's law of reaction.
- (c) Discuss centre of Gravity.

6. Write short notes on any FIVE of the following : (5 × 4 = 20)

- (a) Iso kinetic exercise.
- (b) Synovial fluid.
- (c) Goniometer.
- (d) Fatigue.
- (e) Pulleys.
- (f) Strength and endurance.
- (g) Types of motion.

[MS 909]

**BACHELOR OF PHYSIOTHERAPY DEGREE
EXAMINATION.**

Fourth Semester

(Revised Regulations)

Paper III — BIOMECHANICS

Time : Three hours

Maximum : 100 marks

**Answer Sections A and B in
separate answer books.**

SECTION A

1. Write an essay on any ONE of the following : (20 marks)
 - (a) Describe the determinants of gait cycle.
 - (b) Describe the motions of vertebral column.
2. Write short notes on any SIX : (6 × 5 = 30 marks)
 - (a) Screw home movement
 - (b) Diarthrodial joint
 - (c) Precision grip
 - (d) Force of friction
 - (e) Anatomic pulleys
 - (f) Intrinsic muscles of foot
 - (g) Axis of supination and pronation
 - (h) Reverse reaction.

[MS 909]

SECTION B

3. Write an essay on any ONE of the following : (20 marks)
 - (a) Which are the joint distraction force and joint compression force? What are the equilibrium force for each?
 - (b) Describe the mechanical advantages in second and third class of levers.
4. Write short notes on any SIX : (6 × 5 = 30 marks)
 - (a) Law of inertia
 - (b) Coraco-achromial arch
 - (c) Active and passive insufficiency
 - (d) Dorsal digital expansion
 - (e) Distribution of weight in foot
 - (f) Pronator teres and pronator quadratus
 - (g) Vastus medialis and vastus lateralis
 - (h) Lumbar pelvic rhythm.

[SV 909]

Sub. Code : 5148

BACHELOR OF PHYSIOTHERAPY DEGREE
EXAMINATION.

Fourth Semester

(New/Revised Regulations)

Paper III — BIOMECHANICS

Time : Three hours

Maximum : 100 marks

Answer Sections A and B in separate answer books.

SECTION A

Write an essay on any ONE of the following :
(20 marks)

(a) Describe the Dynamic stability of the Gleno humeral joint utilising the Biomechanic principles.

(b) Describe in detail the components of shoulder movements.

2. Write short notes on any SIX : (6 × 5 = 30 marks)

(a) Lumbar pelvic rhythm.

(b) Concentric and eccentric contractions.

(c) Aeromio clavicular joint.

(d) Spring ligament.

(e) Carrying angle.

(f) Cavus foot.

(g) Plantar arches.

(h) Pronator teres and pronator quadratus.

SECTION B

3. Write an essay on any ONE of the following : (20 marks)

(a) Describe the effects of Increased Lumbo Sacral angles on the pelvis and vertebral column.

(b) Describe the factors affecting the muscle tension.

4. Write short notes on any SIX : (6 × 5 = 30 marks)

(a) Agonists and Antagonists.

(b) Motor unit.

(c) Ilio-Lumbar ligament.

(d) Friction.

(e) Intrinsic muscles.

(f) Abduction of thumb.

(g) All-or-none law.

(h) Isokinetic Exercises.

April-1999

[SG 909]

**BACHELOR OF PHYSIOTHERAPY DEGREE
EXAMINATION.**

Fourth Semester

(Revised Regulations)

Paper III — BIOMECHANICS

Time : Three hours *APRIL 99* Maximum : 100 marks

Answer Sections A and B in separate answer books.

SECTION A

1. Write an essay on any ONE of the following : (20)
 - (a) Describe the principles adopted by Guithrie Smith in suspension therapy and its uses.
 - (b) Describe the pulley system and its application in Traction.
2. Write short notes on any SIX : (6 × 5 = 30)
 - (a) Buoyancy and centre of Buoyancy
 - (b) Power grip
 - (c) Kinetic energy
 - (d) Concurrent Force System
 - (e) Inferior radio ulnar joint
 - (f) Codman's Pendulum exercise
 - (g) Crutch walking
 - (h) Shoulder wheel.

SECTION B

3. Write an essay on any ONE of the following : (20)
 - (a) Discuss the cardinal planes of the body
 - (b) What is force? How does the force applied in Lumbo-sacral corset?
4. Write short notes on any SIX : (6 × 5 = 30)
 - (a) Bracing in genu valgum
 - (b) Statics
 - (c) Fracture clavicle
 - (d) Rotator cuff
 - (e) Patella
 - (f) Pes cavus
 - (g) Law of equilibrium
 - (h) Motor unit.

[KB 915]

Sub. Code : 5148

BACHELOR OF PHYSIOTHERAPY DEGREE
EXAMINATION.

Fourth Semester

(New/Revised/Modified Regulations)

Paper III — BIOMECHANICS

Time : Three hours

Maximum : 100 marks

Answer Section A and B in separate answer books

SECTION A

1 Write an essay on any ONE of the following (20)

(a) Describe the functions of shoulder complex including dynamic stability of the glenohumeral joint.

Or

(b) Describe the functions of Tibio femoral joint.

2 Write short notes on any SIX (6 × 5 = 30)

(a) Active and passive insufficiency

(b) Coraco acromial arch

Locking and unlocking of knee joint

(d) Synovial fluid

(e) Intervertebral disc

(f) Lumbar pelvic rhythm

(g) Define Retroversion and Anteversion

(h) 'Q' angle and its significance.

SECTION B

3. Write an essay on any ONE of the following : (20)

(a) Describe the structure and functions of plantar arches including the primary supporting structure.

Or

(b) Describe the various mechanisms which play a role in maintaining posture and explain in detail the various types of posture.

Write short notes on any SIX : (6 × 5 = 30)

(a) Role of Menisci

(b) Prehensile function of hand

(c) Action line of muscle

(d) Torque

April-2000

(e) Chondromalacia patella

(f) Isokinetic exercises

(g) Kinematic chain

(h) Hip Hiking

[KB 927]

Sub. Code : 5317

**BACHELOR OF PHYSIOTHERAPY DEGREE
EXAMINATION.**

Fourth Semester

(New Modified Regulations)

Paper III — BIOMECHANICS

Time : Three hours

Maximum : 100 marks

Answer Section A and B in separate answer books.

SECTION A

1 Write an essay on any ONE of the following : (20)

(a) Describe the determinants of gait

Or

(b) Describe the joint classifications.

2 Write short notes on any SIX . (6 × 5 = 30)

(a) Spurt and shunt muscle

(b) Mechanical advantage

(c) Scoliosis

(d) Cartilage

(e) Spondylolysthesis

(f) Length-tension relationship

(g) Screw-Home mechanism

(h) Ligaments of vertebral column.

SECTION B

3. Write an essay on any ONE of the following : (20)

(a) Draw a diagram of skeletal muscle fibre. Discuss in detail about how the muscle contraction is initiated.

Or

(b) Describe articulations, mobility and stability of the vertebral column.

4. Write short notes on any SIX : (6 × 5 = 30)

(a) Axis of knee joint

(b) Phases of gait cycle

(c) Metatarsal break

- (d) Concentric contraction
- (e) Coxa vara and Genu valgum
- (f) Push-ups
- (g) Hallux valgus
- (h) Kyphosis.

[KC 915]

Sub. Code : 5148

**BACHELOR OF PHYSIOTHERAPY DEGREE
EXAMINATION.**

Fourth Semester

(New/Revised/Modified Regulations)

Paper III — BIOMECHANICS

Time : Three hours *DEC-2000* Maximum : 100 marks

Answer Section A and B in separate
answer books.

SECTION A

1. Write an essay on any ONE of the following : (20)

(a) Describe the basic principles of joint design.
Classify the joints. Describe the function, kinematic
chain, range of motion in respect of knee joint.

Or

(b) Describe the normal curves of the vertebral
column, and discuss the factors responsible for its
mobility and stability.

2. Write short notes on any SIX : (6 × 5 = 30)

(a) Equilibrium

(b) Isokinetic Exercises

(c) Agonist and antagonist

(d) Hand GRIPS and function

(e) Ligaments of Hip Joint

(f) Center of Gravity

(g) Factors affecting muscle tension

(h) Scapulo-humeral rhythm.

SECTION B

3. Write an essay on any ONE of the following : (20)

(a) Describe the three classes of lever, and
describe the mechanical advantage of each of them. How
are they helpful for study of muscle function?

Or

(b) Describe the maintenance of normal erect
posture with relation to gravity, and the muscles and
ligamentous structures that counterbalance
gravitational movements in standing posture.

4. Write short notes on any SIX : (6 × 5 = 30)

(a) Pes Planus

(b) Phases of Gait

(c) Alpha Motor Neuron

(d) Femoral Neck Shaft Angle

(e) Extrinsic Muscles of Hand

(f) Hamstring Muscles

(g) Radioulnar Joints

(h) Intervetral Disc.

[KC 927]

Sub. Code : 5317

**BACHELOR OF PHYSIOTHERAPY DEGREE
EXAMINATION.**

Fourth Semester

(New Modified Regulations)

Paper III — BIOMECHANICS

Time : Three hour

Maximum : 100 marks

Answer Section A and B in separate answer books.

SECTION A

1. Write an essay on any ONE of the following : (20)

(a) Describe the structural components of shoulder. Describe the mechanism of stability, movements and rhythm of the shoulder and its components.

(b) Mention the arches of the foot and their composition. How are they maintained? Discuss the biomechanical factors of the foot complex.

2. Write short notes on any SIX :

(6 × 5 = 30)

(a) Anatomic Pulleys.

(b) Friction.

(c) Structure of skeletal muscle.

(d) Scoliosis.

(e) Srew Home Movement.

(f) Lumbar-Pelvic Rhythm.

(g) Carrying angle.

(h) Structure and function of menisci.

SECTION B

3. Write an essay on any ONE of the following : (20)

(a) Describe the extrinsic and intrinsic muscles of hand and their role in the functioning of fingers and hand grips.

(b) Describe the structure and functions of Tibio femoral joint and the effects of injury and disease in that joint, causing disturbance in biomechanical factors.

4. Write short notes on any SIX. (6 × 5 = 30)

- (a) Newton's Law of Reaction.
- (b) Fibrous Tissue.
- (c) Isometric Contractions.
- (d) Articulations of Talus.
- (e) Gait Cycle.
- (f) Ligamentous complex of vertebral column.
- (g) Muscles of Hip Joint Complex.
- (h) Hallux Valgus.