

Student Exam No:

GANPAT UNIVERSITY
B.Tech. Semester VII (BM&I) Regular Examinations Nov/ Dec 2014
2BM 702 Biomechanics

Time:- 3 Hours

Marks:- 70

Instructions:

1. Answer to the questions must be written in separate answer books.
2. Figure to the right indicate marks.
3. Assume data, if needed.
4. Conventional terms / notations are used.
5. All the questions are compulsory.

SECTION-I

Q.1

- (a) What is musculotendinous unit? Explain all the behavioral properties of the musculotendinous unit. 4
- (b) Explain all transverse plane and saggital plan movements in detail with neat diagram. 5
- (c) Write a short note on muscle fatigue. 3

OR

Q.1

- (a) Explain the isometric contraction and eccentric contraction in detail 4
- (b) Draw and explain different types of mechanical loads on the human body. 4
- (c) Write a short note on loads on the knee joint. 4

Q.2

- (a) Define moment arm. How does moment arm affect the ability of a force to rotate a segment? 4
- (b) How much tension may be developed in muscles with the following cross sectional areas: i) 2cm^2 ii) 20cm^2 4
The tension generating capability of muscle tissue is 90 N/cm^2
- (c) How much torque is produced at the elbow by the biceps brachii inserting at an angle of 60° on the radius when the tension in the muscle is 400N ? (Muscle attachment to the radius is 2 cm from the centre of rotation of the elbow joint) 3

OR

Q.2

- (a) Construct a chart listing all muscles crossing the hip joint according to whether they are anterior, posterior, medial or lateral to the joint centre. 4
- (b) Enlist the types of lever. Explain each type with neat diagram and example. 7

Q.3

- (a) Write a short note on movements on ankle joint. 5
- (b) How much force must be produced by biceps brachii attaching at 80° to the radius at 2.5 cm from the centre of rotation at the elbow joint, to support a weight of 100N held in the hand at a distance of 25 cm from the elbow joint? Calculate the force at 20° and 120° . Write your comment for both these angles considering physiological relevance. 7

SECTION-II

Q.4

- (a) Draw and explain the different phases of GAIT cycle. 6
- (b) Explain in detail the factors that affect the generation of muscle force. 6

OR

Q.4

- (a) Write a short note on structure of the knee joint. 6
- (b) Draw and enlist the different muscles in the body. 6

Q.5

- (a) Draw the structural organization of skeletal muscle. Explain what happens at sarcomere level when muscle contracts. 6
- (b) Explain structure of shoulder in detail. 5

OR

Q.5

- (a) Write a short note on types of fracture. 6
- (b) Draw and explain the loads on the shoulder joint. 5

Q.6

- (a) What is centre of gravity of a human body? Explain the reaction board method to locate the centre of gravity of a human body. 6
- (b) Draw and explain the loads on the ankle joint. 6

----- END OF PAPER -----