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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER- VI (New) EXAMINATION - WINTER 2019

Subject Code: 2160308 Date: 11/12/2019

Subject Name: Biomechanics

Time: 02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. Attempt all questions.

- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.

| | | | MARKS |
|------------|------------|---|-------|
| Q.1 | (a) | Explain terms: a) viscoelasticity b) Anisotropy c) Deformation | 03 |
| | (b) | Define moment of inertia. | 04 |
| | (c) | Explain structural and mechanical property of muscles. | 07 |
| Q.2 | (a) | Explain briefly scalar and vector mechanics. | 03 |
| | (b) | Define: 1) Coplanar Forces 2)Collinear Forces 3)Concurrent Forces 4) Parallel Force | 04 |
| | (c) | Explain mechanical properties of hard tissue. | 07 |
| | (0) | OR | U/ |
| | (c) | Explain mechanical properties of soft tissue. | 07 |
| Q.3 | (a) | What do you mean by Fatigue Failure of Bone? | 03 |
| | (b) | Discuss biocompatibility of orthopedic implants. | 04 |
| | (c) | List and explain the rheological properties of blood. | 07 |
| | . , | OR | |
| Q.3 | (a) | Explain solid and fluid frictional force. | 03 |
| | (b) | Explain structural difference between ligaments and tendons with | 04 |
| | | figure. | |
| | (c) | Explain biomechanics of heart valves with necessary derivations. | 07 |
| Q.4 | (a) | State Bernoulli's principle. | 03 |
| | (b) | Discuss characteristics of a muscle of Hill's muscle model. | 04 |
| | (c) | Explain the applications of gait and locomotion analysis. | 07 |
| | | OR | |
| Q.4 | (a) | Discuss laminar flow versus turbulent flow. | 03 |
| | (b) | Explain accelerometry in GAIT motion. | 04 |
| | (c) | Describe the characteristics of Shoulder, elbow and wrist joints. | 07 |
| Q.5 | (a) | Explain Hagen-poiseuille equation. | 03 |
| | (b) | Give equations for skeletal muscle stress and strain characteristics. | 04 |
| | (c) | Explain mechanism of respiratory cycle. | 07 |
| | | OR | |
| Q.5 | (a) | What is its importance in fluid mechanics? | 03 |
| | (b) | Write a short note on ankle joint. | 04 |
| | (c) | Explain dynamics of total hip prosthesis. | 07 |
