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MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

III SEMESTER B.Tech.(BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2018-19 SUBJECT: BIOMECHANICS (BME 2104) (REVISED CREDIT SYSTEM) Wednesday, 2nd January 2019: 9 am to 12 noon

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to Candidates:

1. Answer all the questions.

- 2. Draw labeled diagrams wherever necessary.
- 1. (a) How do you calculate the resistance of RBCs in a very narrow blood vessel using the 03 inversion of Fahraeus-Lindquist effect?
 - (b) Provide an example for casson fluid and also derive the casson's equation for that 03 fluid.
 - (c) Obtain the differential equation for the mechanical model (used to measure the viscoelasticity of materials) which responds well with both creep and relaxation functions.
- 2. (a) Draw the rheological diagram for different types of fluids and explain them. 03
 - (b) Obtain the equation to calculate the diffusion capacity of the respiratory membrane 03 used for the exchange of gases.
 - (c) Explain about the blood vessel wall materials that play a major role in determining the 04 mechanical properties of the blood vessels.
- 3. (a) What is peripheral resistance that is experienced in the vascular tree? Which part of 05 the vascular tree experiences maximum peripheral resistance? Justify with appropriate reasons.
 - (b) What are the types of muscle tension? Explain them and make a comparison of them. 05

4.	(a)	Draw the gait cycle and write about the phases and sub-phases of the gait cycle.	03
	(b)	Provide an example to explain the order in which the motor units get activated and deactivated.	04
	(c)	Draw the structure of cancellous bone and explain it in detail.	03
5.	(a)	Explain how do you measure skin firmness. Also write about the intrinsic parameters that determines the firmness of the skin.	05
	(b)	Draw the stress-strain diagram for tendon and ligament. Mention its structural	05

properties. Also, explain the reason for the non-linear part of the diagram.