Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University, Manipal – 576 104

6th SEMESTER B.Tech. (BME) DEGREE MAKE-UP EXAMINATIONS, JUNE/JULY 2016

SUBJECT: BIOFLUIDS & BIOMECHANICS (BME 320)
(REVISED CREDIT SYSTEM)
Wednesday, June 29th, 2016 : 2.00 pm - 5.00 pm

TIME: 3 HOURS **ANSWER ANY FIVE FULL QUESTIONS** **MAX. MARKS: 100**

1. (a) Why RBCs are highly deformable compared to other cells? [2]

   (b) Explain about plasma skimming. [4]

   (c) Explain why aorta and vene cava are called as pressure and volume reservoirs respectively? [6]

   (d) Draw the rheological diagram showing various types of fluids and explain them. [8]

2. (a) What happens to the hematocrit when it has to flow through blood vessels of unequal diameters? [2]

   (b) Define the features of viscoelasticity. [4]

   (c) By considering the blood composition, describe why blood is a Non-Newtonian fluid. [6]

   (d) Write about the viscoelastic nature of sputum and cervical mucus. [8]

3. (a) How much is the airway resistance in the upper and terminal airways? [2]

   (b) What are the clinical applications of Blood Rheology? [4]

   (c) Explain the various types of stress and strain. [6]

   (d) How does thrombosis and thromboembolism affect the fluid dynamics of prosthetic valves? [8]

4. (a) Write a note on congestive heart failure. [2]

(b) Explain the measuring principle of Cutometer. [4]

(c) What are the three wall materials of the blood vessels? Explain them in detail. [6]

(d) Draw the structure of collagen and explain it in detail. [8]

5. (a) What causes diastolic murmur? [2]

(b) Bone is an anisotropic material and its mechanical behavior depends upon the direction of loading. Comment on it. [4]

(c) Draw the stress-strain diagram of trabecular bone and explain it in detail. [6]

(d) Define the temporal parameters of a gait cycle. [8]

6. (a) How do the slow twitch and fast twitch muscle fibers handle a prestretch? [2]

(b) Write the functions performed by a muscle. [4]

(c) With appropriate examples, write about the muscle action that creates, opposes, stabilizes and neutralizes movements. [6]

(d) Explain in detail, the process of muscle excitation-contraction coupling. [8]