

Evening

Date: - 1/12/2014.

Student Exam No:

GANPAT UNIVERSITY
B.Tech. Semester V (BM&I) Regular Examinations Nov/ Dec 2014
2BM 505 Cardiovascular System and Dynamics

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) Explain "Power Law Constitutive model for Blood". [6]
(b) Derive the expression for Newton's law of Viscosity. [6]

OR

Q.1

- (a) Write a short note on Pulsatile flow in elastic channel. [4]
(b) Define blood and write a short note on 'Blood Hematology'. [8]

Q.2

- (a) Explain the following terms. [6]
I. Pseudo plasticity
II. Deformation
III. Non Newtonian fluid
(b) Write a short note on Wind kessel model. [5]

OR

Q.2

- (a) Describe the Poiseuille's law and its significance in different blood vessels. [6]
(b) What is Reynolds number? Calculate the Reynolds number in human aorta at rest with a cardiac output of 6 litre/min. Based on the Reynolds number, define the type of blood flow. (Given: Diameter of aorta is 2.5 cm, blood density is 1.07 gm/cm^3 and viscosity is 0.04 Pa.s) [5]

- Q.3** Answer the following:
- (a) Derive the generalized Bernoulli's equation for pressure and flow in blood vessel. Explain its physiological and clinical relevance. [6]
- (b) What is cardiovascular systems & dynamics? Discuss the scope of the subject. [6]

SECTION-II

- Q.4**
- (a) What is laminar flow and turbulent flow? How does laminar flow turn to turbulent flow? Explain the importance of laminar flow. [6]
- (b) Draw and explain the pressure variations in the systemic circulation. [6]

OR

- Q.4**
- (a) Explain the mechanical events in cardiac cycle. [6]
- (b) Write a short note on hemodynamic in vascular channel. [6]

- Q.5**
- (a) Define shear stress and shear strain of human blood. [6]
- (b) What is Strouhal number? Derive the equation for kinetic reynold number. [5]

OR

- Q.5**
- (a) Define the stenosis. Explain with diagram the effect of aortic stenosis on P-V loop of left ventricle. [5]
- (b) Explain the following terms: [6]
- Viscosity
 - Bingham Plasticity
 - Dicrotic notch

- Q.6** Answer the following:
- (a) For one complete cardiac cycle of heart, explain electrical impulse conduction system with diagram. [6]
- (b) Draw and explain the ECG waveforms for different heart related diseases. [6]

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