

Student Exam No: _____

GANPAT UNIVERSITY
B.TECH SEM. VI BIOMEDICAL & INSTRUMENTATION ENGINEERING
REGULAR EXAMINATION MAY/JUNE-2012
BME-603: CARDIOVASCULAR SYSTEM & DYNAMICS

TIME: 03 HOURS

TOTAL MARKS-70

- INSTRUCTIONS: -
- 1 All the questions are compulsory.
 - 2 Figure to the right indicates full marks.
 - 3 Answer to each section must be written in separate answer sheet.
 - 4 Assume suitable data if necessary.

SECTION-I

- Que.-1 12
- (a) With diagram explain the electrical system & conduction electrical impulse in heart.
 - (b) Explain the various phases of P-V loop for left ventricle during cardiac cycle.
- OR
- Que.-1 12
- (a) Explain the Mitral stenosis and its effect on P-V loop with diagram.
 - (b) Give the independent effect of pre load and after load on ventricular P-V loop.
- Que.-2 11
- (a) How are the heart valves operated? With diagram explain the three experiments that show operation of heart valve.
 - (b) Write the equation of Newton's law of motion applied to a fluid & explain the importance of each terms
- OR
- Que.-2 11
- (a) With equation explain that the deceleration of fluid causes the positive pressure gradient. Also give example of heart valve closer using same principle.
 - (b) Give the length-tension relationship for cardiac muscle.
- Que.-3 12
- (a) Write short note on Importance of turbulence.
 - (b) 1) Define the following terms
 - i) Conservation of mass
 - ii) Conservation of momentum
 - 2) Draw the P-V loop and explain the stroke work and cardiac work

SECTION-II

Que.4 12

- (a) Write short note on:
(1) Viscosity of Blood
(2) Poiseulle's Law
- (b) What are the types of arteries according to their functional characteristics? Explain in brief.

OR

Que.4 12

- (a) Discuss the law of conservation of mass, energy and momentum in view of the cardiovascular system.
- (b) Draw and explain any one method of measuring Blood Viscosity.

Que.5 11

- (a) Enlist and explain the types of fluid with the help of examples.
- (b) Describe following terms in brief:
(1) Atherosclerosis
(2) Stenosis
(3) Aneurysm
(4) Thrombosis
(5) Coronary Artery Bypass Grafting

OR

Que.5 11

- (a) List the elements of blood and describe each element in detail.
- (b) Describe the Fahraeus Lindqvist effect.

Que.6 12

- (a) Using the Einstein equation to predict viscosity as a function of a hematocrit and temperature,
(1) Calculate the viscosity of blood at 35⁰C using hematocrit of 45% and a plasma viscosity of 1.24×10^{-3} NS/ m².
(2) Calculate the viscosity of blood at 35⁰C using hematocrit of 65% and a plasma viscosity of 1.24×10^{-3} NS/m²
(3) State the effect of increase in hematocrit on the viscosity of blood.
- (b) Fluid is flowing through a pipe having diameter 20cm and 10cm at section 1 and section 2 respectively. The rate of flow through pipe is 35 liters/s. The section 1 is 6m above datum and section 2 is 4m above datum. If the pressure at section 1 is 39.24 N/cm². Find the intensity of pressure at section 2.

'END OF PAPER'