

GUJARAT TECHNOLOGICAL UNIVERSITY**ME Semester –III Examination Dec. - 2011****Subject code: 733102****Date: 08/12/2011****Subject Name: Cardiovascular Mechanics****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Describe the diagrammatic model of major components of healthy elastic artery. **07**

(b) Draw the structure of human cardiac muscle. Explain in detail ERP, RRP and SNP for myocardial cell **07**

Q.2 (a) Explain structure and function of heart. **07**

(b) What is MCV? A patient has a hematocrit of 23 percent red blood cells and if that same person has 8 million red blood cells in each cubic millimeter of blood. Estimate the MCV. **07**

OR

(b) What is MCH? A patient has a hemoglobin concentration of 13 g per 100mL of whole blood and also has three million red blood cells in each mm³ of blood. Estimate the MCH. **07**

Q.3 (a) Give the differences between Stress-strain characteristics for a linearly elastic material and an artery. Justify your answer with proper reasons. **07**

(b) What is LST? Describe diagrammatically the principle of LST. Also explain the schematic of LST system. **07**

OR

Q.3 (a) What do you mean by “compliance”? Represent its modeling by diagrammatically and mathematically. **07**

(b) What is HRV? Give any method to estimate frequency and amplitude of LF and HF components of it. **07**

Q.4 (a) Explain the modeling of pulsatile flow in rigid tubes with Fry Solution. **07**

(b) Write a short note on Arrhythmia and myocardial diseases. **07**

OR

Q.4 (a) Explain the modeling of pulsatile flow in rigid tubes with Womersley Solution. **07**

(b) Write a short note on heart valve diseases. **07**

Q.5 (a) Describe diagrammatically and mathematically, electrical analog model of flow in a tube. Also describe equations for each node and terminal node. **07**

(b) Write a short note on heart sounds. **07**

OR

Q.5 (a) Describe diagrammatically and mathematically, flow through mitral valve. Also describe active ventricular relaxation and convective resistance. **07**

(b) Give the relation of EKG with pressure related to heart. **07**
