Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech(BME)/SEM-2/MBMI-204-C/2012

2012

ARTIFICIAL DEVICES FOR CARDIOVASCULAR AND RENAL ABNORMALITIES

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* questions. 5 × 14 = 70

1. What do you understand by artificial heart values ? Differentiate between mechanical and bio-engineered heart valves. While designing an artificial heart valve what are the factors responsible for the effectiveness of the heart valve.

4 + 5 + 5

2. With the help of a neat sketch, describe the functioning of a homodialyzer. What is CRRT ? What are the different parameters to be monitored during the functioning of a Hemodialyzer. How do you measure the effectiveness of a hemodialysis machine ? 4 + 3 + 5 + 2

3. With the help of a neatly labelled diagram explain the functioning of an Artificial Heat-Lung machine. What are bubble oxygenators and how do they function ? Between bubble and membrane oxygenators which one is functionally more effective and why ? 4 + 5 + 5

4. How do you measure Arterial Pump Flow Rate ? What are Priming Fluids and why are they essential ? What are the factors essential for the selection of priming fluids. How do the composition of the priming fluids vary depending on thire functionalities ? 3 + 4 + 3 + 4

5. Describe the anatomy of the kidney. What are Renal Function Tests. Discuss the complications arising from chronic renal failure and the possible measures to overcome them. 5 + 5 + 4

6. What are the different abnormalities which may arise due to loss in the rhythmicity of the heart and interpret their recordings in the ECG. What is vector cardiography and what are cardiac vectors ? Explain. 8 + 3 + 3

7. Discuss the physiology of micturition. What do you understand by Renal Ultrafiltration. What is peritoneal dialysis and when is it used ? 8 + 4 + 2