

GANPAT UNIVERSITY
B. TECH SEM- V (BM&I) REGULAR EXAMINATION- NOV-DEC 2016
2BM505 : Cardiovascular System & Dynamics

TIME: 3 HRS

TOTAL MARKS: 60

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
 (2) Figures on right indicate marks.
 (3) Be precise and to the point in answering the descriptive questions.

SECTION: I

- Que.01** **Answer the following questions.** **[10]**
- a) Which factors affects stroke volume? 2
- b) Draw and explain pressure, flow and resistance relationship of blood circulation? 2
- c) What are the major vessels of the heart? 2
- d) Explain in detail the frank sterling law of the heart. 4

OR

- Que.01** **Answer the following questions.** **[10]**
- a) Draw a flow diagram explaining regulation of cardiac output. 3
- b) Explain fluid exchange across capillary wall. 3
- c) Draw a graph and explain cardiac action potentials of conducting tissue and ventricular muscle. 4

- Que.02** **Answer the following questions.** **[10]**
- a) Explain the terms elasticity, Hook's law and young's elastic modulus. 3
- b) Give an explanation for hemolysis and types of hemolysis. 3
- c) Explain poiseuille's equation with necessary figures for blood viscosity and fluid flow 2
- d) Draw and explain a pathway of blood from heart through lungs. 2

OR

- Que.02** **Answer the following questions.** **[10]**
- a) Write short note on elements of blood? 3
- b) What is ejection fraction? 1
- c) Draw and explain the phases of cardiac cycle. 3
- d) Give characteristics of turbulent flow. 3

- Que.03** **Answer the following questions.** **[10]**
- a) Choose the correct answer from the given multiple choice questions: 5
1. Coefficient of friction for laminar flow is given as
 Where, $Re = \text{Reynold's number}$:
 (a) $(Re / 32)$ (b) $(32 / Re)$ (c) $(Re / 16)$ (d) $(16 / Re)$
2. Bernoulli's equation cannot be applied when the flow is
 (a) rotational (b) turbulent (c) unsteady (d) all above
3. If the Reynolds number is less than 2000, the flow in a vessel is
 (a) Turbulent (b) Laminar (c) transition (d) None of above
4. Blood returning to the heart from the inferior vena cava would enter the:
 (a) Left atrium (b) Left ventricle (c) Right atrium (d) Right ventricle
5. The stress strain relationship of Newtonian fluid is
 (a) Linear (b) Parabolic (c) Hyperbolic (d) Inverse type
- b) What is cardiac output and what is cardiac reserve? 2
- c) Draw a schematic diagram of Factors involved in regulation of cardiac output. 3

SECTION: II

- Que. 04** **Answer the following questions.** **[10]**
- a) Give the analogy between fluid mechanics and circuits. 3
 - b) Describe the sequence of excitation of heart. 3
 - c) If someone's heart has a stroke volume of 70 ml and a heart rate of 90 beats/minute, the cardiac output would be _____ . 1
 - d) What is Rheology? 1
 - e) What is the difference between Laminar and turbulent fluid flow? Explain with some examples. 2

OR

- Que. 04** **Answer the following questions.** **[10]**
- a) What is the structure and function of arterioles? 3
 - b) What is compliance? 1
 - c) Give Physiological Examples of Bernoulli's principle 3
 - d) Define flow and perfusion. 3

- Que. 05** **Answer the following questions.** **[10]**
- a) Give the electrical circuit equivalence for windkessel effect and discuss the models. 4
 - b) Draw a graph and explain cardiac action potentials of conducting tissue and ventricular muscle. 4
 - c) What is the size and location of the heart? 1
 - d) The spread of cardiac excitation is delayed by about 0.1 s at the atrio-ventricular node. True or false? 1

OR

- Que. 05** **Answer the following questions.** **[10]**
- a) How blood pressure is regulated? Explain in detail 3
 - b) Factors determining the rheological properties of blood. 3
 - c) Draw the graph of action potentials of pacemaker and heart 2
 - d) Give the names of heart valves with their functions. 2

- Que. 06** **Answer the following questions.** **[10]**
- a) What is the difference between plasma and serum? 2
 - b) Describe the Factors determining ESR(erythrocyte Sedimentation rate). 4
 - c) Which are the erythrocyte indices? 2
 - d) What is the importance of windkessel effect? 2

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