2009

M.Sc.

1st Semester Examination

HUMAN PHYSIOLOGY

PAPER—II

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Unit—03

Answer any *two* questions.

1. Describe the microstructure and function at gas exchange are in lung. 10

2. (a) Why do the velocities of a flow at various parts of vascular bed varies when the flow rate remains the same? What is its biological significance?

   (b) In an experiment on the flow of a liquid through a capillary tube, the following data were obtained.

   Length of tube = 25 cm, radius = 1 mm

   Volume of liquid issuing per min = 15 ml.

   Head of liquid = 30 cm.

   Now if the density of the liquid is 2·3 gm/cc. calculate the viscosity. (4+2)+4

3. What is viscosity ? How it is related with shear stress. What do you mean by Reynolds' number. With suitable model diagram explain the Bernoulli's equation. 1+3+2+4

4. (a) The mean pressure in the artery supplying a given organ is 100 mm Hg, the mean pressure in the vein draining it is 10 mm Hg and the blood flow through the organ is 600 ml/min. What is the vascular resistance accross the organ (in R unit)?

   (b) Estimate the mean pressure in the large artery in the head situated 50 cm above the heart in a adult human in upright position, when the mean arterial pressure at heart level is 100 mm Hg.

   (c) In an experiment on the flow of liquid through a capillary tube, the following data were obtained.
   - Length of the tube = 25 cm
   - Radius = 1 mm
   - Volume of liquid issuing per min = 15 ml
   - Head of liquid = 30 cm

   Now, if the density of liquid is 2.3 g/cc, calculate the viscosity. 3+3+4

Unit—04

Answer any *two* questions.

1. (a) Describe the construction of an ultrasound transducer.

   (b) Describe briefly the process of recording of echocardiograph. 4+6

2. (a) Why an artificial pacemaker is used?

   (b) Describe the working principle of demand pacemaker. 4+6

3. (a) Discuss the construction of a x-ray tube.

   (b) Describe the process of CT Scan.

   (c) Illustrate the types of detectors used in CT Scan 3+4+3

4. (a) Discuss the principles of NMR imaging system.

   (b) What do you mean by FID?

   (c) What are basic NMR components? 4+4