

Question Paper

Exam Date & Time: 29-Nov-2022 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

MANIPAL INSTITUTE OF TECHNOLOGY
FIFTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV/ DEC 2022

BIOMEDICAL INSTRUMENTATION-II [BME 3152]

Marks: 50

Duration: 180 mins.

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

- 1) What is the purpose of an oxygen therapy unit? Illustrate the parts and working of the oxygen therapy unit in detail. (5)
 - A)
 - B) Differentiate 'Fleish type' from 'Lilly type' of pneumotachometer. Mention the drawbacks of these pneumotachometers. (3)
 - C) Differentiate the different types of gas regulators. (2)
- 2) Illustrate with a neat figure, the working principle of Cathode Ray Tube used as display in ultrasound. (5)
 - A)
 - B) Compare percutaneous ultrasonic lithotripsy from water-bath lithotripsy. (3)
 - C) If an ultrasonic beam has an original intensity of 10W/cm^2 and the returning echo is 0.001W/cm^2 , what will be their relative intensity? (2)
- 3) Illustrate with a figure, the principle and the instrumentation involved in the Atomic absorption spectroscopy. (4)
 - A)
 - B) Compare the different oxygenators used in the heart- lung machine. (3)
 - C) In a blood cell coulter counter, the threshold is set to zero and the output display reads 5.31×10^{12} / liter. The threshold is then set to T1 and the output reading becomes 5.18×10^{12} / liter. The threshold is then set to T2 and the display shows 0.18×10^{12} / liter. Find the count of RBC, WBC and platelets in units of cells/ liter. [Assume: $0 < T1 < T2$] (3)
- 4) Is thermography considered a good imaging modality for early diagnosis of cancer? Give reasons. (4)

With a neat figure, explain the thermography equipment in detail.

 - A)
 - B) Determine the advantages of placing the vaporizer within the circle circuit of the anesthesia machine, and also explain the characteristics of plane-2 of surgical anesthesia. (4)
 - C) Give reason: Image quality of the fiber-optic endoscopes, is not better than a rigid lens system. (2)

- 5) Give reasons for the failure of the coil type and parallel plate dialyzer and explain with a neat figure, (5)
the most effective design of the hemodialyser.
- A)
- B) Illustrate with a neat figure, how laser can be used to count the blood cells. (3)
- C) Differentiate cutting mode from coagulation mode in Electrosurgical Unit (ESU). (2)

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