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**MANIPAL INSTITUTE OF TECHNOLOGY**  
(A constituent unit of MAHE, Manipal 576104)

**VII SEMESTER B. TECH (BME) DEGREE END-SEM EXAMINATIONS DEC/JAN 2020-21**

**SUBJECT: MEDICAL EQUIPMENTS (BME 4103)**  
(REVISED CREDIT SYSTEM)

**Monday, 28<sup>th</sup> December 2020: 2 PM to 5 PM**

**TIME: 3 HOURS**

**MAX. MARKS: 50**

**Instructions to Candidates:**

1. Answer ALL questions.
2. Draw diagram wherever necessary.

1. (a) Explain the two conditioning units used in the oxygen therapy units. (3)
- (b) With neat figures, explain the working principle of manual artificial ventilators. (3)
- (c) Explain an indirect technique for the measurement of respiration. (4)
2. (a) What is 'masking' in audiometry? Mention the characteristics of the different types of masking noise used in audiometry. (1+2)
- (b) Identify and explain a type of hearing aid that can be used to aid patients with sensory neural hearing loss. (4)
- (c) What are the different ways in which heat loss can take place from the body of neonates? What are the factors to be considered to minimize heat loss from the infant's body? (3)
3. (a) Differentiate forward-view from lateral-view endoscopes. Identify the specific application of each of these endoscopes (i) cystoscope (ii)Otoscope (2+1)
- (b) Explain the parts of an electrosurgical unit and describe any two modes of operation of ESU. (2+2)
- (c) Explain the circle-circuit anesthesia machine in detail. (3)

4. (a) Define hematocrit. With a neat figure, explain the principle of coulter-counter method of blood cell counting. (1+4)
- (b) If an ultrasound beam with initial intensity of  $12\text{mWcm}^{-2}$  is reduced by 3dB, what is its final intensity? Also, explain the spatial and temporal variations in the ultrasound beam. (2+3)
5. (a) Explain the features of an ideal Heart-Lung machine. List the advantages of using the membrane oxygenators over the other types of oxygenators. (3+2)
- (b) With a neat figure, explain the hemodialysis machine in detail. (5)