

## II SEM M. Tech (Medical Informatics) DEGREE END SEMESTER EXAMINATIONS, MAY/JUNE-2023 SUBJECT: DIGITAL PATHOLOGY AND DIGITAL IMAGING (BME 5013) (REVISED CREDIT SYSTEM)

Wednesday, 31st May 2023; 9.30 AM – 12.30 PM

## TIME: 3 HOURS

MAX. MARKS: 50

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## Instructions to Candidates:

## **1.** Answer ALL questions.

2. Draw labeled diagrams wherever necessary.

- 1A Consider an example of a Cytopathological research problem Automatic Cervical cell 5 image grading. In this scenario, "deep learning can provide better performance than machine learning." Justify your answer.
- **1B** Illustrate the concept of the Image pyramid in whole slide imaging and explain its 3 significance.
- **1C** Differentiate Radiology and Digital Pathology.
- 2A Consider a Hematopathological research problem, and illustrate how machine learning 5 can automatically detect the disease from digital microscopic blood smear images.
- **2B** Explain various modes and applications of telepathology.
- **2C** Articulate the role of the DICOM supplement 145 in managing Whole Slide Images. 2
- **3A** "There are major obstacles to the widespread adoption of digital pathology." Justify 3 your answer.
- **3B** Distinguish digital slides and glass slides.
- **3C** Determine the drawbacks of symmetric key encryption. Explain how public key 5 encryption can be done along with the authentication of data.
- **4A** Determine the advantages of the fifth-generation CT machines over the previous CT 5 geometries used and explain the fifth-generation CT in detail.

4B	Illustrate with a neat figure the parts and working of thermography equipment. Also,	3
	compare the different detectors used in thermographs.	
4C	It takes 0.2ms for the sound from the ultrasound probe to travel to a baby's heel and	2
	back again. If the sound travels at 1540 m/sec inside the body, calculate how far is the	
	baby's foot below the mother's skin.	
5A	What are radioisotopes? Explain the principle of PET scan in detail.	5

- **5B** Contrast direct and indirect flat-panel detectors (FPDs) and explain the working of 3 direct FPD.
- **5C** Illustrate, with an example, how the slice thickness is determined in MR imaging. 2

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