



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

**VI SEMESTER B.TECH. EXTERNAL EXAMINATIONS END SEM APRIL 2018**

**SUBJECT: DIGITAL MEDICINE [IIE 5202]**

**Date of Exam: 30/04/2018 Time of Exam: 9.00 AM – 12.00 PM Max. Marks: 50**

**Instructions to Candidates:**

- ❖ Answer ALL the questions & missing data may be suitable assumed
- ❖ Please note that this is a lengthy paper and be crisp with your answers to complete it.

1A.	Give a brief history of genomics.	2
1B.	Draw and describe the genetic blue print of the DNA.	2
1C.	What is the gene in the DNA and what are its features?	2
1D.	What are the changes in a DNA? What diseases do they cause? How do we use ML & sequencing to identify them?	2
1E.	What are the technologies to cause changes in the DNA?	2
2A.	Compare the Human Brain & the computer.	2
2B.	What is Roger Penrose hypothesis on functioning of the brain?	2
2C.	What is Singularity? What are your views on brain/computer (machine) singularity?	2
2D.	Describe agents, agency, k lines, nemes & nomes and how they work as describe by Prof. Marvin Minsky in his books "Society of the minds"?	4
3A.	What are the different types of Clustering?	2
3B.	In K means clustering what role does a centroid play. Explain	2
3C.	What are the steps in K means clustering?	2
3D.	Define in detail the sum of squared error formula for defining the convergence criteria for squared error?	2
3E.	What is the weakness & strength of K means?	2
4A.	Briefly describe the Bayes theorem and how does it contrast to a "frequentist" model	2
4B.	What is prior in a Bayes Model?	2
4C.	Describe the Bayes theorem mathematically?	4
4D.	How is Bayes applied to medicine?	2
5A.	What is an artificial neural network? What is the concept?	2.5
5B.	Draw and explain the general model of an ANN?	2.5
5C.	What are the different types of network? Elaborate.	2.5
5D.	What is back propagation in ANN?	2.5