MANIPAL UNIVERSITY, MANIPAL – 576 104
MANIPAL INSTITUTE OF TECHNOLOGY (M I T)
DEPARTMENT OF BIOTECHNOLOGY

OPEN ELECTIVE

IIE 502: DIGITAL MEDICINE

Time: 3 hr *Max. Marks: 50*

Question 1 is compulsory. Answer any 4 from Q2 to Q6. Each question carries 10 marks.
(5 x 10 = 50)

1. General

a) What are IMR, MMR & HDI?
b) What is the current status of health care in India, its limitation and what do we need?
c) Talk about longevity trends and what that means for health care.
d) What are 4 digital forces that will transform the delivery of health care and how? Please explain.

2. Computing

a) What is Von Neumann architecture? Please explain.
b) What is 1 tier, 2 tier, 3 tier software architecture? Please explain.
c) What is software development life cycle (SDLC)? Explain the waterfall model and Agile model.
d) What are the maturity levels in software development? What is CMM?
e) Draw a table comparing the evolution of 5 generations of SW & HW in brief.

3.

a) What is COTS? Please explain.
b) What is cloud computing? What are its benefits?
c) What is IOT? Please explain its relevance to digital medicine.
d) What are features, features vector & training set in machine learning.
e) Describe in detail various techniques in Machine learning.

4. Imaging Informatics

a) Define medical imaging & Imaging informatics.
b) What are the basic modalities of imaging? List and describe them briefly.
c) What is Biomedical Image Management? Explain PALS.
d) What is the Standard for data format in PALS? What are the open source software available for processing medical images? Describe them.
e) Describe Tomography & its variants.

5. Wearables

a) What are Wearables and what are the attributes of wearable computers?
b) What are the 6 categories of wearables? Describe with use cases.
c) What are the technology forces driving growth of wearable technology?
d) List the 5 factors shaping wearables and describe them.

e) Describe 2 wearables in detail for different parts of the body with different uses.

6.

a) What is DNA? What are the 4 base nucleotides found in DNA?
b) What is DNA sequencing? Why is it required? What are its uses?
c) What does amazon web services offer for bioinformatics and genomics?
d) What is EHR? What are its benefits?
e) Draw the IT architecture of a typical EHR system and explain it.