Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
JANUARY/FEBRAURY 2021
SUBJECT: EMBEDDED NETWORKING (ECE - 4002)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. Assume that the master is communicating with the slave (address is 0x69) device using I2C protocol. The master writes a command/data byte 0xA5 to slave followed by reading a data 0x8D. Describe the steps involved in this communication and also write the waveform to show the data transfer between them along with necessary conditions.

1B. Consider the application in which the primary computer wanted to receive/send data/command from/to the secondary computer located far away. Mention the type of communication standard suitable for this application. Also describe the functions of each signals associated with the standard with neat interface diagram showing all the connection.

(5+5)

2A. In a given application, 4 nodes are connected by using a standard communication protocol with addresses 0x769, 0x3AD, 0x26C and 0x516 are trying to initiate communication simultaneously. Mention the protocol employed and also explain the process of contention resolution with neat timing diagram.

2B. Describe the methods used for speed identification of devices on the USB bus. Also mention the features of bulk data transfer type.

(5+5)

3A. Describe the method used in Ethernet to avoid the collision with example.

3B. Describe the following encoding techniques with neat waveform for the data 1011011001:

i. Block encoding
ii. Manchester encoding
iii. Multi-level encoding
iv. NRZI
v. NRZ

(5+5)

4A. Explain with neat diagram how an embedded system communicate with the internet using firewall for secure communication in the presence of multiple systems.

4B. Describe the different types of messages in Internet Control Message Protocol.

(5+5)

5A. Explain the following localization techniques in detail:
   i. Binary proximity
   ii. Radio signal based distance calculation

5B. Describe the following routing techniques used in WSN to enhance lifetime of sensor nodes.
   i. ETX metric based routing
   ii. Power aware routing

(5+5)