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

SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
MARCH 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 0x7A) device using I2C protocol. The master first writes a data byte 0x89 into a register (register address is 0x35) of slave followed by reading a data 0x1C. 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 using telephone lines. 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, 5 nodes are connected by using a standard communication protocol with addresses 0x269, 0x712, 0x116, 0x555 and 0x686 are trying to initiate communication simultaneously. Mention the protocol employed and also explain the process of contention resolution with neat timing diagram.

2B. What are the different types of data transfer scheme supported by USB. Describe two types in which one involve time as a critical factor and other uses to get immediate attention.

(5+5)

3A. With neat frame format describe the IEEE Ethernet frames.

3B. Describe in detail the following features of CAN bus: multi-master, protocol flexibility, remote transmit request and error detection

(5+5)

4A. Describe functions of each layer in the Ethernet protocol stack.

4B. Describe the sequence of operations performed by a computer to send and receive a message using UDP in an Ethernet network.

(5+5)

5A. Describe any five key design challenges needs to be addressed by any routing protocol.

5B. Describe the following w.r.t WSN:
   i. TDoA   ii. Principles of pull and push diffusion

(5+5)