

RAN-2511001104044001
B.Sc. (IT) (NEP) (Sem.- IV) Examination March - 2026
Minor - Fundamental of Embedded system and IoT (Paper - 402)
Time: 2 Hours]
[Total Marks: 50

સૂચના : / Instructions (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી. Fill up strictly the above details on your answer book	Seat No.: Student's Signature
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Q.1. Answer the following questions. (10)
Q.1. [A] Define the following terms [Any Five] [5]

- 1) "program status word (PSW)"
- 2) " simulator "
- 3) " Interrupt"
- 4) "RFID TAG "
- 5) "Special Function Registers(SFR)"
- 6) "Compiler"

Q.1. [B] Answer following questions in short [Any Five] [5]

- 1) What are the common challenges faced in embedded systems?
- 2) What is the role of embedded systems in consumer electronics?
- 3) Explain why microcontroller is more suitable for standalone Embedded system?
- 4) What is cost constraint in embedded systems?
- 5) What is the typical range of Bluetooth communication?
- 6) List out at least four applications of Embeddedsystem.

Q.2. Answer the following questions in detail (16)
Q.2. [A] Answer the following questions in detail [Any Two] [10]

- 1) Draw block diagram of Successive Approximation type Analog to digital convertor and explain temperature sensor in detail.
- 2) Write short note on SPI communication.
- 3) Develop program for 8051 micro controller to sense external interrupt from INT-1 pin. Configure Timer-0 in Mode-1 and configure timer-1 in mode-0 as a 13-bit timer and consider TH1 = 0xCD and TL1= 0x5A value. Configure Interrupt-1 and timer-1 priority as a highest priority. When timer-1 interrupt service routine is executed then make PORT-1 all pins are high. When INT-1 interrupt service routine is executed then make PORT-1 all pins are low. Write comments after each and every instruction to explain program logic

- Q.2. [B] Answer the following questions in brief [Any Two] [6]**
- 1) Define the Robotic Operating System (ROS) and explain its key features for use in embedded robotic systems.
 - 2) Explain static storage class with the help of appropriate c program and comments.
 - 3) Explain Right shift bitwise operator with the help of C program.
- Q.3. Answer the following questions in detail (16)**
- Q.3. [A] Answer the following questions in detail [Any Two] [10]**
- 1) What is actuator? Explain Humidity sensor and ultrasonic sensor in detail.
 - 2) Explain IP and TCON register of 8051 microcontroller.
 - 3) Consider a prefilled array of sensor data sensor_reading [] = {74,53,23,89,91,23}. Develop program for 8051 micro controller to sense external interrupt from INT-0 pin and write logic to sort & arrange an array in ascending order- Explain each and every line of program using comment.
- Q.3. [B] Answer the following questions in brief [Any Two] [06]**
- 1) List out different applications of RFID and explain any one application of RFID in detail.
 - 2) Describe how the 8051 microcontroller handles multiple simultaneously generated interrupt requests.
 - 3) Differentiate between timer mode and counter mode in the 8051. What is the role of the TMOD register in configuring a timer-0 as a counter?
- Q.4. Answer the following questions in detail (08)**
- Q.4. [A] write a short note on 8051 microcontroller. [05]**
- OR**
- Q.4. [A] Write short note on embedded system Development process. [05]**
- Q.4. [B] What ethical challenges arise during IoT system development and how can developers address them? [03]**
- OR**
- Q.4. [B] What is the role of embedded systems in Internet of Things (IoT) applications? [03]**
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