



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year: 2023-2024	Semester: IV
Class: SY	Program: B.Tech Electrical Engineering
Branch Code: ELE	Pattern: 2022
Name of Course: Microcontroller and Embedded Systems	Course Code: ELE222012
Max. Marks: 60	Duration: 2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains _____page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

- 1a) Draw and explain each bit of program status word (PSW) of 8051. (6) CO1

Question No. 2 Attempt following Question

- 2a) Differentiate between SJMP, LJMP and AJMP instruction set by using appropriate example. (6) CO1

Question No. 3 Attempt following Question

- 3a) What is pipelining? How does pipelining help in improving the speed of processors? Explain with a suitable example. (8) CO1

OR

- 3b) Differentiate between Harward and Von-Neumann architecture processors. (8) CO1

- 3c) Explain the special function registers available in the ARM architecture. (8) CO1, CO3

OR

- 3d) Differentiate between the ARM and Thumb instruction set (8) CO1, CO3

Question No. 4 Attempt following Question

- 4a) List and explain with examples the shift operators in the ARM architecture. (8) CO1, CO3

OR

- 4b) List and explain with examples the bitwise logical operations in the ARM architecture. (8) CO1, CO3
- 4c) Explain various functions available in the Interrupt library of ARM processors. Write a program to toggle a LED continuously after a delay of 50 seconds. (8) CO1, CO2

OR

- 4d) Explain various functions available in the PWM library of ARM processors. Write a program to generate a toggle signal of 50KHz frequency with a duty cycle of 50%. (8) CO1, CO2

Question No. 5 Attempt following Question

- 5a) To design an indicator for an electric meter to show the proper working, write an assembly language program to interface a LED at Port 1.3 of a microcontroller. Design a control logic to blink the LED after every 50 seconds indicating that the meter is working properly. Use Timers to generate the time delay considering appropriate clock cycle and mode of operation with a 12 Hz frequency. (8) CO4

OR

- 5b) In an automatic street light switching system, the light sensing circuitry will be connected to pin P1.3 such that it will be HIGH for low light or night condition. Write an assembly level program to operate a relay through a relay connected to pin P2.0. Also develop the respective algorithm. (8) CO4
- 5c) A home automation system is to be developed by using a microcontroller such that it will turn ON a light through a relay when a human motion is detected by the motion detector (LOW digital input). The light will be turned OFF when human absence is detected. (8) CO4

OR

- 5d) To measure the temperature of a room, you need to design a setup which requires a temperature (digital) sensor which is connected to a microcontroller. In this regard with help of block diagrams explain in detail the steps to interface a digital sensor with a microcontroller. (8) CO4

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