

**SET-1**

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| <b>Name:</b><br><b>Enrolment No:</b> |  |
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**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, May 2019**

**Course:** Microcontroller and Embedded Systems

**Semester: IV**

**Program:** B. Tech ASE+AVE

**Time 03 hrs.**

**Course Code:** ECEG3006

**Max. Marks: 100**

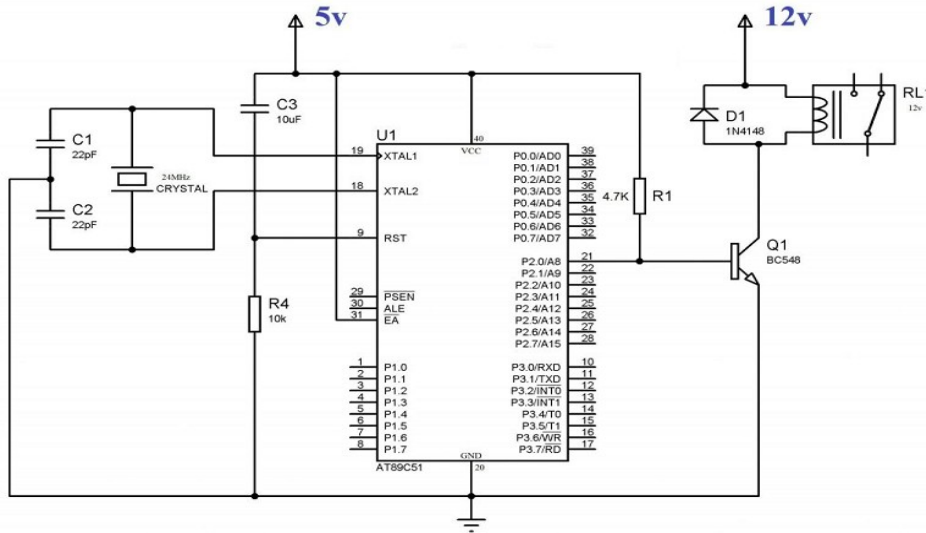
**Instructions:** Read and understand the questions before answering

**SECTION A**

| Q.No. | Answer all the questions   | Marks | CO  |
|-------|--|-------|-----|
| 1     | List different types of embedded systems with example for each.                      | 5     | CO1 |
| 2     | Why hardware software co-design is always advised in the design of embedded systems? | 5     | CO3 |
| 3     | What is the difference between pull-up and pull-down resistors?                      | 5     | CO2 |
| 4     | Differentiate between soft and hard RTOS with examples.                              | 5     | CO4 |

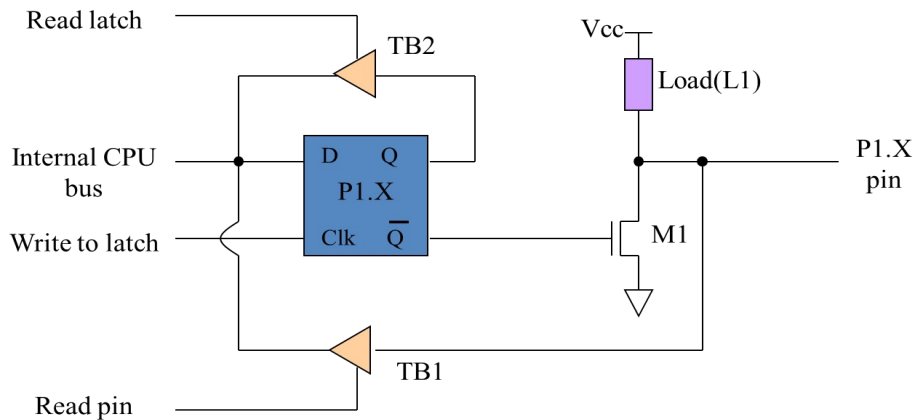
**SECTION B**

| Q.No. | Question 5, 6 and 7 are compulsory. Choice is there in question no 8.  | Marks | CO4 |
|-------|--|-------|-----|
| 5     | What are the different scheduling algorithms in RTOS, briefly explain each   | 10    | CO4 |
| 6     | Design a switch monitoring system using 8051. Assume that switch SW is connected to P1.1. Write the C program to monitor the switch and create the following frequencies on P2.1. Use timer 0<br>i) If SW= 0, Frequency = 250Hz<br>ii) If SW=1, Frequency = 500Hz                                  | 10    | CO3 |
| 7     | Differentiate between packed and unpacked BCD with examples. Write C program to convert a packed BCD number 29 to its ASCII equivalent and display the result on P1 and P2 of 8051 microcontroller.  | 10    | CO4 |
| 8     | Consider the following figure where a relay is interfaced P2.0 of 8051 microcontroller. Write a C program to switch the relay ON and OFF for five times with a delay of 1000ms between each switch. Also explain the use of transistor connected to P2.0 and the diode connected across the relay. | 10    | CO1 |



(OR)

Consider the given figure which represents is the hardware structure of I/O pin of 8051 microcontroller. Explain clearly the step wise procedure for reading 1 at Pin 1.X and writing 0 at Pin 1.X.



### SECTION-C

Question 9 is compulsory. Choice is there in question no 10.

**Marks**

**CO5**

9

Design an Analog-to-Digital converter system using 8051 controller. Use ADC0804, 8-bit single channel, parallel A-to-D converter. The 8-bit digital data to be read on P1 has to be converted to its ASCII form and sent to P3. Write the C program for the whole logic and draw the complete interfacing circuit.

20

CO4

10

Design a memory interfacing system for 8051 microcontroller to interface 16Kx8 of EPROM using 4Kx8 EPROM and 8Kx8 of RAM using 4Kx8 of RAM.


(OR)

Design a temperature monitoring system using LM35 temperature sensor and 8051 microcontroller. The temperature value to be read on P1 has to be converted to its ASCII form before displaying it on P2. Write the C program for the whole logic and draw the complete interfacing circuit.

20

CO3

**SET-2**

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|---|---|--|------------|
| <b>Name:</b><br><b>Enrolment No:</b>  |   |  |            |
| <b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b><br><b>End Semester Examination, May 2019</b>  |   |  |            |
| <b>Course:</b> Microcontroller and Embedded Systems<br><b>Program:</b> B. Tech ASE+AVE<br><b>Course Code:</b> ECEG3006<br><b>Instructions:</b> Read and understand the questions before answering |   | <b>Semester: IV</b><br><b>Time 03 hrs.</b><br><b>Max. Marks: 100</b> |            |
| <b>SECTION A</b>  |   |  |            |
| Q.No.   | Answer all the questions  | <b>Marks</b>   | <b>CO</b>  |
| 1   | What is the function of RS and Enable pins of a LCD?  | 5  | CO1        |
| 2   | What is the difference between <i>while(1)</i> and <i>for{ ; ; }</i> loops  | 5  | CO2        |
| 3   | Define embedded systems. List the different types of embedded systems   | 5  | CO3        |
| 4   | What is RTOS? Give any 4 examples of RTOS   | 5  | CO4        |
| <b>SECTION B</b>  |   |  |            |
| Q.No.   | Question 5, 6 and 7 are compulsory. Choice is there in question no 8.   | <b>Marks</b>   | <b>CO4</b> |
| 5   | What is the difference between the following operators used in C language?<br>i) & and &&    ii)   and       iii) = and ==    iv) < and <<    v) > and >>   | 10   | CO2        |
| 6   | Explain the function of below mentioned LCD commands<br>i) 0xC0    ii) 0x38    iii) 0x85    iv) 0x01    v) 0x05   | 10   | CO1        |
| 7   | Write an 8051 C program to toggle all the bits of P1 continuously with a delay of 50ms. Use Timer 0 in mode 2. Assume 11MHz crystal.  | 10   | CO3        |
| 8   | Draw and explain the format of TMOD and TCON registers of timers in 8051.<br><b>(OR)</b><br>Define task in RTOS. What are the different states of task explain with a neat sketch.  | 10   | CO4        |
| <b>SECTION-C</b>  |   |  |            |
|   | Question 9 is compulsory. Choice is there in question no 10.  | <b>Marks</b>   | <b>CO5</b> |
| 9   | Design a memory interfacing system for 8051 microcontroller to interface 8Kx8 of EPROM using 4Kx8 EPROM and 4Kx8 of RAM using 2Kx8 of RAM.  | 20   | CO3        |
| 10  | Design an Analog-to-Digital converter system using 8051 controller. Use ADC0808, 8-bit 8-channel, parallel A-to-D converter. Use any one out of 8 channels. The 8-bit digital data to be read on P1 has to be converted to its ASCII form and sent to P3. Write the C program for the whole logic and draw the complete interfacing circuit.<br><b>(OR)</b><br>In the design of a converter system using 8051 microcontroller, define what is packed and unpacked BCD and design a converter system that converts a 2-digit packed BCD to its unpacked form first and then to its ASCII form. Display the ASCII values on PORT1 and PORT2. Write the complete algorithm and its C code. | 20   | CO4        |