 

**KULLIYYAH OF ENGINEERING**

**MID-OF-SEMESTER EXAMINATION**

**SEMESTER 1, 2020/2021 SESSION**

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| Programme : | **Mechatronics Engineering** | Level of Study : | **UG 4** |
| Time : | **3.30 p.m. – 3.30 a.m.** | Date : | **9 December 2020** |
| Duration : | **12 hours** |  |  |
| Course Code : | **MCT 4334 / MCTE 4342** | Section(s) : | **1** |
| Course Title : | **Embedded System Design** | | |

This Question Paper Consists of **Two (2)** Printed Pages (Including Cover Page) with **Two (2)** Questions.

**INSTRUCTION(S) TO CANDIDATES**

* Total mark of this examination is 30**.**
* This examination is worth 3**0%** of the total course assessment.
* This is an open book, open notes examination. Answer **ALL QUESTIONS**
* Marks assigned to each question are listed in the margin.

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| **DECLARATION**  By answering this final examination, I hereby declare that:   * The whole answer of this final examination is my own work. * I do not receive any help from any other parties in answering on any part of this final examination. * I do not give any clue, hint or work to other students in answering on any part of this final examination. * I understand that any form of cheating or attempt to cheat is a serious offence which may lead to dismissal. |

**QUESTION 1 (10 marks)**

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| The world is racing to develop a vaccine for COVID-19, and there are encouraging signs we might find one in record time. But in a similar situation in the future, could technology help us get there even more quickly? Yes, says a new report from the World Economic Forum and Scientific American magazine.  Here are 2020’s top 10 emerging technologies:   1. Microneedles Could Enable Painless Injections And Blood Draws 2. Sun-Powered Chemistry Can Turn Carbon Dioxide Into Common Materials 3. Virtual Patients Could Revolutionize Medicine 4. Spatial Computing Could Be The Next Big Thing 5. Digital Medicine Can Diagnose And Treat What Ails You 6. Electric Aviation Could Be Closer Than You Think 7. Low-Carbon Cement Can Help Combat Climate Change 8. Quantum Sensors Could Let Autonomous Cars ‘See’ Around Corners 9. Green Hydrogen Could Fill Big Gaps In Renewable Energy 10. Whole-Genome Synthesis Will Transform Cell Engineering   Choose any 2 emerging technologies and briefly discuss the role of the embedded systems in both characterizing and developing stage with examples in order to illustrate your answer. | **(5)**  **(5)** |

**QUESTION 2 (20 marks)**

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| The disruptive effects of the COVID-19 outbreak have impacted almost all sectors of our society. Higher education is no exception.  Design a suitable embedded system project that can be use in IIUM campus.   1. System functionality and the effectiveness of the proposed solution. 2. System architecture or block diagram of the operation.   `   1. Circuit design which includes interfaces with sensors and actuators. 2. Bill of Materials (Total budget should be less than RM800) | **(4)**  **(6)**  **(6)**  **(4)** |

**END OF PAPER**