Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **14CE2046** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SMART MATERIALS AND STRUCTURES** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Outline the phenomenon of producing electricity in piezoelectric  materials and its properties. | CO1 | 12 |
| b. | Evaluate the electro rheological (ER)and magneto rheological (MR) fluids used as smart materials. | CO2 | 8 |
| **(OR)** | | | | |
| 2. | a. | Discuss how shape memory alloys are used as a smart materials. | CO1 | 10 |
| b. | Outline the features of actuators. | CO2 | 6 |
| c. | Value the concept behind vibration control. | CO2 | 4 |
|  |  |  |  |  |
| 3. | a. | Investigate fiber optics and explain its internal reflection,  properties and its characteristics. | CO2 | 12 |
| b. | Illustrate about load cell and mention its types and applications. | CO1 | 8 |
| **(OR)** | | | | |
| 4. | a. | Describe in detail the different types of strain gauges with neat sketches. | CO1 | 12 |
| b. | Demonstrate the working of active vibration absorber with sketch. | CO2 | 8 |
|  |  |  |  |  |
| 5. | a. | Outline pressure transducer and its types with a neat sketch. | CO3 | 10 |
| b. | Explain wheatstone bridge with diagram. | CO2 | 10 |
| **(OR)** | | | | |
| 6. | a. | Paraphrase on open loop and closed loop control system with neat sketch. | CO1 | 10 |
| b. | Define the following:  i) Resistance ii) Capacitance iii) Inductance. | CO2 | 6 |
| c. | Recall the parallel damped vibration absorber with neat sketch. | CO3 | 4 |
|  |  |  |  |  |
| 7. | a. | Elaborate on the application of shape memory alloys in bridges. | CO3 | 10 |
| b. | Research the application of optical fibres in smart structures. | CO3 | 10 |
| **(OR)** | | | | |
| 8. | a. | Interpret the classification of control systems. | CO1 | 12 |
| b. | Explain passive damping system with suitable sketches. | CO2 | 8 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the application of MR Dampers in bridges and high rise structures. | CO3 | 10 |
| b. | Describe smart concrete. | CO3 | 10 |