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



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

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| **Code :** | **14EI2040** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ULTRASONIC INSTRUMENTATION** | **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. | State the definition of progressive waves and derive the expression for velocity of vibrating particle in progressive wave. | CO1 | 15 |
| b. | Describe the reflection and transmission coefficients. | CO1 | 5 |
| **(OR)** | | | | |
| 2. | a. | Discuss the different modes of propagation of ultrasonic waves. | CO1 | 10 |
| b. | Explain the generation of ultrasonic waves using Magnetostrictive method with a neat diagram. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Explain the characteristic properties of ultrasonic waves and the loses caused due to attenuation. | CO1 | 10 |
|  | b. | Explain the experimental technique used for the measurement of density of liquid mixtures. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | Describe the generation of ultrasonic waves using Piezoelectric method with a neat diagram. | CO1 | 10 |
|  | b. | Discuss about direct contact method and delay line method in thickness measurement. | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | Explain the working of different types of SONAR with neat diagram. | CO2 | 20 |
| **(OR)** | | | | |
| 6. | a. | Describe the electrical method in detecting ultrasonic waves. | CO2 | 10 |
|  | b. | Ilustrate the following testing methods.   1. Pulse Echo Method 2. Immersion Testing | CO2 | 10 |
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| 7. | a. | Explain the principle, construction and working of a ultrasonic flaw detector with a neat diagram. | CO3 | 10 |
|  | b. | Discuss the role of ultrasonics in rail inspection. | CO3 | 10 |
| **(OR)** | | | | |
| 8. | a. | Explain the Ultrasonic Flow and Level measurements in detail. | CO2 | 10 |
|  | b. | Discuss the inspection of welds and defect detection in welds. | CO3 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Discuss about the different types of scans used in medical imaging and their clinical application. | CO3 | 20 |