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

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**End Semester Examination – Nov/Dec – 2018**

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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. | Explain the concept of transmission and reflection of ultrasonic wave and also derive its expression. | CO1 | 10 |
| b. | Discuss the longitudinal and transverse wave motion in the propagation of ultrasonic waves. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Elaborate on the transmission of energy and intensity of progressive wave with its mathematical expressions. | CO1 | 14 |
| b. | Give an outline on the transmission losses occurring in the ultrasonic waves. | CO1 | 6 |
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| 3. | a. | State the concept of piezoelectricity and elaborate on the construction and working of a piezoelectric transducer with a neat diagram. | CO1 | 14 |
| b. | Write short notes on the detection of ultrasonic waves using mechanical method. | CO2 | 6 |
| (OR) | | | | |
| 4. | a. | Explain the optical method for measuring the wavelength and velocity of an ultrasonic wave. | CO2 | 12 |
| b. | Illustrate the inspection of welds and defect detection in welds. | CO3 | 8 |
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| 5. | a. | Describe the following representations in the CRT display  i) A-scan ii) B-scan iii) C-scan | CO2 | 12 |
| b. | Elaborate on the Immersion testing method for detection of flaws. | CO3 | 8 |
| (OR) | | | | |
| 6. |  | Explain in detail about the ultrasonic density and viscosity measurement. | CO2 | 20 |
|  |  |  |  |  |
| 7. | a. | Elaborate on the different methods adopted for thickness measurement with necessary diagrams. | CO2 | 14 |
| b. | Discuss on the application of ultrasonics in rail inspection. | CO3 | 6 |
| (OR) | | | | |
| 8. |  | Elaborate on the different types of SONAR with a neat diagram. | CO3 | 20 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the following types of Holography in detail:  i) Transmission acoustic holography.  ii) Pulse reflection acoustic holography.  iii) Linear acoustic holography | CO3 | 15 |
| b. | Give an outline on the ultrasonic applications in medical therapy. | CO3 | 5 |