Code No: **R164103B** **R16** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Jan/Feb – 2022

CONDITION MONITORING

(Common to Mechanical Engineering and Automobile Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
*****

PART–A *(14 Marks)*

1. a) Write and explain the expressions for natural frequency for free and forced vibrations. [3]
   b) Explain the process of windowing and averaging. [3]
   c) Define static and dynamic balancing. [2]
   d) Explain the image interpretation in thermography. [2]
   e) Explain about severity rating. [2]
   f) What are the limitations of Ultrasonic testing? [2]

PART–B *(4x14 = 56 Marks)*

2. a) What is natural frequency? Explain the importance of knowing the natural frequency of any structural design with an example. [7]
   b) Derive the expression for equations of motion for forced spring mass systems. [7]

3. a) Explain modern approach for condition monitoring of power transformers. [7]
   b) Write a short not on Sampling and aliasing methods in vibration analysis. [7]

4. Discuss the appropriate condition monitoring methods to diagnose the condition of the following : Draw the necessary sketches. [14]
   (a) Antifriction bearings
   (b) Gearbox of automobile's

5. a) Explain the theoretical principles of thermography with neat sketch. [7]
   b) Describe the process of radiographic testing in industries. [7]

6. a) Discuss how monitoring the condition of oil is done. Write about physio – chemical properties. [7]
   b) Explain the process of ferrography wear particle analysis. [7]

7. a) Explain the mechanism and working principle of ultrasonic monitoring system used for detecting cracks and thickness. [7]
   b) Discuss the use of ultrasound in detecting air leaks and steam trap testing. [7]