BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: VII**
BRANCH: CIVIL **SESSION : MO/2019**

SUBJECT : CE7001 EARTHQUAKE RESISTANT DESIGN

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) How the output data characteristics of a digital recording device varies from a manual recording device if both record a 7.2 magnitude earthquake data from a same location. [4]
(b) What is Seismogram? [1]

Q2 (a) How do we classify the characteristics of surface waves? [3]
(b) How do we scale earthquake intensity? [2]

Q3 Obtain the differential equation of motion of the system given in Figure: 1 considering the damping ratio as 0.02 for free vibration. Also determine the system natural frequency for the same considering no damping. [3+2=5]

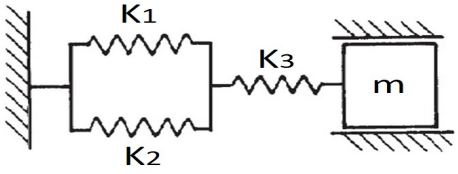

Figure: 1

Q4 Derive the general equation for displacement for an underdamped system under free vibration. [5]

Q5 If the acceleration vs time plot is given for any non linear dynamic data set, how the general expression of velocity for a certain time step in Newmark's Average acceleration method varies from the expression of velocity for the same time step in Newmark's Linear acceleration method. [5]

Q6 For a fixed damping ratio, how do we plot different forms of response spectrum from a series of vertical oscillators having different natural frequencies? [5]

:::: 19/09/2019M ::::::