Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech., Summer 2017 – 18 Examination

Semester: 2 **Date: 28/05/2018**
Subject Code: 03217182 **Time: 2:00 pm to 4:30 pm**
Subject Name: Vibro Acoustics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Write down applications of FFT analyzer. **(05)**

B) Explain elementary noise Radiators? **(05)**

C) Derive Wave Equation for the vibration of string? **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

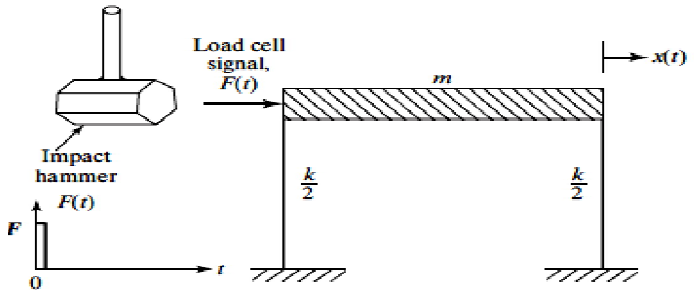
A) Derive the formula for the transmissibility

B) Define Vibration isolators and its types in brief.

C) Explain Duhamel's Integral.

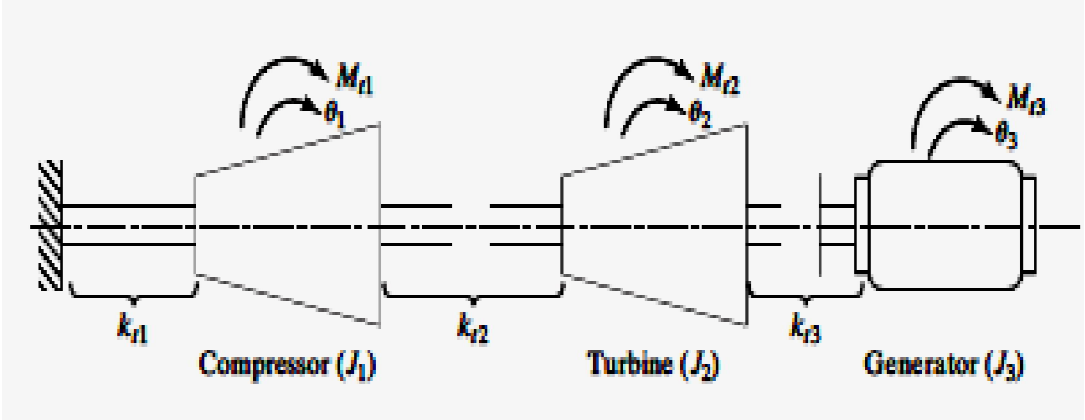
D) Define Principal of virtual work and complimentary virtual work.

Q.3 A) In a vibration testing of a structure ,an impact hammer with a load cell to measure the impact force is used to cause excitation, as shown in figure (a) assuming m=5kg, k=2000N/m, c=10N-s/m and impulse=20N-s . Find the response of the system. **(07)**
Assume suitable data.



(a)

B) The arrangement of compressor, turbine and generator in a thermal power plant is shown in a figure. This arrangement can be considered as a torsional system where J_i denote the mass moments of inertia of the three components (compressor, turbine, and generator), M_{ti} indicate the external moments acting on the components, and K_{ti} represent the torsional spring constants of the Shaft between the components, as indicated in Fig. Derive the equations of motion of the system using Lagrange's equations by treating the angular displacements of the components θ_i as generalized coordinates. **(08)**



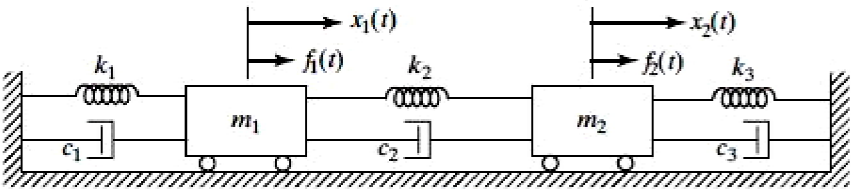
OR

B) Discuss the Transverse vibration of beam. **(08)**

Q.4 A) Discuss design Principle of FFT analyzer. **(07)**

OR

A) Frame the equation of motion in matrix form for the diagram given below and deduce the formula for frequency if the system is undamped and no external force is acting. **(07)**



B) For the same system shown in figure of Question 4(A). find the mode shapes if $K_1=K_2=K_3=K$ and $M_1=M_2=M_3=M$ and $C_1=C_2=C_3=0$ **(08)**