

Roll No _____

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- Oct 2017

B.Tech VII / M.Tech I Semester

COURSE CODE: 11M1WCE112

MAX. MARKS: 25

COURSE NAME: STRUCTURAL DYNAMICS

COURSE CREDITS: 3

MAX. TIME: 1.5 Hrs.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. An automobile can be modeled as a SDOF system vibrating in the vertical direction while travelling over a rough road. The road surface may be assumed to vary sinusoidally as shown in the **Fig # 1**. The vertical distance between peak to trough is 0.2 m and the distance along the road between the peaks is 35 m . If the natural frequency of the automobile is 2 Hz and the damping ratio of the shock absorbers is 0.15 , determine the amplitude of vibration of the automobile travelling at a speed of 60 km/hr . If the speed of the automobile is varied, find the most unfavourable speed for the passengers. [10 Marks]

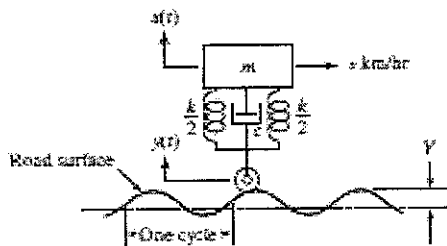


Fig # 1



Fig # 2

2. Find the **Frequency Response Function (FRF)** for the displacement of the mass shown in **Fig # 2**. [10 Marks]
3. A rectangular pulse is defined as :

$$f(t) = \begin{cases} 1 & -T < t < T \\ 0 & t > |T| \end{cases}$$

Find out the **Fourier Transform** of the given pulse.

[5 Marks]