

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Test -1 EXAMINATION, SEPT. 2017

B.Tech 7<sup>th</sup> Sem. ECE

COURSE NAME: NON-LINEAR AND DIGITAL CONTROL SYSTEM

COURSE CODE: 14B1WEC734

MAX.MARKS:15

MAX.TIME: 1 Hr

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**Note: Carrying of mobile phones during examination will be treated as a case of unfair means.**

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Q-1: a) Explain the difference between linear and non-linear control systems. [2.5]

b) Explain various types of non-linearities in a system. [2.5]

Q-2: a) Define the describing function. [2]

b) Derive the expression of describing function of an ideal relay. [3]

Q-3: a) What do you mean by the saddle point? [1.5]

b) Draw the phase-plane trajectory of the following system being modelled as:

$$\dot{x} = -x + x^2$$

Also, indicate the stable and unstable region on it. [3.5]