

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

**CLASS: BE
BRANCH: EEE**

**SEMESTER: VII/ADD
SESSION : MO/2019**

SUBJECT : MEE1119 CONTROL SYSTEM 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.
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- Q1 (a) How can feedback configuration affect robustness of any system? [2]
(b) What are time domain and frequency domain specifications used in control system design? [3]
- Q2 (a) DC Tachometers can be used in many ways in control systems. Mention at least two. [2]
(b) Draw block diagram of any 2DOF controller configuration. [3]
- Q3 (a) How does the derivative term modify the error in time response of a system? [2]
(b) Discuss op-amp realization of a PI controller and find the transfer function. [3]
- Q4 (a) From the point of view of filtering how can PI, PD and PID controllers be classified? [2]
(b) Explain the tuning rule given by Ziegler and Nichols. [3]
- Q5 (a) Why is a multi stage phase lead controller used? [2]
(b) Enumerate the steps to design a phase lead controller for any system. [3]
- Q6 The open loop transfer function of a unity feedback system is given by [5]
$$G(s) = K / s(s+2)$$

It is desired to have a velocity error constant $K_v \geq 10$ and a $\Phi_m \geq 60^\circ$. Design a phase lag compensator to meet the required specification.

:::: 20/09/2019M ::::