

**ACTIVITY CODE: 1903075021**

**B.Sc. 6<sup>th</sup> Semester (Honours) Examination, October 2020**

**Subject: *Electronics (H)***

**Course ID: 61717**

**Course Code: SH/ELC/604/DSE-4(TH)**

**Course Title: *Control System***

**Full Marks: 12**

**Time: 45 mins**

***General guidelines***

1. Answer all the questions provided in the question paper.
2. The figures in the right hand side margin indicate marks.
3. You should submit the answer script as prescribed by the University guidelines within the stipulated time and way.

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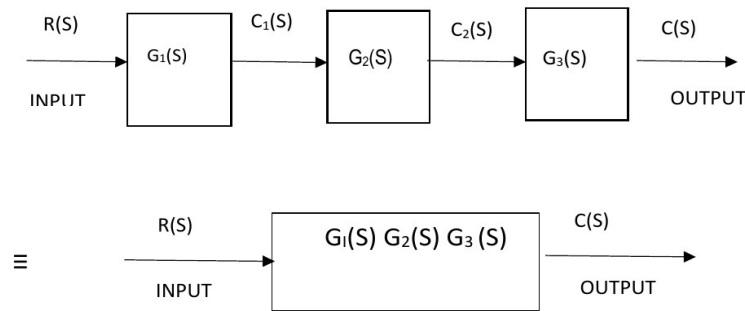
**Time: 45 mins**

*(The figures in the right hand side margin indicate marks*

*Answer all the questions)*

1. Answer *any two* of the following questions 1×2=2
  - (a) What is an open-loop control system? When is it called linear?
  - (b) What is an automatic control system? Give an example of it.
  - (c) Give the block diagram form of open-loop control system.
  - (d) What are the various parameters of a closed loop control system?
  - (e) What is static error?
  - (f) How many types of error detectors are there? Name them.
  
2. Answer *any one* of the following questions. 2×1=2
  - (a) Give the block diagram for a closed loop control system.
  - (b) What are the performance specification parameters for a closed loop control system?
  - (c) Define phase margin for a closed loop control system.
  - (d) Show that the relation given below is correct, for any open loop control system where the symbols have their usual meanings.

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- (e) Define how the band-width change the performance of a closed loop control system.
- (f) Distinguish between open loop-and closed loop control system.

3. Answer *any two* of the following questions. 4×2=8
- (a) Sketch the basic elements of a servo system/servo mechanism in terms of block diagrams and explain its working principle. 4
- (b) Draw the circuit diagram of a potentiometer error detector and show that a small error can also be measured by using Laplace Transformation method. 4
- (c) Sketch the curve for – i) Stable System, ii) Marginally Stable System/ Sustained Oscillation, iii) Unstable System with vector diagram. 1+2+1=4
- (d) Derive the expression for ‘Transfer Function’ in a closed loop control system and obtain the system equation. 4
- (e) Show how a transfer function varies from open loop to closed loop control system due to its parameter variation [ $T(s)$  or  $G(s)$ ] that causes the system stability. 4
- (f) Draw the block diagram of a first order servo control system (closed loop) and obtain the system equation (electrical). 4
- (g) Discuss Routh-Hurwitz criterion for determination of stability for higher order closed loop control system. 4