

04/07/2016

4E2054

Roll No. _____

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4E2054

B.Tech. IV-Sem (Back) Exam; June-July 2016
Automobile Engineering
4AE6(O) Mechanical Measurement and Control
Common with AE, ME

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

- Q.1 (a) Explain the types of measurement with examples. [8]
- (b) Explain the working of hydraulic load cell and optical pyrometer with neat sketch. [8]

OR

- Q.1 (a) State different performance characteristic of an instrumentation system. [8]
- (b) List the applications of strain gauges on rotating shafts with their suitable sketch. [8]

UNIT-II

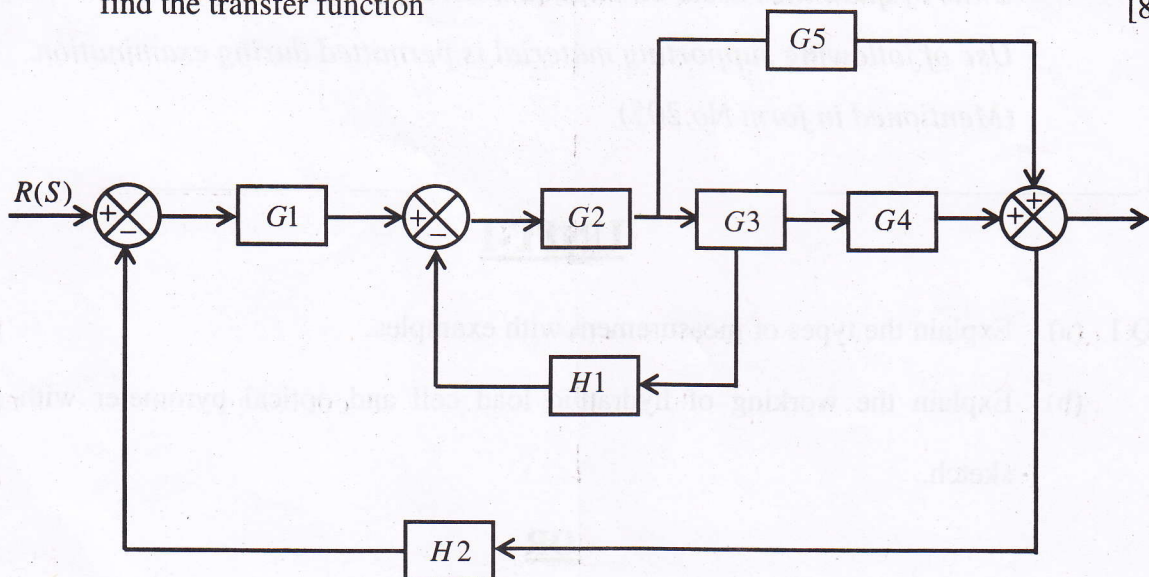
- Q.2 (a) Describe the working principal & construction of optical pyrometer. [8]
- (b) Explain the mechanical & electrical methods for measuring the liquid level. [8]

OR

- Q.2 (a) Explain the various temperature measuring transducers with neat sketches. [8]
- (b) Classify flow measurement methods. Briefly explain any two secondary flow meters. [8]

UNIT-III

- Q.3 (a) What is open and closed loop control system? Explain with suitable example. [8]
- (b) Using block diagram reduction technique reduce the system shown below and find the transfer function [8]



OR

Q.3 Define any two:

[8+8=16]

- (a) Components of an Analog Data Acquisition System.
- (b) Components of Digital Data Acquisition System.
- (c) Multichannel Data Acquisition System.

UNIT-IV

Q.4 For a negative feedback control System having forward path transfer function.

$$G(s) = \frac{K}{s(s+6)} \text{ and } H(s)=1$$

- (i) Determine the value of gain K for the system to have damping ratio of 0.832.
- (ii) For this value of gain K, determine the complete time response to an input $r(t) = 2u(t)$, where $u(t)$ is a unit step function.

[8+8=16]

OR

Q.4 (a) Explain the method of determining the mathematical modeling by nodal analysis.

[8]

(b) Explain the AC and DC servomotor.

[8]

UNIT-V

Q.5 With the help of Routh – Hurwitz criterion comment upon the stability of the system having the following characteristic equation

$$S^6 + S^5 + 8s^4 + 6s^3 + 20s^2 + 8s + 10 = 0$$

[16]

OR

- Q.5 (a) Sketch the root locus of unit feedback system with an open loop transfer function as K varied from 0 to ∞ .

$$G(s) = \frac{K}{s(s+2)(s+3)} \quad [8]$$

- (b) Explain the steps involved in drawing the root locus techniques & find out the stability of the system. [8]
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