Dr salman Raju

COURSE CODE: 10B1WEC515   MAX. MARKS: 15
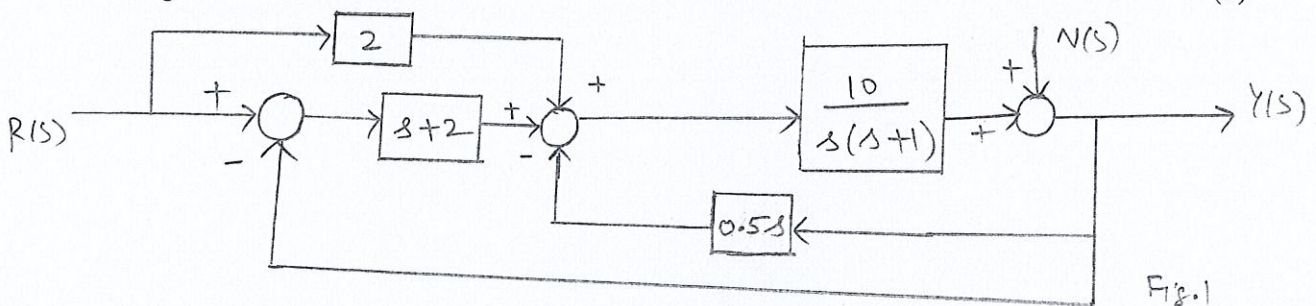
COURSE NAME: Theory and application of control systems   MAX. TIME: 1 HRS

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume any missing data. Marks are indicated in parenthesis.*

1. Find the output $Y(s)$ when $R(s)$ and $N(s)$ are applied simultaneously for Fig.1. Use block diagram reduction rules.   (3)

Fig.1

2. Use Mason's gain formula for Fig.2 to find overall transfer function $\frac{Y_5}{Y_1}$.   (4)

Fig. 2
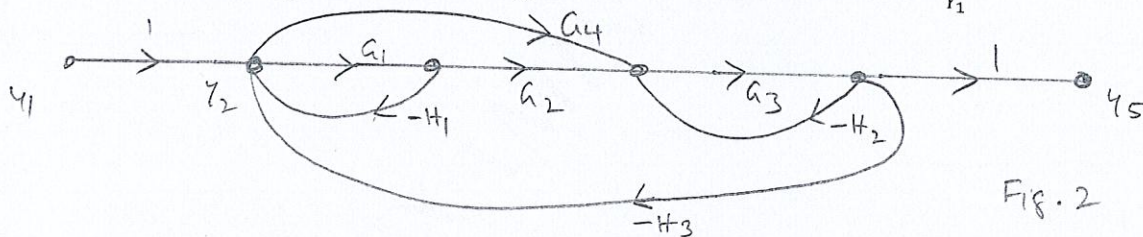
3. The block diagram of a feedback control system is shown in Fig.3. The error signal is defined to be $e(t)$. Find the steady state error of the system in terms of K and K_t when the input is a unit-ramp function. Give the constraints on K and K_t so that the answer is valid.   (4)

Fig.3
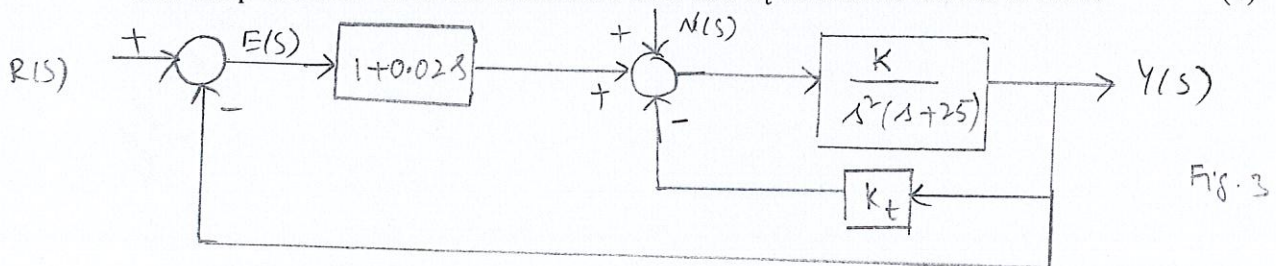
4. For the control system shown in Fig.4, find the values of K and K_t so that the damping ratio of the system is 0.6 and the settling time (5% criterion) of the unit-step response is 0.1 sec. (4)