(c) Draw polar plot for G(s) = K / (sA + 1)*(sB+1) for unity feedback system, find Gain margin, phase margin.

5 Attempt any two of the following : 10×2=20

(a) Draw bode plot and determine G.M., P.M., comment on stability.

G(s) H(s) = 16 (1+0.5s) / s^2 * (1+0.125s) * (1+0.1s)

(b) Explain the Proportional, Derivate, Integral controller and write their advantages.

(c) construct root locus for

G (s) H (s) = k/s* (s+4) * (s+5) K > 0

Printed Pages : 4

NEE-409

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 121413

Roll No.

B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15

ELECTRIC MACHINE & AUTOMATIC CONTROL

Time : 3 Hours] [Total Marks : 100

1 Attempt any four of the following : 4×5=20

(a) Explain the different speed control methods used in a DC motor.

(b) Discuss conversion from 3 phase to 2 phase using Scott connection.

(c) Briefly enumerate the working of auto transformer with its merits, demerits.

(d) A 10 kva single phase 500/250 v transformer gave following test.

OC TEST	250 V	3A	200W
SC TEST	15V	30A	300W

Find efficiency and regulaton at full load 0.8 p.f. Lagging ?

(e) Why series motor is never start on no load, also explain application of DC series and shunt motor.

(f) Why starter is required in DC motor ? Explain different method of starting.

2 Attempt any two of the following : 10×2=20

(a) (i) Explain the working principle of 3-phase induction motor. The rotor of induction motor cannot run at synchronous speed. Explain. Why ?

(ii) 3-ϕ induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate

(a) synchronous speed

(b) rotor speed when slip is 4% and

(c) rotor frequency when rotor runs at 600 rpm.

(b) Explain the working of two phase servo motor and their application.

(c) Explain the following :

(i) Synchronizing of alternators

(ii) V-curve of synchronous motor

3 Attempt any two of the following : 10×2=20

(a) Compare open loop and closed loop system with suitable examples.

(b) Obtain differential equation describing equivalent mechanical system of fig. 1 and draw the equivalent F-V analogy.

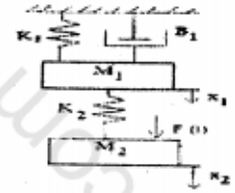

Fig. 1

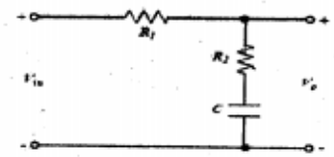

Fig. 2

(c) What do you mean by Transfer Function; find out Transfer Function for Fig. 2 circuit.

4 Attempt any two of the following ; 10×2=20

(a) Find out steady type error with unit step, ramp and parabolic input for

(i) type zero

(ii) type one

(iii) type two system

(b) (i) Explain bounded i/p bounded o/p stability criterion.

(ii) Find stability condition for following characteristics equation

$S^3 + 2ks^2 + (k+2)*s + 4=0$

(c) Draw polar plot for $G(s) = K / (sA + 1)*(sB+1)$ for unity feedback system, find Gain margin, phase margin.

5 Attempt any two of the following : 10×2=20

(a) Draw bode plot and determine G.M., P.M., comment on stability.

$G(s)\,H(s) = 16\,(1+0.5s) / s^2 * (1+0.125s) * (1+0.1s)$

(b) Explain the Proportional, Derivate, Integral controller and write their advantages.

(c) construct root locus for

$G(s)\,H(s) = k/s*(s+4)*(s+5)$ $K > 0$