

ص كينار - السكيد م انتاج

Answer all the following questions

Question 1:

- 1 – Classify the forging processes ?
- 2- State the types of forming machines ?
- 3- What are the types of forging hammers and presses with net sketch ?
- 4- Compare between the open and closed die forging processes ?
- 5- What are the Two Categories of Casting Processes ?
- 6- What are the types of Die Casting Machines with drawing ?

Question 2:

- 1- Define the flash and state its function ?
- 2- What are the steps of closed die forging operation with drawing ?
- 3- Mention the considerations which must be predicted when designing a part by the closed die forging ?
- 4- What are the basic types of the metal flow in forming process ?
- 5- What are the Types of Patterns in casting process?
- 6- state with drawing the Steps in permanent mold casting process ?

Question 3:

- 1- State the basic considerations for the perform operation ?
- 2 – What are the required properties for the die material and state the basic die materials?
- 3- How can you increase the die life ?
- 4- What are the basic indications for die failure ?
- 5- A block of lead $25*25*150 \text{ mm}^3$ is pressed between flat dies to a size $6.25*100*150 \text{ mm}^3$ if the uniaxial flow stress $\sigma_0 = 6.9 \text{ MPa}$ $\mu = 0.25$ determine the pressure distribution over the 100 mm at $x=20$ mm and 50 mm and the total forging load in the sticky friction condition .

تعمير ماكينة ط ٢

TANTA UNIVERSITY

MACHINE DESIGN

FACULTY OF ENGINEERING

(MPD 3219) Third Year

Production Eng. & Mech. Design Dept. Time : Three hours.

Date : 26/5 / 2013

Total Mark: 75 Marks.

2nd - Term Examination

Tables can be used.

Q-1 (25 Marks)

(a)- Remember five recommendations to develop the gearing diagram to achieve Min. possible dimensions.

(b)- A speed – box having 12- speeds (31.5 – 45 – 63 – 90 – 1410 R.P.M.) is powered by one speed motor (1440 R.P.M.) & power is 5 KW. Suppose the speed of the first gear box shaft is 1000 R.P.M. , design the number of the gear teeth, assuming any required data based on your study.

Q-2 (25 Marks)

From the data & results of Q-1 , determine the required spur gear module & the working drawing of the pinion (smallest gear) if the following data can be use :

$K_d = 1.5$, $\psi = 20$,

Standard module : 2, 2.5 , 3 , 4 , 5 , 6 , 8 mm.

Material : St 45 , $[\sigma_b] = 20 \text{ Kg/mm}^2$ & $[\sigma_{con.}] = 4760 \text{ Kg/cm}^2$

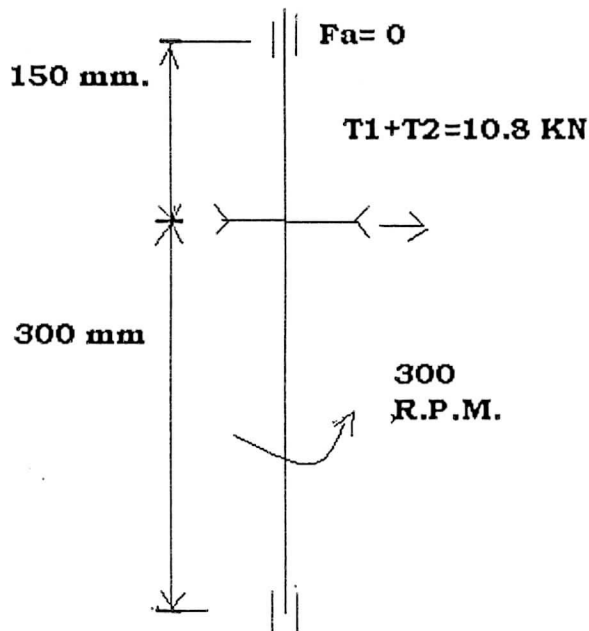
Relations : $Y = 0.154 - 0.912 / Z$

$$m = \left[0.64 M_t . K_d / Y . Z_p [\sigma_b] \right]^{1/3}$$

$$\sigma_{con.} = (34000 / A . i) [N . K_d (1 + i)^{1/3} / n_g . b]^{1/2}$$

Q-3 (25 Marks)

Select the ball bearing for the lower & upper bearing of the vertical shaft , shown in figure , driven by a V-belt. Base the selection on steady load and life of 2000 Hours for 90 % of a group of bearings . The min. shaft diameter based on strength at the lower & upper bearing is 25 mm. The shaft rotates at 300 R.P.M .



F_a = Estimated weight of shaft & pulley = 1.5 KN.

Good Luck !!
Dr. Gaber Sheha



Course Title: Automatic Control
 Date: 30-05- 2013

Course Code: MPD 3223
 Allowed time: 3 Hrs

Year: 3rd Prod Eng.
 No. of Pages: (2)

Answer All The Following Questions:-

[Note: Each question carries 17 Marks]

Question (1):- (17 Marks)

(a) If the overall transfer function of a closed-loop control system is in the form:

$$\theta_o/\theta_i = 386 / (0.125 s^2 + 2.55s + 386)$$

and the input θ_i is a unit step signal, **Find out** the following:-

- (1) Rise time(t_r), (2) Peak time(t_p), (3) Setting time(t_s) if the response allowance is + or -5%,
 (4) Maximum peak(M_p), (5) Steady-state error(ϵ_{ss}). (9 Marks)

(b) **Find** the range of gain (**K**) for the following system that will cause the system to be stable,

$$\frac{Y(S)}{R(S)} = \frac{K}{S(S^2 + S + 1)(S + 4) + K}$$

(8 Marks)

Question (2):- (17 Marks)

(a) By using Laplace transform technique, **solve** the following initial value problem and **find** the time response $y(t)$, of the system :-

$$\ddot{Y} + 2\dot{Y} - \dot{Y} - 2Y = 0, \text{ where } Y(0) = 1, \dot{Y}(0) = \ddot{Y}(0) = 2. \quad (9 \text{ Marks})$$

(b) **Obtain** the time response $y(t)$ of the following system by applying the inverse Laplace transform:

$$Y(s) = (2s^2 + 7) / [(s^2 + 4)(s + 3)]. \quad (8 \text{ Marks})$$

Question (3):- (17 Marks)

Reduce the following block diagram shown to a single block diagram and hence determine overall transfer function(or C/R).

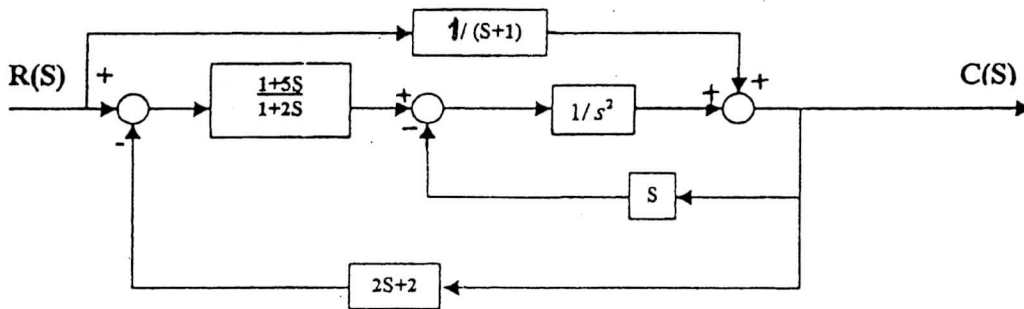


Figure of Question(3)

P.T.O. → (2)

Question (4):- (17 Marks)

(a) A process plant consists of two tanks of capacitance C_1 and C_2 . If the flow rate into the top tank is Q_3 , find the transfer function relating this flow to the level in the bottom tank. Each tank has a resistance R in its outlet pipe. (Consider the tanks to be noninteracting.) (9 Marks)

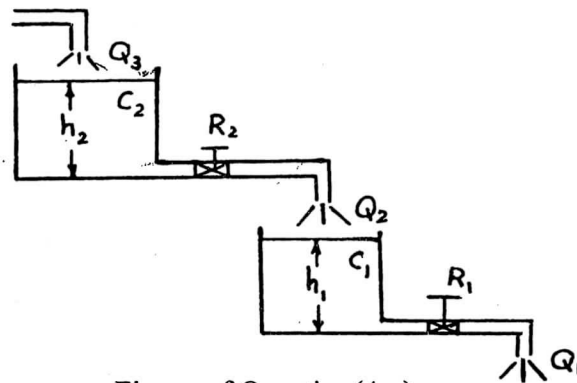


Figure of Question(4-a).

(b) For the shown valve, derive the overall transfer function (\dot{q}_o/\dot{P}_i) . (8 Marks)

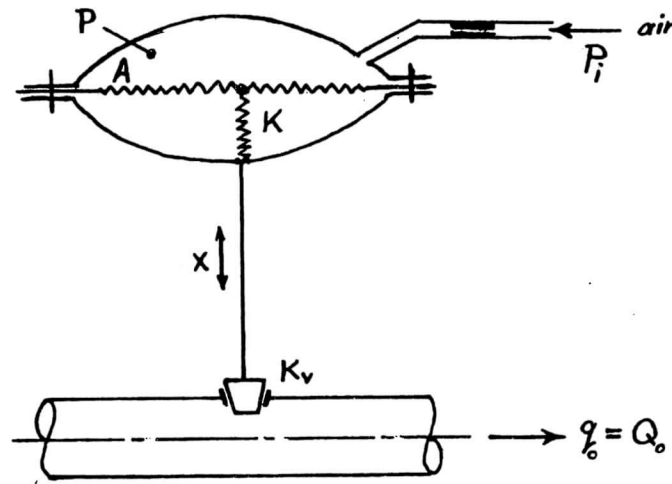


Figure of Question(4-b).

Question (5):- (17 Marks)

(a) Apply Nyquist criterion to examine the relative stability of the open-loop transfer function given in the form:-

$$GH = \frac{10}{(D+1)(D+2)} \quad (7 \text{ Marks})$$

(b) If the characteristic equation of a closed-loop control system is in the form:

$$S^6 + 6S^5 + 37S^4 + 72S^3 + 327S^2 + 162S + 675 = 0.$$

Determine the stability condition of this system by use of Routh stability method. (10 Marks)

(انتهت الأسئلة)

With My Best Wishes



Course Title: Forming Technology
Course Code: MPD 3222
Year: 3rd Year Production

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الذاتي

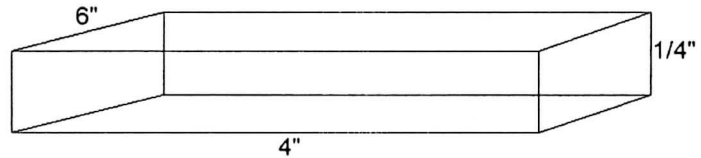
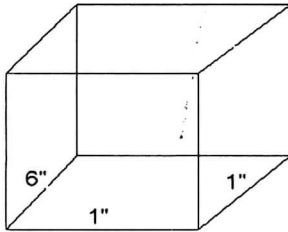
Date: May 2013
Allowed time: 3 hrs.
No. Of pages: 2

Answer all the following questions:

Question1.

(15 marks)

- What are the important variables in the design of bulk forming process?
- Consider a load $1'' \times 1'' \times 6''$ to be pressure between flat dies to $1/4'' \times 4'' \times 6''$ as shown in figure. The flow stress = $\sigma_0 = 1000$ psi. $\mu = 0.25$ Calculate maximum pressure and forging load for the following:
 - Sliding friction
 - Sticking friction.



Question2.

(20 marks)

- What do you know about types of rolling based on work piece geometry and work temperature?
- Draw with freehand the steel products made in a rolling mill?
- Draw the rolling mill configuration for thread rolling?
- Mention the advantage of thread rolling over the thread cutting machine?

Question3.

(20 marks)

- What are some of the attractive features of the cold extrusion process?
- What are the unique capabilities and special limitations of hydrostatic extrusion?
- Draw schematic illustration of roll straightening of a drawn round rod?

Question4.

(20 marks)

- a. What is spring back? What determines the amount of spring back in bending?
- b. What is the major limitation of the super plastic forming of sheet metal? What are some of the attractive features?
- c. Use a neat sketch to indentify the wire drawing dies?

Question5.

(15 marks)

- a. What is the defect in rod and wire drawing?
- b. Determine the draw stresses to produce a 20% reduction in a 10mm stainless steel wire. The flow stress is given by $\sigma_0 = 1300 \epsilon^{0.3}$ MPa. The die angle is 12° and $\mu=0.09$. Also, determine the largest possible reduction.

With my best wishes