INDIAN INSTITUTE OF TECHNOLOGY MADRAS Department of Metallurgical & Matls. Engineering , Materials Forming Laboratory

PART II

END SEMESTER EXAMINATION, 2011 BOOK

SUBJECT: 3 MM 562 METAL FORMING EQUIPMENT

Class: I M.Tech MME, Total Number of Students taking the Examination : 04

Time Duration of Examination: 03 hrs. Marks : 100 & will be converted for 50

Date of Exam: "F" SLOT,2010, 13 hrs to 15 hrs

DATE OF EXAMINATION: …02nd May, 2011……………………………………..

Roll No: …………………………………………………………

Name: …………………………………………………………..

Class: …………………………………………………………..

Branch: …………………………………………………………

Semester: ………………………………………………………

There are PART "I & Part "II". Part I consists of True or False Questions. Write in brackets provided **"True or False"** and not T or F. Part II consists of abstractive questions. While **there is no choice in part I**, **answer for 50 marks choosing full questions from part II**. The Question cum Answer Book will not be returned to the Candidates or to the Office since these are objective type of questions. No extra copy will be prepared other than four (for four students taking the Examination). No separate answer sheets will be provided. Write the answers in the question book itself.

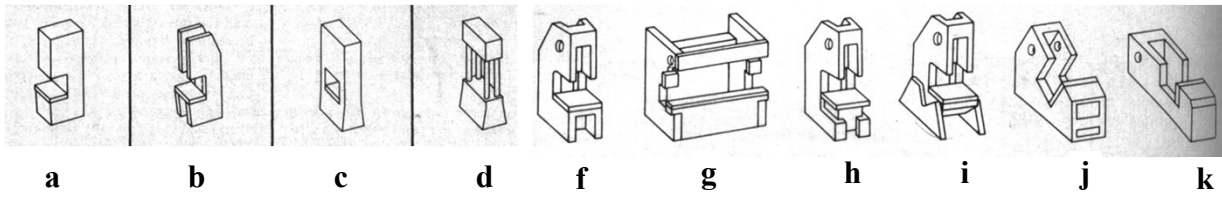TEACHER / EXAMINER: Prof. Dr. P. Venugopal. Phone: 4764., Mobile: 9444489973

**ANSWER ANY FULL QUESTIONS FOR 50 MARKS IN THE QUESTION
PAPER ITSEF. All questions carry equal 05 marks each.**

Q. 1. Figure below shows the deflection of a crank press with moments, load etc. Draw on left side the frame of the press to show the above characteristics. What is the fundamental principle in design of press frame with this diagram

05 marks
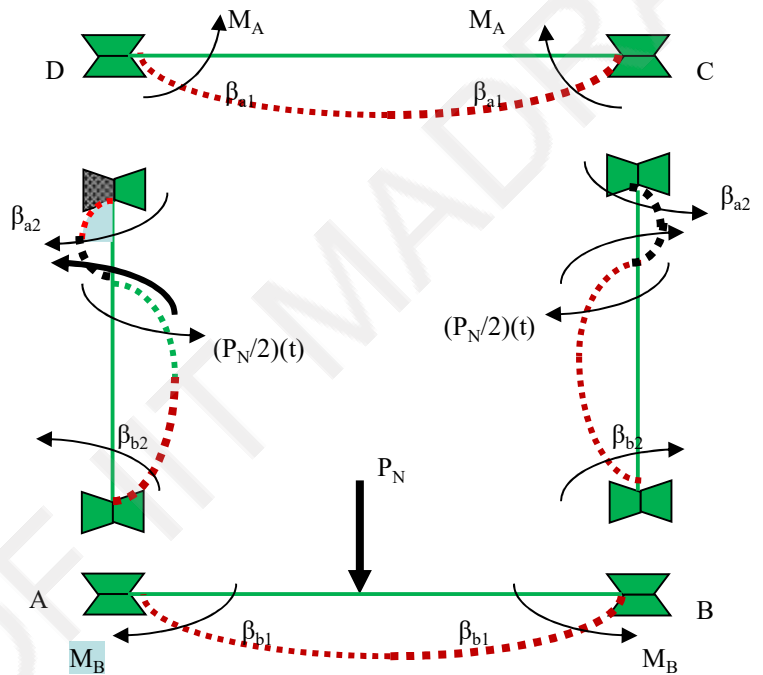
Q.2. The following figures are concerned with different types of frame design. Mention in brief the types and special merits.

a   b   c   d   f   g   h   i   j   k

05 marks

Q.3.Examine the figure that show that, $dr / dt = (r_i) (e^{\omega o} \tan \gamma) (\omega_0) (\tan \gamma) = V_{DOWN}$. If so, to avid the slip loses, which component of the above equation should be addressed to?
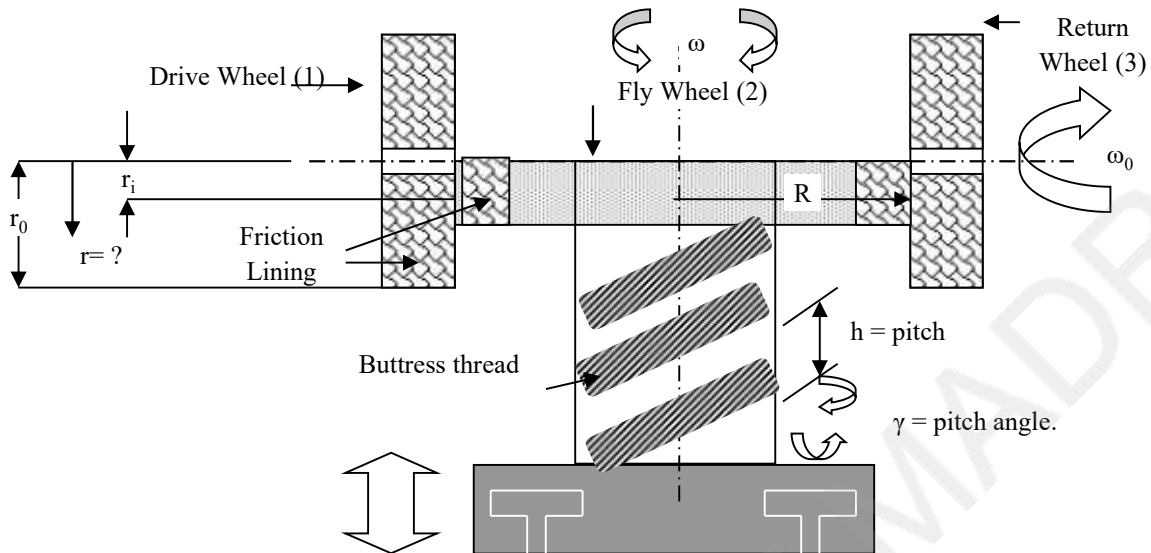
10 marks

Q. 4. .With the Figures shown below, discuss about the blow factor concerned with friction screw press.
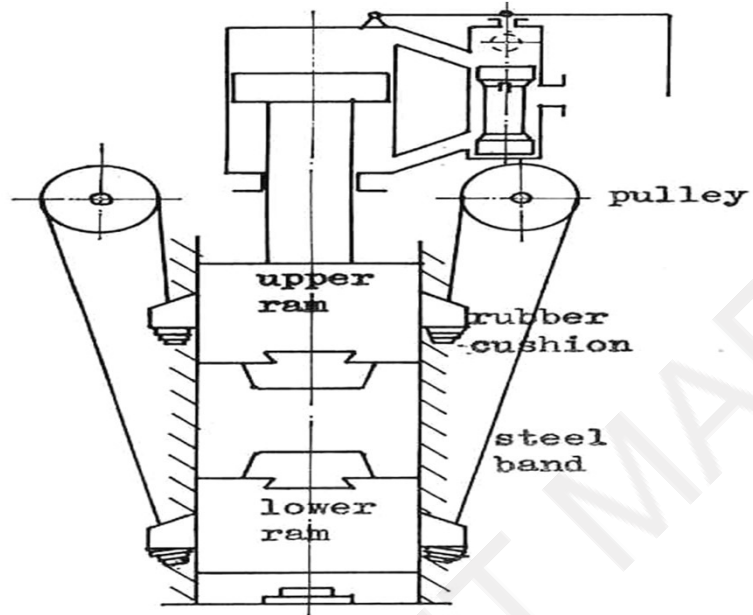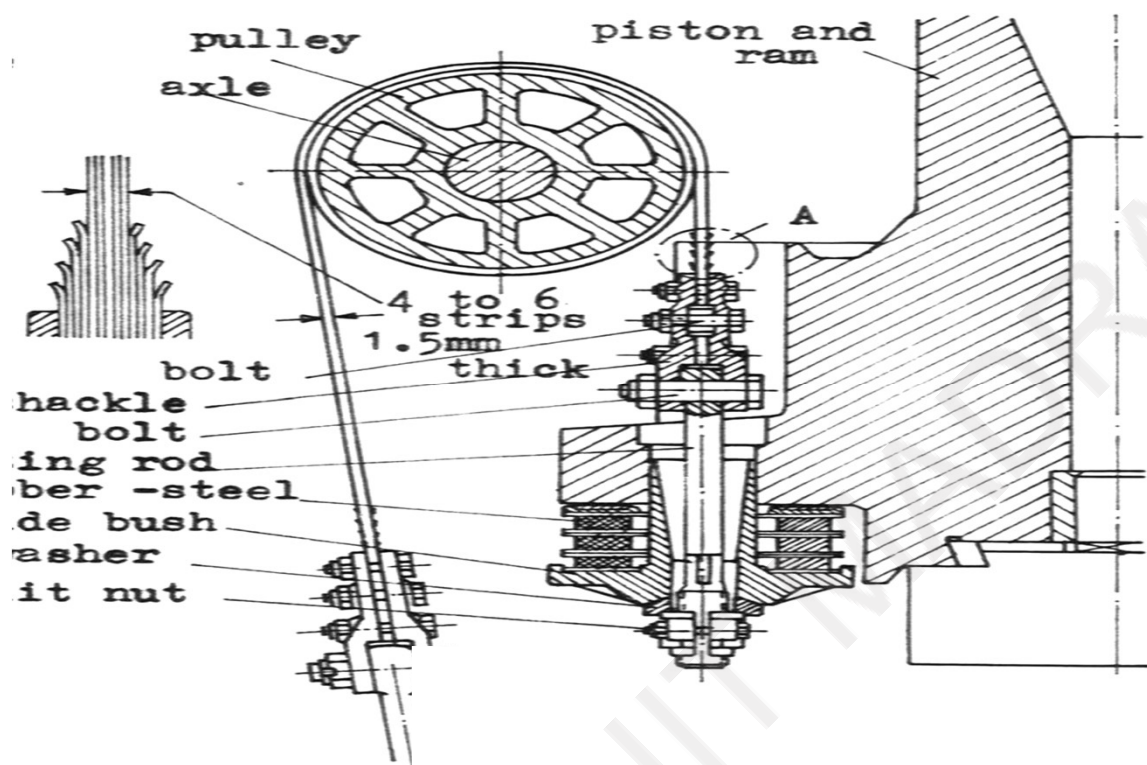
10 marks

$[W_K = (F_{MAX}^2) / (2. C_{TOT})]$

Force, F

W_D

$W_D + W_K = E$ S, mm

$\equiv$

Force, F

F_{MEAN}

S

$E = F_{MEAN} \times S$ S, mm
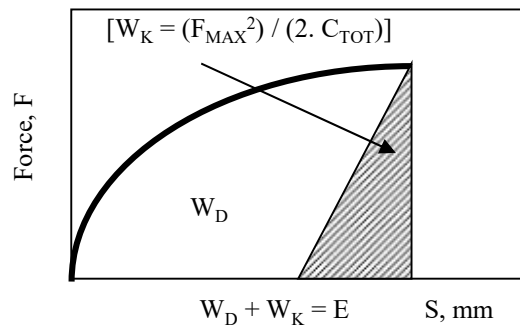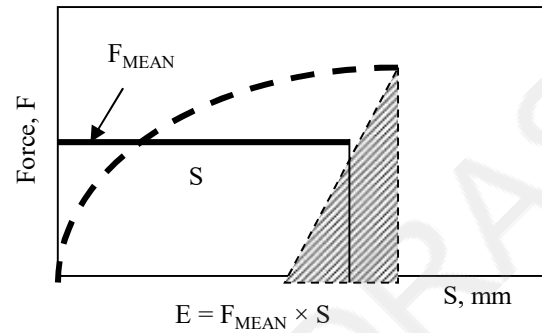
Q.5 .What is the famous equation from which this type of hammer was evolved? Mention its application in the hot forging.
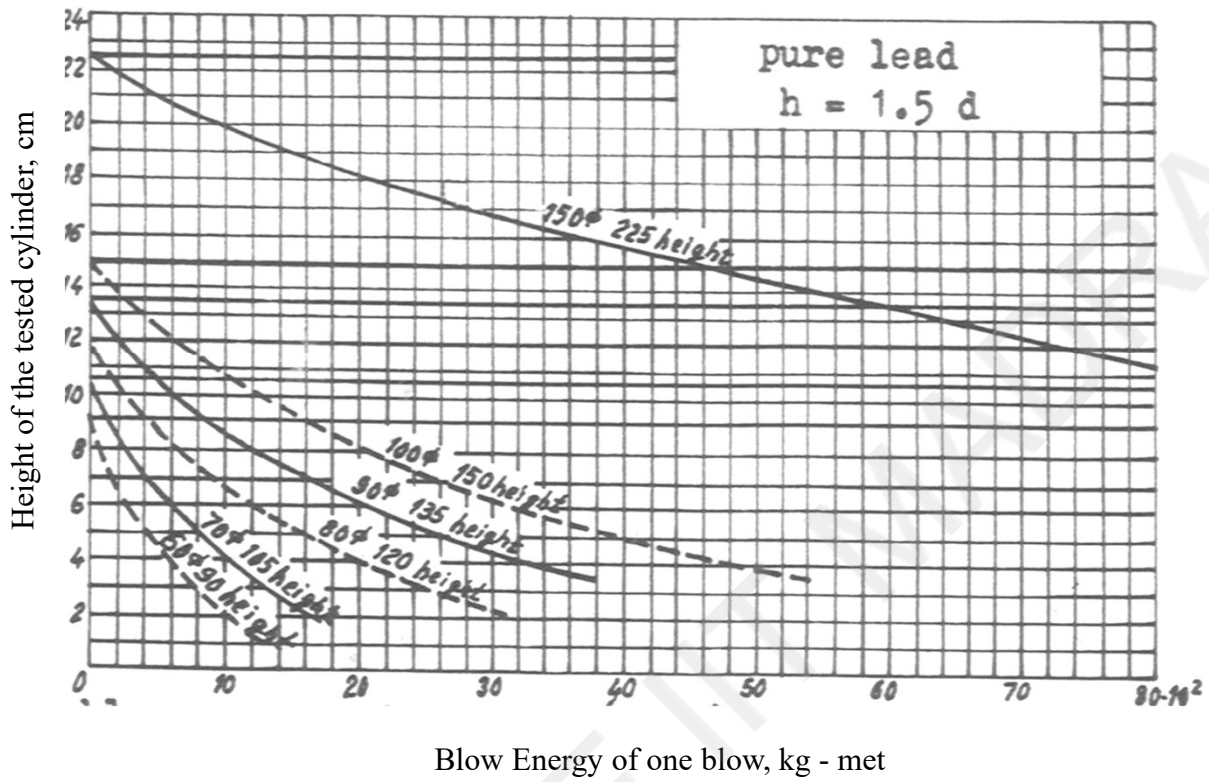
10 marks

Q.6 .Why is the criticality of the coupling of belts near the lug of the hammer shown below?

pulley

axle

piston and
ram

A

4 to 6
strips
1.5mm
thick

bolt

hackle
bolt
ing rod
ber -steel
de bush
asher
it nut

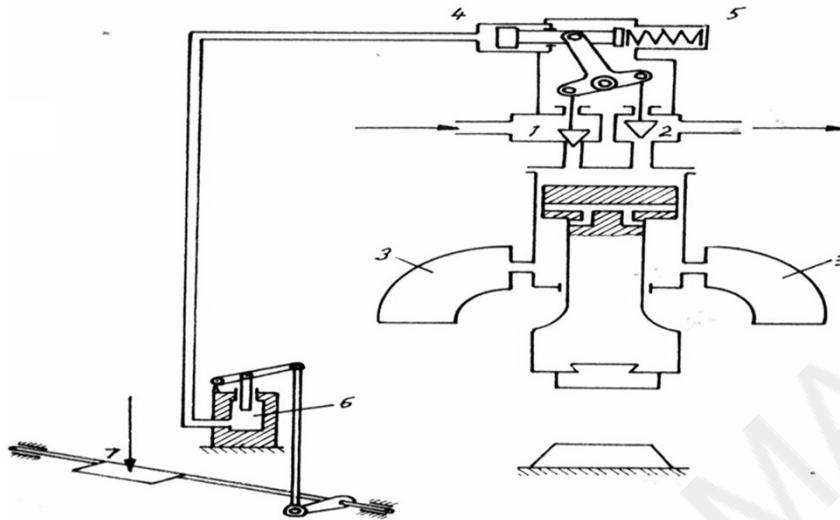Q. 7. Figure shows a nomogram relevant to hammers. Mention in brief what it is and the significance of this nomogram.
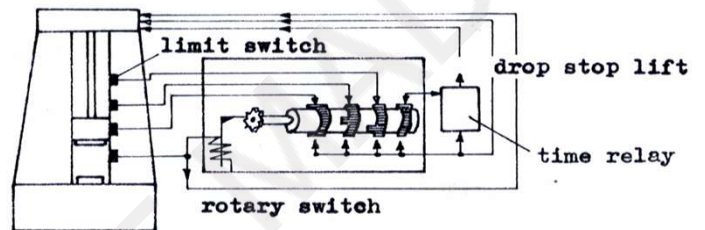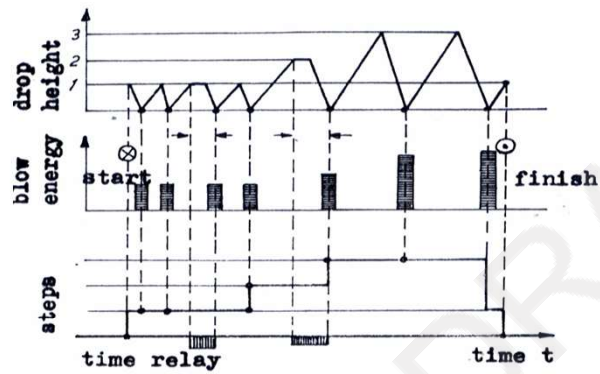
05 marks

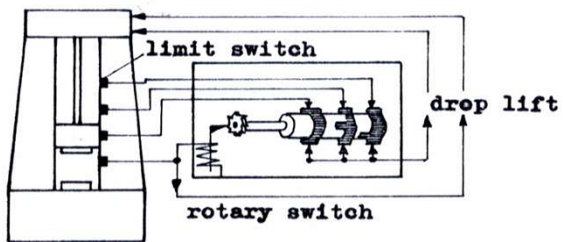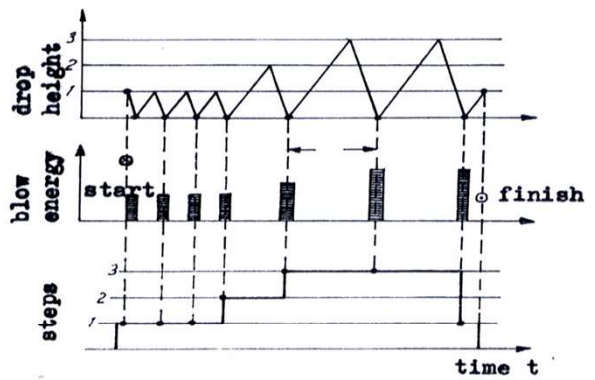Blow Energy of one blow, kg - met

Q. 8. A control system for a hammer is shown below. Name the hammer and explain the controls..

05 marks

Q. 9. Controls for drop hammer are furnished below. Explain in brief both.

10 marks

Q.10. If the intentions of Figs. A and B are to ensure emergency stop in the hydraulic circuit, which one is better circuit and why?
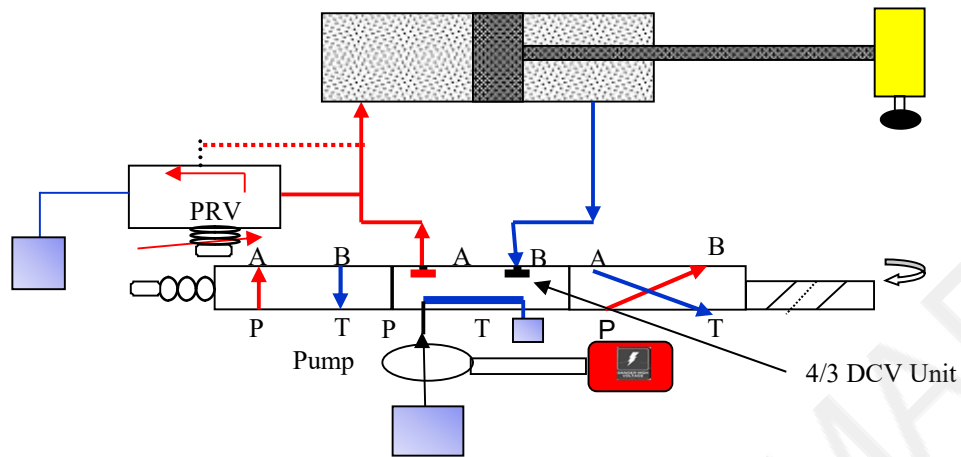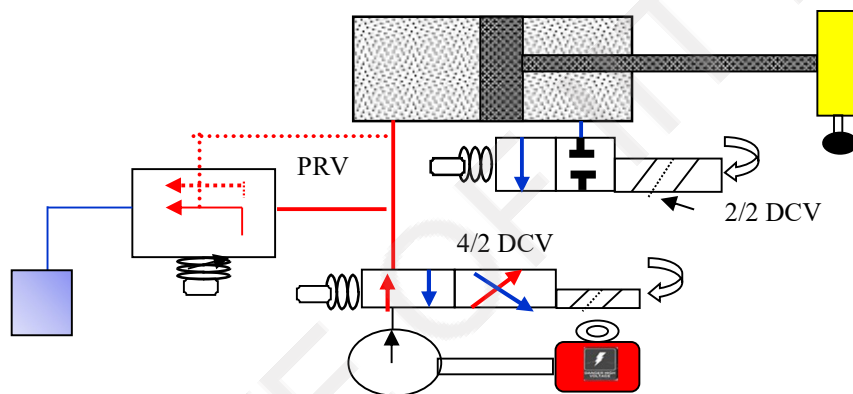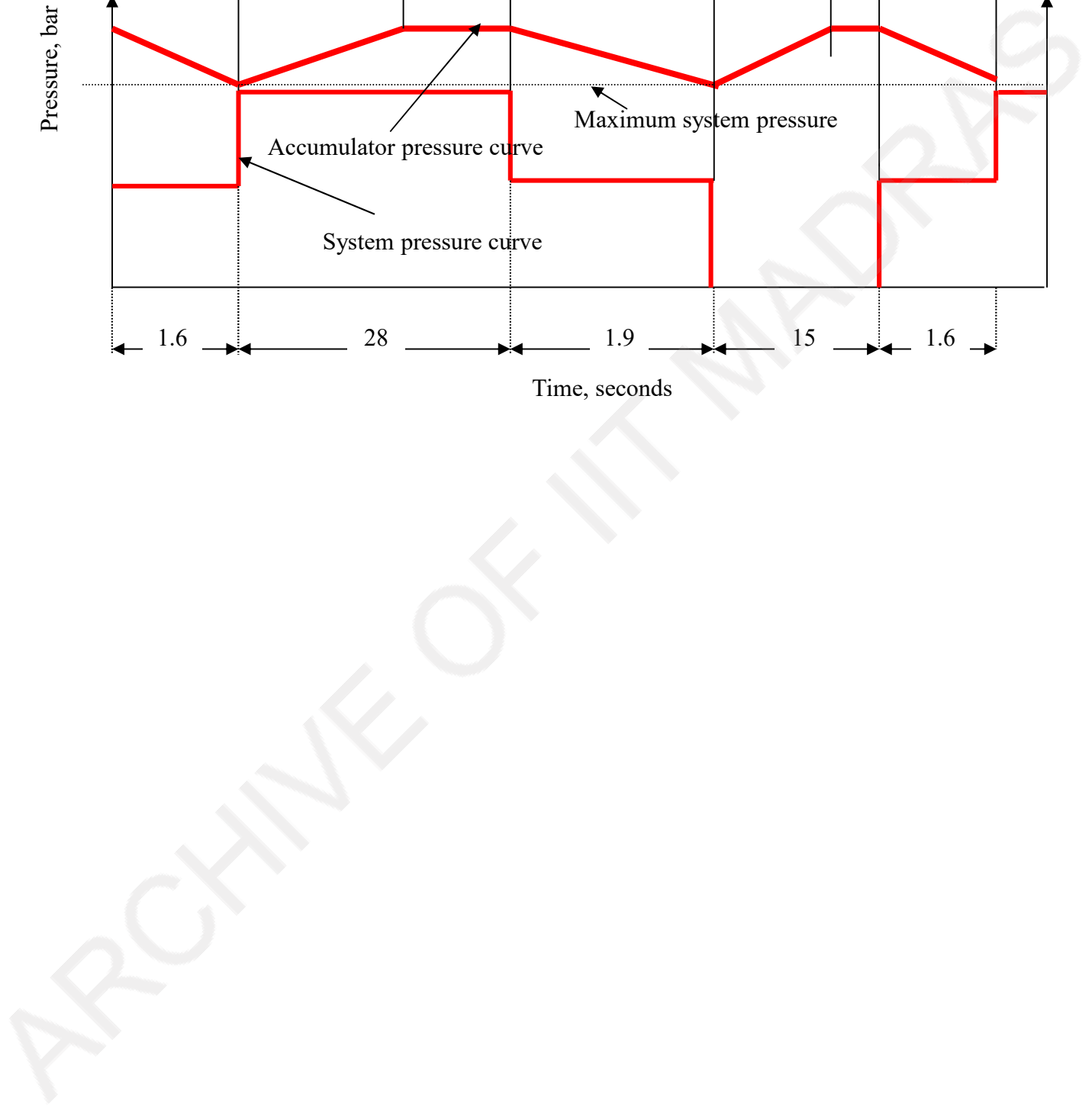
10 marks

Fig. A

Fig. B

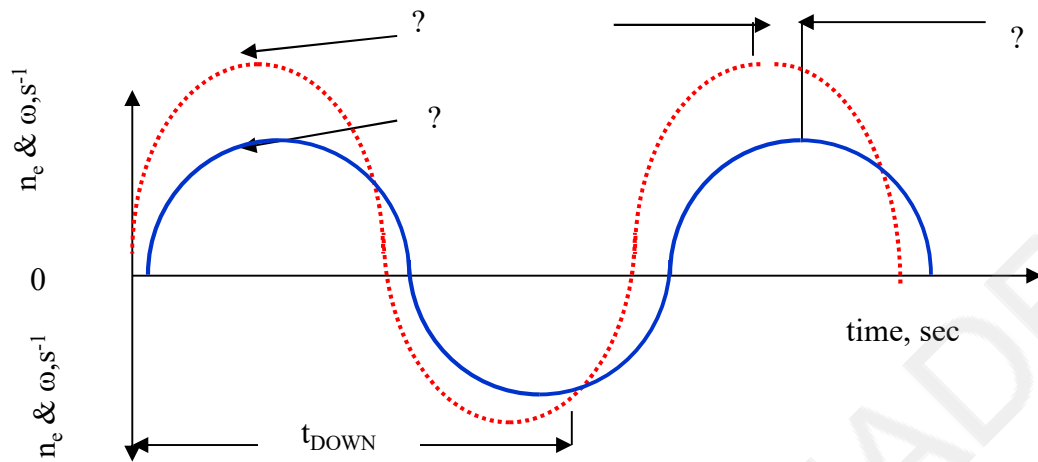Q.11. Shown below a hydraulic pressure cycle and that of accumulator. Mark the gaps (zones) related to accumulator.
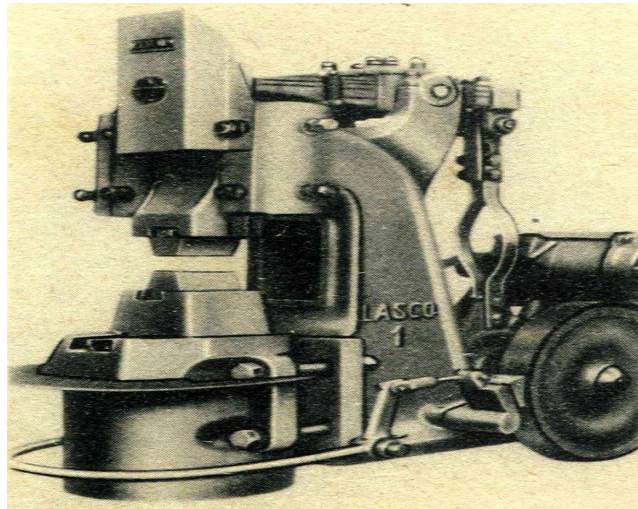
10 marks

Q. 12. Figure below corresponds to the solution of the pneumatic hammer. Mark the missing quantities and what is the time you will take for calculating maximum velocity?.

10 marks

Q. 13. What is the simple method of calculating the velocity components of this spring hammer?

Q. 14. Two types of primary hydraulic forging presses are shown below. What are the special merits and demerits of "b" with respect to "a"?