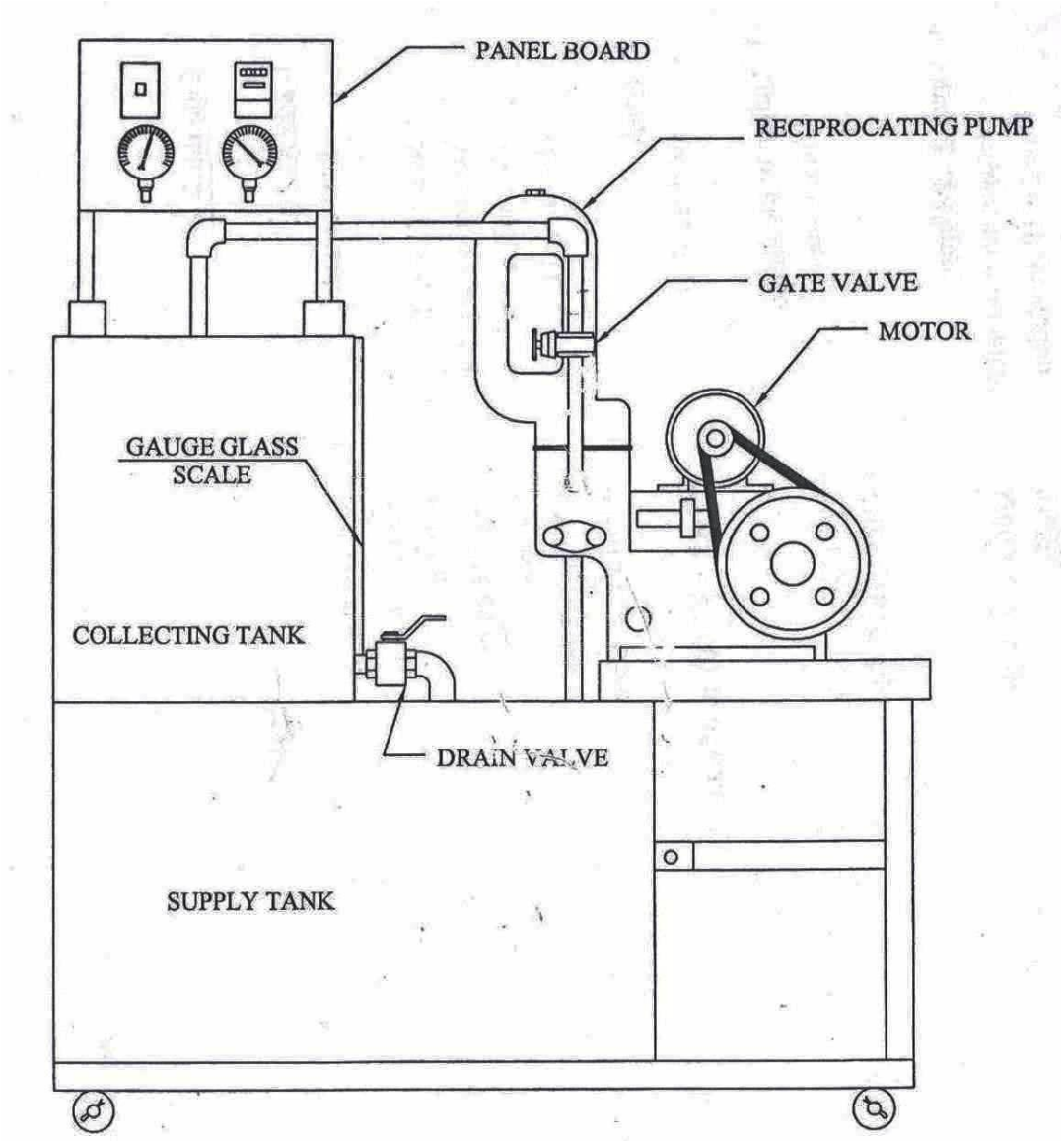

RECIPROCATING PUMP TEST RIG

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CONDUCTING EXPERIMENTS AND DRAWING THE CHARACTERISTICS CURVES OF RECIPROCATING PUMP

AIM:

To study the performance characteristics of a reciprocating pump and to determine the characteristic with maximum efficiency.

APPARATUS REQUIRED:

1. Reciprocating pump
2. Meter scale
3. Stop watch

FORMULAE:

1. ACTUAL DISCHARGE:

$$Q_{act} = A \times y / t \quad (m^3 / s)$$

Where:

A = Area of the collecting tank (m^2)

y = 10 cm rise of water level in the collecting tank

t = Time taken for 10 cm rise of water level in collecting tank

2. TOTAL HEAD:

$$H = Hd + Hs + Z$$

Where:

Hd = Discharge head; Hd = Pd x 10, m

Hs = Suction head; Pd = Ps x 0.0136, m

Z = Datum head, m

Pd = Pressure gauge reading, kg / cm^2

Ps = Suction pressure gauge reading, mm of Hg

3. INPUT POWER:

$$P_i = (3600 \times N) / (E \times T) \quad (Kw)$$

Where,

N = Number of revolutions of energy meter disc

E = Energy meter constant (rev / Kw hr)

T = time taken for 'N' revolutions (seconds)

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S.No	Delivery pressure reading Pd kg / cm^2	Suction pressure reading Ps mm of Hg	Delivery head Hd = Pdx10.0	Suction head Hs = Ps x 0.0136	Datum head Z m	Total head H	Time taken for 10 cm of rise of water in tank t sec	Actual discharge Q_{act} m^3/s	Time taken for N rev of energy meter disc t sec	Input power Pi kw	Output power Po kw	η %
											Mean =	

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4. **OUTPUT POWER:**

$$Po = \rho \times g \times Q \times H / 1000 \quad (Kw)$$

Where,

ρ = Density of water (kg / m^3)

g = Acceleration due to gravity (m / s^2)

H = Total head of water (m)

Q = Discharge (m^3 / sec)

5. EFFICIENCY:

$$\eta_o = (\text{Output power po / input power pi}) \times 100\ \%$$

Where,

Po = Output power KW

Pi = Input power KW

PROCEDURE:

1. Close the delivery valve and switch on the unit
2. Open the delivery valve and maintain the required delivery head
3. Note down the reading and note the corresponding suction head reading
4. Close the drain valve and note down the time taken for 10 cm rise of water level in collecting tank
5. Measure the area of collecting tank
6. For different delivery tubes, repeat the experiment
7. For every set reading note down the time taken for 5 revolutions of energy meter disc.

GRAPHS:

1. Actual discharge Vs Total head
2. Actual discharge Vs Efficiency
3. Actual discharge Vs Input power
4. Actual discharge Vs Output power

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MODEL CALCULATION:

RESULT:

The performance characteristic of the reciprocating pump is studied and the efficiency is calculated …… %

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