their note to balance. July 3rd. Shipped R. Manning $3,000 worth of merchandise, one half from my storehouse, balance bought from J. Heal on my note at 30 days. 4th. Received from R. Manning his second consignment, consisting of 100 bbls. flour, invoiced at $8 per bbl. ; paid freight and drayage on same by cheque, $180. 6th. Sold R. Dunn 100 bbls. flour, from R. Manning's consignment No. 2, at $12.60 per bbl. ; received in payment a cheque on Bank for $300, an order on A. B. for $60, cash for balance. 10th. Closed R. Manning's consignment (No. 2), and rendered him an account sales of the same ; our charges for storages, &c., $20 ; commission, $40 ; R. Manning's net proceeds, remitted in cash, $1,020. 16th. Received account sales of merchandise shipped R. Manning on the 3rd inst., accompanied by a cheque for amount of our net proceeds, $3,500, which I deposited in Bank. Merchandise on hand, as per inventory, $3,250.00.

5. Write out the Business Forms required in the preceding question for the 1st and 2nd of the month.

NATURAL PHILOSOPHY.

Time—Three Hours.

1. Enunciate the Triangle of Forces, and by means of it deduce the Principle of Moments.

Find the resultant of three forces acting in consecutive directions round a triangle, and represented respectively by its sides.

2. A lever without weight is c feet in length, and from its end a weight is supported by two strings in length a and b feet respectively. Find the ratio of the lengths of the arms, if there be equilibrium when the lever is horizontal.

3. A piece of uniform wire is bent into the form of a triangle ; find the position of its centre of gravity.

4. State Newton's Laws of Motion. What is the meaning of "Motion" in the First Law ? What is its meaning in the Second Law, and how is it measured ? What is the meaning of "Action" in the Third Law, and how is it measured ?

Deduce the parallelogram of Forces from the Second Law of Motion.

5. A swing gate weighing 96 lbs. rests on a hinge A, and against a frictionless turning-point B, four feet directly beneath A. Find the strain on the hinge and the pressure on the point, given that the centre of gravity of the gate is 4 feet 7 inches from AB.

What will be the strain and the pressure if a boy weighing 108 lbs. stands on the gate 6 ft. from AB?

6. The radii of the fore and hind wheels of a coach are r and R respectively, and d is the distance between their centres. A particle driven from the highest point of the hind wheel falls on the highest point of the fore wheel. Find the velocity of the coach.

7. A heavy sphere of density 6.8 is placed in a vertical cylinder filled with atmospheric air. Find the density of the air in the cylinder when the sphere, which exactly fits the cylinder, is in a position of permanent rest. Height of the barometer 30 inches, density of mercury 13.6.

8. A body weighs w in air by a common scale with brass weights ; will it weigh more or less by the same in a vacuum ?

PHYSICS.

Time—Two Hours.

1. Describe fully some one experiment by which the mechanical equivalent of heat has been ascertained, and state approximately the numerical result.

It is found that equal weights of water and copper require respectively 100 units and 9 units to raise their temperature by the same amount : find from this fact how much a mass of copper would be raised in temperature by striking a hard non-conducting surface after a fall of 36 feet.

2. How may the quantity of heat in a body be measured ?

To what height would a weight of 193 lbs. be raised by cooling 5 lbs. of boiling water, the temperature of the air being 62 F ?

3. What is the cause of the difference between the specific heat of air at constant pressure and at constant volume ?

4. If a luminous point be seen after reflection at a plane mirror by an eye in a given position, there is a certain space within which the image of the point can never