

NEW STANDARD ACADEMY

Marks: 80

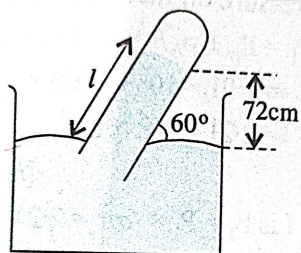
Date : 10-11-25

CLASS : 11TH

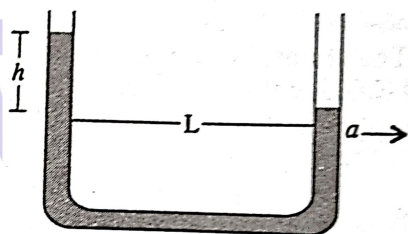
Time: 3 hours.

PHYSICS

1. The atmospheric pressure at a place is 1 atm. Express it in (a) C.G.S. units (b) S.I. units.
2. Atmospheric pressure at a place is 72 cm of mercury column. If the barometer tube is inclined at an angle of 60° with the horizontal, find the length of mercury column in the tube.



3. What is the pressure on a swimmer 10 m below the surface of lake?
4. A U-tube containing a liquid is accelerated horizontally with a constant acceleration a . The separation between the two vertical arms of the tube is 'L'. Find the difference in the heights of the liquid in the two arms.



5. Two syringes of different cross-sections (without needles) filled with water are connected with a tightly fitted rubber tube filled with water. Diameters of smaller piston and larger piston are 1.0 cm and 3.0 cm respectively. (a) Find the force exerted on the larger piston when a force of 10 N is applied to the smaller piston. (b) If the smaller piston is pushed in through 6.0 cm, how much does the larger piston move out?
6. A hydraulic lift has two pistons A and B of areas of cross-section A_1 and A_2 . Forces F_1 and F_2 are acting on them respectively. If the force on the piston A is doubled and area of cross-section of piston B is reduced to one third, find the new force on piston B. Given that original force on it was 30 N.

7. Two pistons of hydraulic press have diameters of 30.0 cm and 2.5 cm. Find the force exerted by the longer piston when 50 kg wt is placed on the smaller piston. If the stroke of the smaller piston is 4 cm, find the distance through which the longer piston would move after 10 strokes.
8. The pressure exerted by a cubical block of each side 50 cm on the ground surface is 10 N m^{-2} . Find the weight of the block.
9. The pressure of a gas contained in a cylinder with a movable piston is 750 Pa. The area of the piston is 0.5 m^2 . Calculate the force that is exerted on the piston.
10. The elephant weighs 20,000 N. Area of one foot is 1000 cm^2 . How much pressure would it exert on the ground? Assume that area of each of the four feet is equal.

CHEMISTRY

1. At constant temperature, dissociation of 0.01 M CH_3COOH solution is 4%. Calculate the dissociation constant of acetic acid.
2. Calculate the pH of (a) 10^{-5} N HCl , (b) $0.001 \text{ N H}_2\text{SO}_4$ and (c) $4 \times 10^{-4} \text{ N NaOH}$ solution at 25°C .
3. 6 gram of acetic acid are present in a 200 litre aqueous solution. If the acid is 75% dissociated at this concentration, what is the pH of the solution?
4. Calculate the pH of 0.08 M solution of hypochlorous acid (HOCl). The ionisation constant is 2.5×10^{-5} . Determine per cent dissociation of HOCl .
5. Calculate the degree of hydrolysis, hydrolysis constant and H^+ of 0.10 M NH_4Cl solution. (Given that: $K_b = 1.8 \times 10^{-5}$)
6. Calculate the pH of 1 M ammonium formate solution $\text{pK}_a = 3.8$, $\text{pK}_b = 4.8$ and $\text{pK}_w = 14$.
7. Calculate the pH of a buffer solution obtained by mixing 1.5 mole of sodium acetate and 0.09 mole of CH_3COOH , $K_a = 1.8 \times 10^{-5}$.
8. Calculate the pH of a solution formed on mixing 0.2 M NH_4Cl and 0.1 M NH_3 . The pK_b of ammonia solution is 4.75.
9. Solubility of AgCl in water is $1.06 \times 10^{-5} \text{ mol/litre}$ at 298 K. Calculate its K_{sp} .
10. Solubility constant, of $\text{Mg}(\text{OH})_2$ is

8.9×10^{-12} . Calculate its solubility in gram/litre. [$\text{Mg}(\text{OH})_2 = 58$]

BIOLOGY

1. Why is O negative blood called a universal donor and AB positive a universal recipient?
2. Explain the conduction system of the human heart (SA node, AV node, Bundle of His, Purkinje fibers).
3. Why is the SA node called the pacemaker of the heart?
4. Explain the process of an ECG recording and what each wave represents.
5. What is heart failure? How is it different from cardiac arrest?
6. How blood coagulation take place?
7. What is the double circulation give the importance
8. Give the 4 difference between artery and vein
9. What is the lymphatic system explain?
10. Draw the labelled diagram of internal heart.

MATHS

1. Find the equation of the circle with centre (2,2) and which passed through the point (4,5).
2. If two diameters of a circle lie along the lines $x-y-9=0$ and $x-2y-7=0$ and the area of the circle is 38.5 sq units find its equation.
3. Find the equation of circle which pass through the point (3,6) and touch both the axes.
4. Find the equation of the circle which passed through two points on y axis which are at a distance of 3 units from origin and has radius 5 units.
5. Find the the center the radius of the circle $x^2 + y^2 + 8x + 10y - 12 = 0$.
6. A circle of radius 2 units lies in the first quadrant and touches both the coordinate axes. Find the equation of the circle with centre at C(6, 5) and touching the above circle externally.
7. Find the equation of the circle which passes through the point (2, 4) and centre at the intersection of the lines $x - y = 4$ and $2x + 3y + 7 = 0$.
8. One end of a diameter of the circle $x^2 + y^2 - 3x + 5y - 4 = 0$ is (2, 1) find the coordinates of the other end.

9. Find the equation of the circle which passes through the centre of the circle $x^2 + y^2 + 8x + 10y + 7 = 0$ and is concentric with the circle $2x^2 + 2y^2 - 8x - 12y - 9 = 0$
10. Find the equation of the circle which is concentric with the circle $x^2 + y^2 - 4x + 6y - 3 = 0$
(i) circumference (ii) area.